



TECHNICAL DATA

MODEL VNR WIDE RANGE PROPORTIONER

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

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

Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. GENERAL DESCRIPTION

The wide range proportioner accurately proportions foam concentrate into a water stream over a wide range of system flow rates and 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 specific foam concentrate(s), a foam storage tank, a concentrate control valve and foam discharge devices.

The discharge devices most commonly used are closed head sprinklers but nozzles, monitors, grate nozzles, foam makers and foam chambers can also be used. 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.

Intended for use primarily in wet pipe and preaction type systems, 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 sprinkler heads have activated.

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

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



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

Other International approval certificates may be available upon request

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 Materials

Table 3.2.1 - 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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3.3 Standard design specification

Table 3.3.1 - Standard design specifications

Design pressure	250 PSI / 17.2 bar (1.7MPa)
Test pressure	500 PSI / 34.4 bar (3.4Mpa)
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 (0.2MPa)
Maximum operating inlet pressure	175 PSI / 12.1 bar (1.2MPa)
Proportioning range	See table 3.4.1

3.4 Ordering information

1. This wide range proportioner is for use with Viking ARC3X3S foam concentrate.
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 3.4.1**. The required higher flow rate should be lower than the maximum flow rate shown in **table 3.4.1**. If more than one size of ratio controller is suitable then size selection can then be based on the size of the riser or supply pipework into which the ratio controller will be installed.
3. After selecting the size, check the appropriate graph in **section 7.2.1** 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 3.4.1 - Ordering information

Connection		Foam type ²	Part number	Foam inlet orifice size ⁴		FM approved			
Body wafer ³	Foam inlet grooved			Inch	mm	Minimum flow rate ¹		Maximum flow rate ¹	
						GPM	l/min	GPM	l/min
6" (150 mm)	2.5" 76.1 mm	Viking ARC 3X3S	VNR066J	0.728	18.5	50	189	1,800	6,813
6" (150 mm)	2.5" 73.0 mm	Viking ARC 3X3S	VNR063J	0.728	18.5	50	189	1,800	6,813
8" (200 mm)	2.5" 76.1 mm	Viking ARC 3X3S	VNR086J	0.945	24	50	189	3,000	11,355
8" (200 mm)	2.5" 73.0 mm	Viking ARC 3X3S	VNR083J	0.945	24	50	189	3,000	11,355

NOTES:

- ¹ Please refer to graphs in section 7.2 for specific flow rate parameters.
- ² Foam complies with the requirements of the EPA 2010/2015 PFOA Stewardship Program.
- ³ Can be installed between ANSI or PN16 flanges
- ⁴ 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.

EMEA: Viking S.A., Z.I. Haneboesch, L-4562 Differdange / Nieder Korn, 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



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6. PRODUCT VARIANTS

6.1 Options

- Pre-assembled with bladder tank and water/foam pipe work

6.2 Dimensions

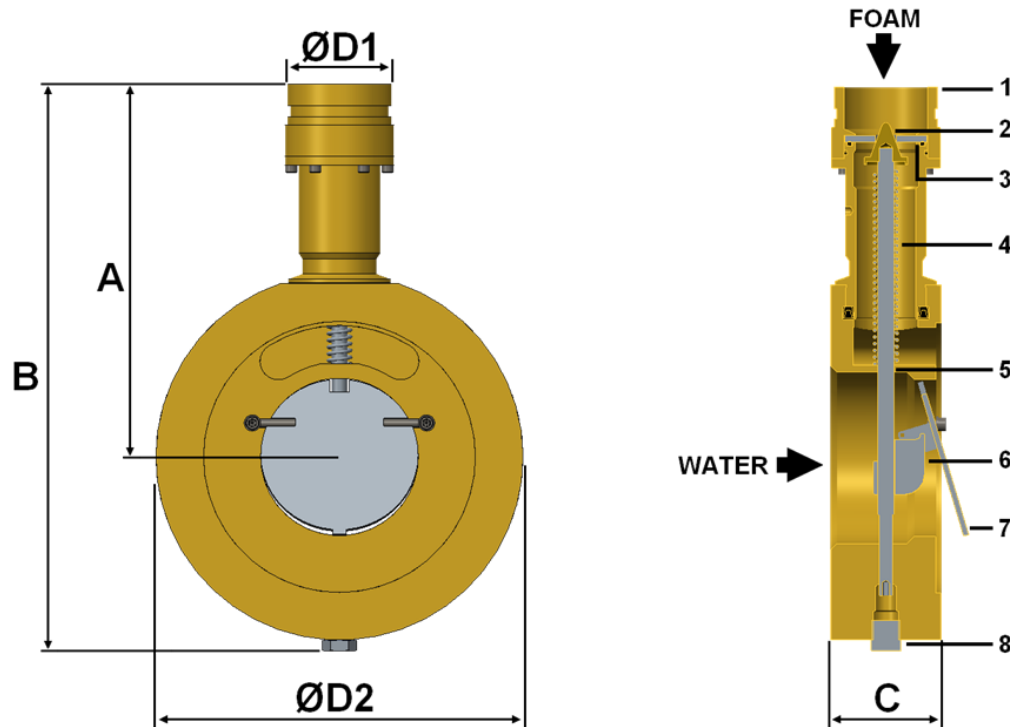


Table 6.2.1 - Wide range proportioner components

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

Table 6.2.2 – Weight and dimension data

Nominal size (D2)	Approximate weight		Approximate dimensions							
			A		B		C		Foam inlet (D1)	
	LBS	KGs	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



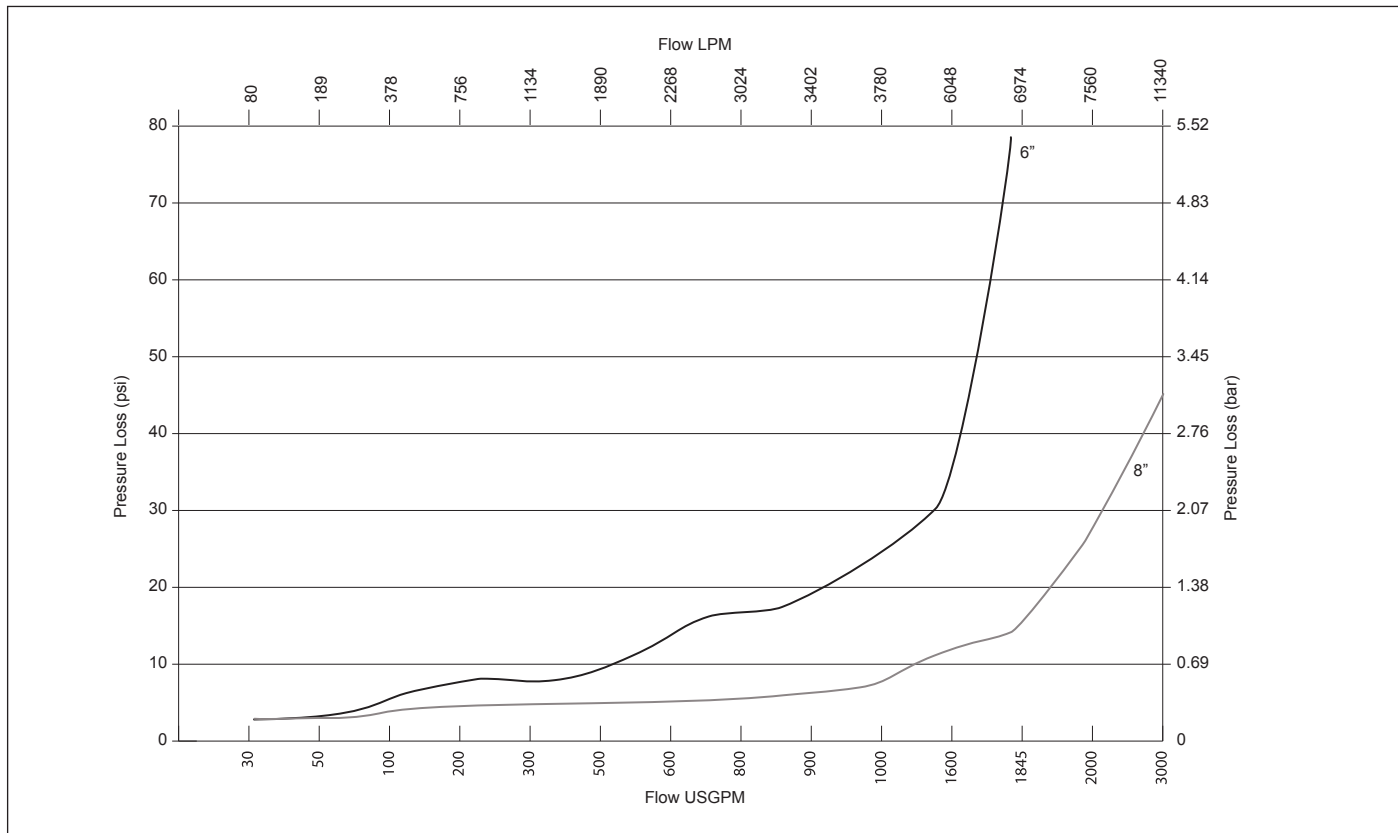
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7. PERFORMANCE DATA

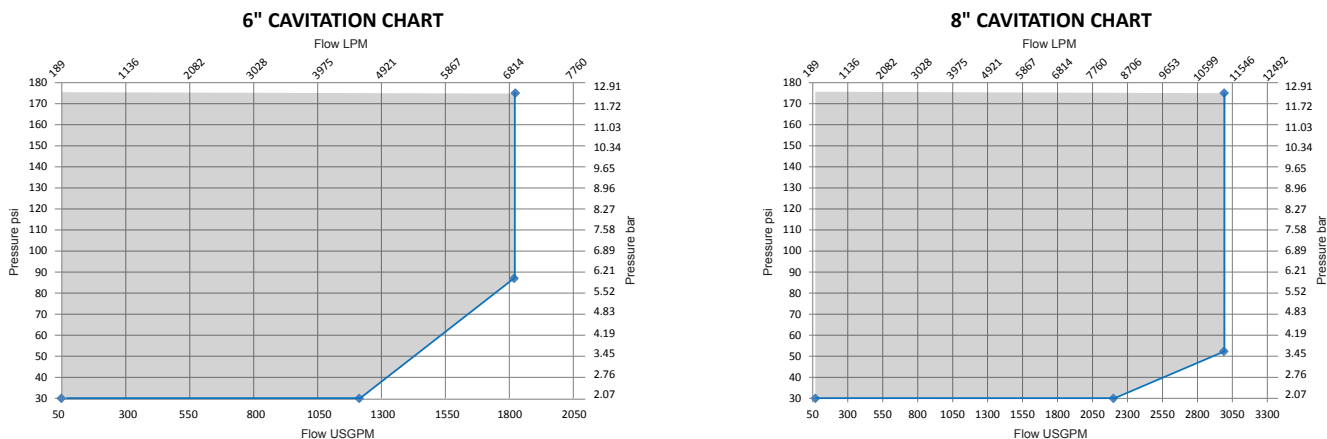
7.1 Friction loss vs foam solution flow



Graph 7.1.1 Friction loss vs foam solution flow

7.2 Inlet pressure vs foam solution flow

Wide range proportioner 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. 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

The wide range proportioner must not be installed in dry pipework. If used in preaction, dry or deluge type systems, the wide range proportioner must be installed in the wet pipework upstream of the system control 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 removable section of pipe should be installed between the Concentrate Control Valve and wide range proportioner foam inlet to allow the flushing of foam concentrate after system activation.
- g) A check valve must be placed on the foam concentrate line and a concentrate control valve is highly recommended.
- h) The ideal location for the wide range proportioner is level with or below the top tank discharge point and within 3 feet (1m) of the tank.
- i) The wide range proportioner can be placed further from the bladder tank, as long as the pressure of the foam concentrate at the foam inlet of the ratio controller is within 2 PSI of the incoming water pressure at low flow rates and 12 PSI at maximum flow rates.
- 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:

WARNING

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

9. 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.



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Due to the viscosity of some foam concentrates, the low flow rating can be high when using traditional ratio controller style proportioners which makes them unsuitable for closed head wet or preaction sprinkler systems. 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 flowrate. 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 flowrate increases. At larger water flowrates, the water clapper (7) and the orifice restriction (2) are fully open. (Numbers as per per **Fig 6.2.1.**)

10. GUARANTEE

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

11. INSPECTION, TESTS AND MAINTENANCE

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.

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.

12. DISPOSAL



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

13. ACCESSORIES AND SPARE PARTS

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

14. DECLARATION OF CONFORMITY

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