



TECHNICAL DATA

MODEL VGH10000 & VGH2000 ASPIRATED HIGH EXPANSION GENERATORS

Viking S.A., 21, Zone Industrielle Haneboesch, L-4562 Differdange / Niederkorn, Luxembourg
Telephone: 36 57 57 1 | Email: vikinglux@viking-emea.com | Web: www.viking-emea.com

1. GENERAL DESCRIPTION

Aspirated-type high expansion foam generators (HEGs) are designed to expand foam into a large volume of stable bubbles. Expansion rates up to 856:1 are possible due to jet streams of foam solution that aspirate a sufficient amount of air, which is then entrained onto perforated screens to produce high expansion foam. This high performance is achieved without any external power source or moving parts, which gives advantages for installation and reduces ongoing maintenance requirements.

High expansion generators are usually part of a fixed deluge or flow control system and shall be used in combination with a suitable foam proportioning system. Foam concentrates developed and tested to work in high expansion systems shall be used. It is critical to select a combination of generator and foam concentrate that have been developed and tested together to ensure critical parameters are achieved such as expansion, submergence height and fire performance.

High expansion foam systems are commonly used on hazards such as ordinary combustibles, flammable and combustible liquids or liquefied natural gas (LNG) for example. Such hazards are commonly found in applications such as aircraft hangars, warehouses, LNG facilities, cable tunnels, underground storage or recycling plants. High expansion foam systems should be brought into operation very quickly after the onset of fire so suitable detection and actuation systems should be provided.

For further information, please contact the appropriate sales office in **Section 5 - Availability**, or refer to the technical documentation. The contents of this publication are subject to modifications without notice.

2. LISTINGS AND APPROVALS

The high expansion generator is UL Listed (UL139) as part of a fire extinguishing system combining designated foam concentrate, proportioning devices and bladder tanks.

Listed system components can be found at
<https://iq.ulprospector.com>



UL Listed GLHZ.EX28418 – Generators, High expansion Foam

UL Listed GLKX.EX27844 – Liquid Concentrates, High expansion Foam

Tested in accordance with EN13565-1

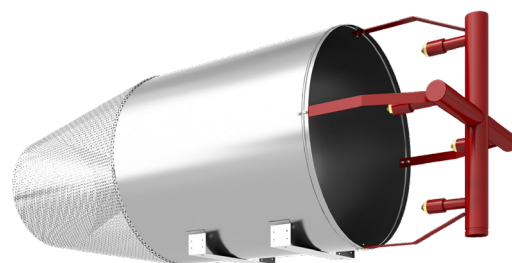


Fig 1.1 Model VGH10000 & VGH2000 Single

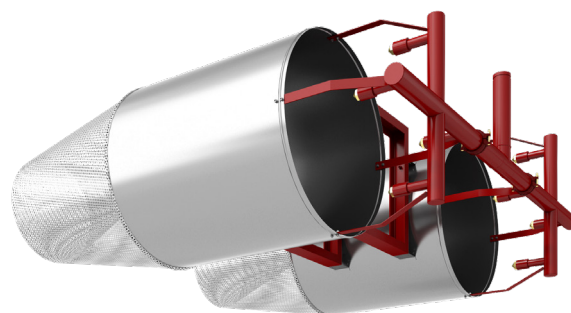


Fig 1.2 Model VGH10000 Paired

Images for illustration purposes only



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3. TECHNICAL DATA

3.1 Construction features

- 3 size options for design flexibility
- No moving parts and no external power requirements
- Reduced/no generator maintenance which mitigates associated costs of testing
- Listed with 3% XMAX Synthetic Fluorine Free Foam (SFFF)
- Vertical or horizontal installation
- Stainless steel body with carbon steel or stainless steel flow manifold
- Fixing points included
- Heat and fire resistant to UL139
- Foam expansion up to 1000:1 (depending on model and supply conditions)
- Grooved inlet connection
- Suitable for the protection of Class A and Class B commodities according to recognised design and installation standards such as NFPA11, NFPA409, UFC 4_211 and EN13565-2
- Innovative nozzle design to maximize performance and minimize clogging

3.2 Standard materials

Table 3.2.1 - Standard Materials	
VGH10000 & VGH2000 – High expansion generators	
Generator inlet connection	VGH10000 - 3" (88.9 mm) Grooved (Single and Paired version) VGH2000 - 2.5" (76.1mm) Grooved (Single version)
Nozzle manifold	Carbon steel ASME SA106 Gr.B or stainless steel ASME SA312 Tp.316
Nozzle manifold support arm	SA516 Gr.70
Nozzle	Brass EN CW614N
Body	Stainless steel AISI-430
Support arm nuts, bolts & washers	AISI-304
Finish – Nozzle manifold	RAL3000 Flame red
Finish - Body	Natural

3.3 Standard design specification

Table 3.3.1 - Standard Design Specifications												
Model	Inlet size	Working pressure ¹				Flow range ¹				Nozzle qty	Weight	
		Minimum		Maximum		Minimum		Maximum			lbs	kg
		psi	bar	psi	bar	GPM	LPM	GPM	LPM			
VGH10000 Single	3" ²	40	2.8	103	7.1	77	291	118	447	4	159	72
VGH10000 Paired	3"	40	2.8	103	7.1	154	582	236	894	8	411	186
VGH2000 Single	2.5"	45	3.1	100	6.9	15.5	59	21.1	80	4	130	59

¹ VGH10000 UL Listed from 40-103psi (2.8-7.1bar), VGH2000 Listed at 75psi (5.2bar) only.

² Supply pipework can be a smaller diameter according to hydraulic calculation.

GPM = Gallons per minute, LPM = Litres per minute



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3.4 Ordering information

- 1) Select the required generator model based on project requirements and performance data in **Section 7**.
- 2) The Paired generator consists of two single units combined with a fixing bracket and flow manifold. (see **Fig 3.4.3**)
- 3) Select the flow manifold pipe material

Table 3.4.1 - Ordering Information - EMEA, APAC Territories

Part number	Description	Material / Finish	Finish	Inlet connection	Drawing
VGH10000V	VGH10000 Single HEG	Body - Stainless steel Flow manifold - Carbon steel	Natural Painted RAL3000	3" (88.9 mm) Grooved	Fig 3.4.2
VGH10000VS	VGH10000 Single HEG	Body - Stainless steel Flow manifold - Stainless steel	Natural Painted RAL3000	3" (88.9 mm) Grooved	Fig 3.4.2
VGH10000V-P	VGH10000 Paired HEG ¹	Body - Stainless steel Flow manifold - Carbon steel	Natural Painted RAL3000	3" (88.9 mm) Grooved	Fig 3.4.3
VGH10000VS-P	VGH10000 Paired HEG ¹	Body - Stainless steel Flow manifold - Stainless steel	Natural Painted RAL3000	3" (88.9 mm) Grooved	Fig 3.4.3
VGH2000V	VGH2000 Single HEG	Body - Stainless steel Flow manifold - Carbon steel	Natural Painted RAL3000	2.5" (76.1mm) Grooved	Fig 3.4.4
VGH2000VS	VGH2000 Single HEG	Body - Stainless steel Flow manifold - Stainless steel	Natural Painted RAL3000	2.5" (76.1mm) Grooved	Fig 3.4.4

Note:
¹ The paired high expansion generator (HEG) comes complete with centre bracket and feeding manifold



Fig 3.4.2 VGH10000 Single HEG

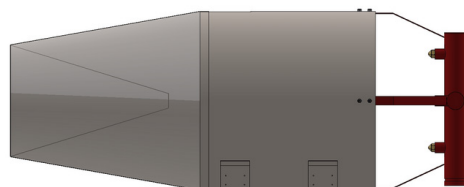


Fig 3.4.4 VGH2000 Single HEG

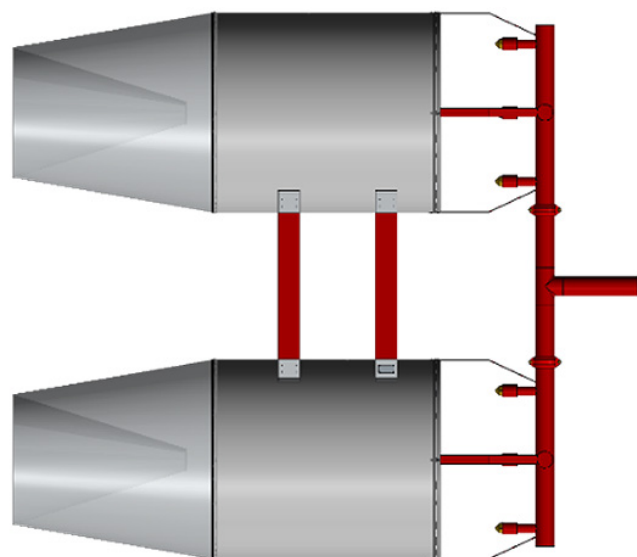


Fig 3.4.3 VGH10000 Paired HEG



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4. SCOPE OF DELIVERY

Ensure that all components are complete and in good condition.

Note: Due to the size of the high expansion generator, logistics planning is recommended at initial order stage.

Included

Unit is supplied with nozzles pre-installed into flow manifold pipework.

Main body supplied with fixing bracket.

To enable manageable handling and reduce logistics costs the flow manifold is shipped inverted inside the generator body.

Site assembly of the body to the flow manifold is required. The paired version requires the 2 single generators to be site assembled to the centre bracket. Nuts, bolts and washers are supplied.

For additional information, please refer to **Operation & Maintenance Manual TM1.3.4.25**.

Not Included

Fixing material, inlet connection coupling & optional strainer.

5. AVAILABILITY

Please contact Viking for further information.

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

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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

This data page is not applicable to the Americas. For Americas, please refer to data page **F_051019**



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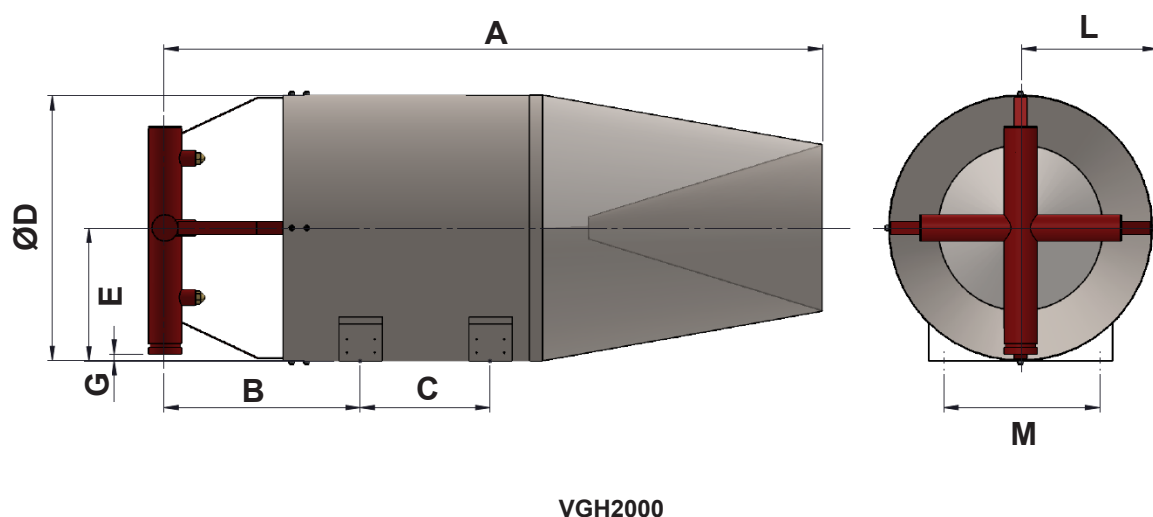
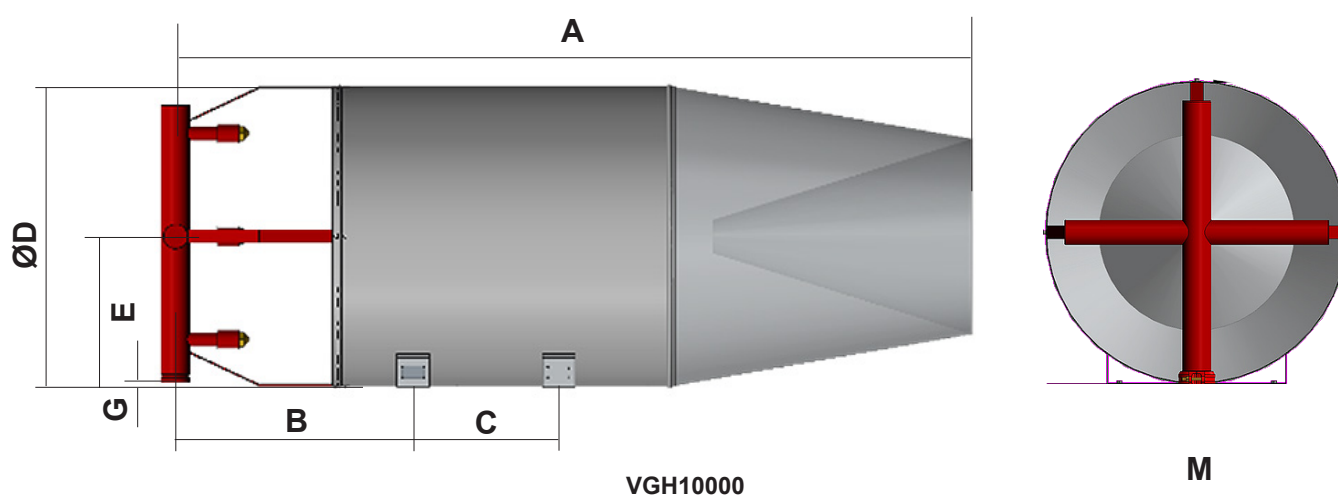
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6. PRODUCT VARIANTS

6.1 Options

- Non-standard connections may be available on request
- Strainer (see section 13)
- Different packaging options according to project volume and location

6.2 Dimensions: Foam generator



6.2.1 - VGH10000 & VGH20000 Single Dimensions



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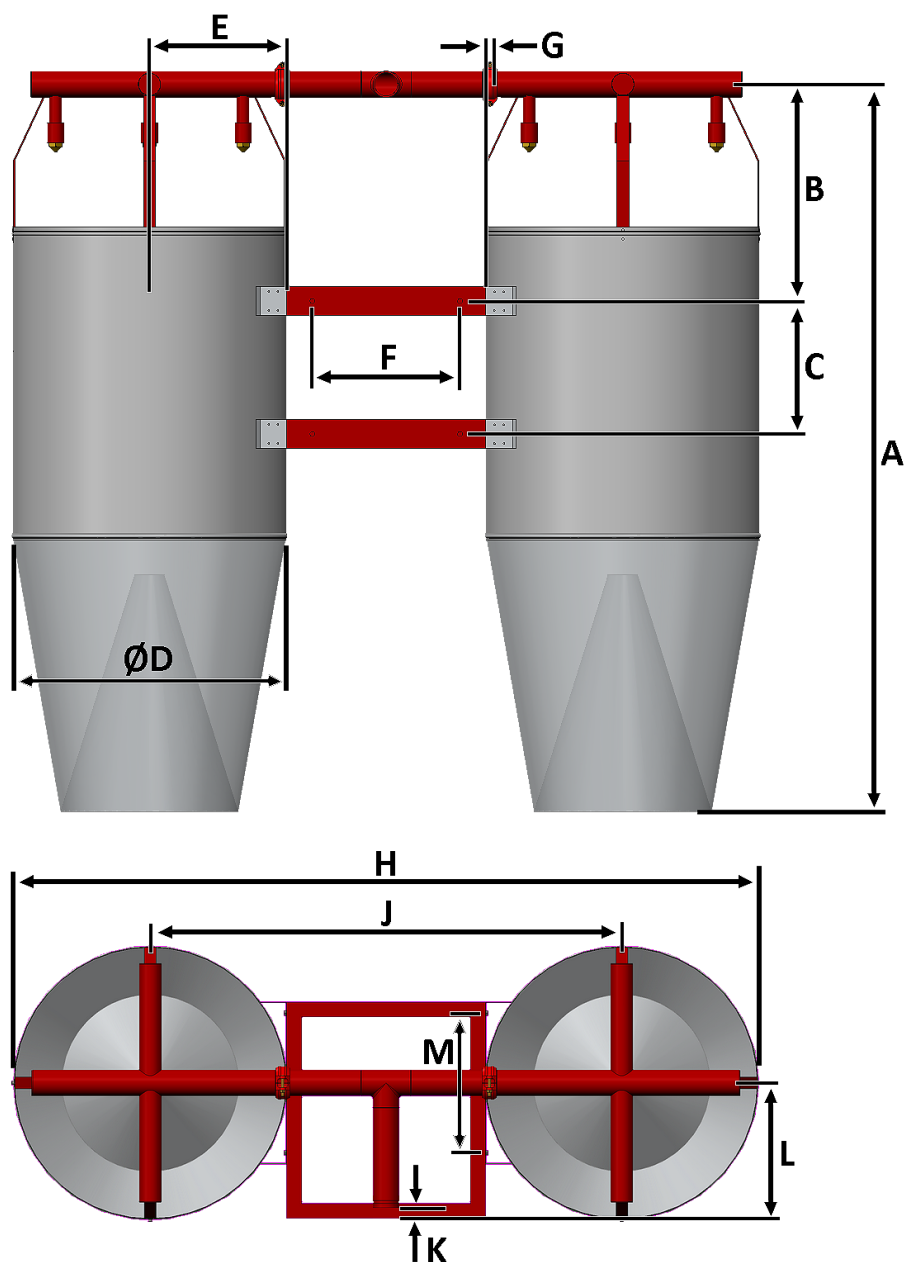


Fig 6.2.2 - VGH10000 Paired Dimensions



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Table 6.2.3 - Generator Dimensions

Dimension	VGH2000 Single		VGH10000 Single		VGH10000 Paired	
	Inches	mm	Inches	mm	Inches	mm
A	60.0	1620	97.0	2,464	97.0	2,464
B	17.0	453	29.0	737	29.0	737
C	11.8	300	17.0	432	17.0	432
ØD	24.0	610	36.4	925	36.4	925
E	12.0	306	18.3	464	18.3	464
F	-	-	-	-	19.7	500
G	0.6	15	0.55	14	0.55	14
H	-	-	-	-	99.4	2,525
J	-	-	-	-	63.0	1,600
K	-	-	-	-	0.59	15
L	12.3	313	18.2	462	18.2	462
M	2.4	360	18.7	475	18.7	475
Nozzle quantity	4		4		8	

7. PERFORMANCE DATA

When planning, installing and commissioning high expansion foam systems it is extremely important to use system components that have been tested together. The link between the high expansion generator and foam concentrate is very important as the resulting data is essential in the design calculations of the system. Foam concentrate should also be compatible with the selected proportioning system and foam storage tank.

NOTICE

The following data is based on the high expansion generators referenced in this data page working together with specific foam concentrates at their tested flow rates and pressures. Actual site conditions may produce different results.

7.1 Submergence height

The height of the building and storage is an important factor to consider during design. The 3% XMAX foam concentrate has been tested at heights in excess of 25 metres. Consideration shall be given in the system design calculation that the higher the submergence height then the higher the correction factor for foam collapse might be. Test data obtained independently of the UL Listing.

Please contact your local Viking office for further information.

7.2 High expansion foam concentrate

The following foam concentrate is Listed and certificated with the VGH series of aspirated high expansion foam generators detailed in this data page.

Table 7.2.1 – High expansion generators approved for use with specific foam concentrates

Foam concentrate ⁷	Type	UL ¹	EN13565-1 ²	EN1568 Certification			
				Part1 ³	Part2 ⁴	Part3 ⁵	Part4 ⁶
Viking 3% XMAX	Synthetic SFFF	yes	yes	yes	yes	yes	no

¹ UL Listed as a system comprising foam concentrate, high expansion generator, proportioning devices and bladder tank

² Tested to the requirements of EN13565-1:2019 including Annex D (Heat and fire resistance test)

³ Part 1 = Medium expansion foam concentrates for surface application to water-immiscible liquids (hydrocarbons)

⁴ Part 2 = High expansion foam concentrates for surface application to water-immiscible liquids (hydrocarbons)

⁵ Part 3 = Low expansion foam concentrates for surface application to water-immiscible liquids (hydrocarbons)

⁶ Part 4 = Low expansion foam concentrates for surface application to water-immiscible liquids (polar solvents)

⁷ Please refer to foam concentrate data page or product sheet for detailed technical information



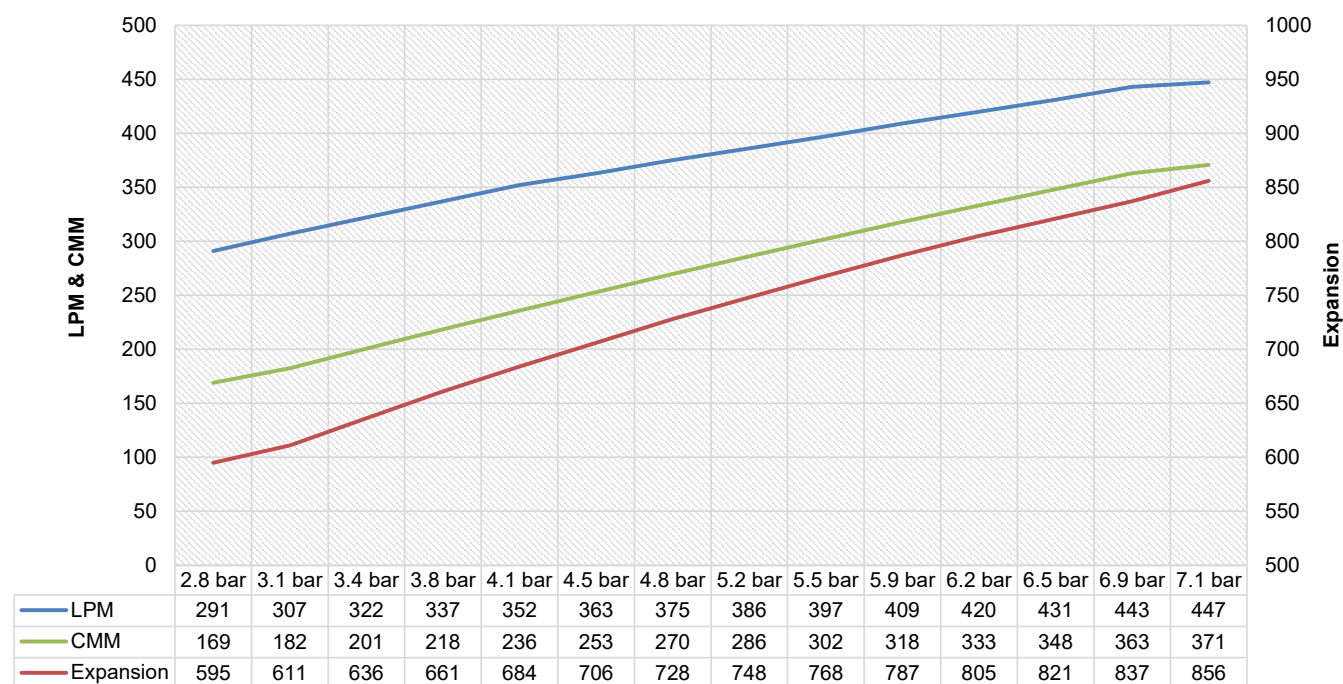
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7.3 Expansion performance

During system design and planning the following performance data will be required to select the most suitable generator size, discharge pressure and generator quantity.



Glossary of terms.

LPM=litres per minute, GPM=gallons per minute, CMM=cubic metres per minute, CFM=cubic feet per minute, Expansion = The ratio of final foam volume compared to the original foam solution volume.

Graph 7.3.1 - VGH10000 Single with Viking 3% XMAX foam

Table 7.3.2 - Performance data - VGH10000 Single with 3% XMAX foam concentrate

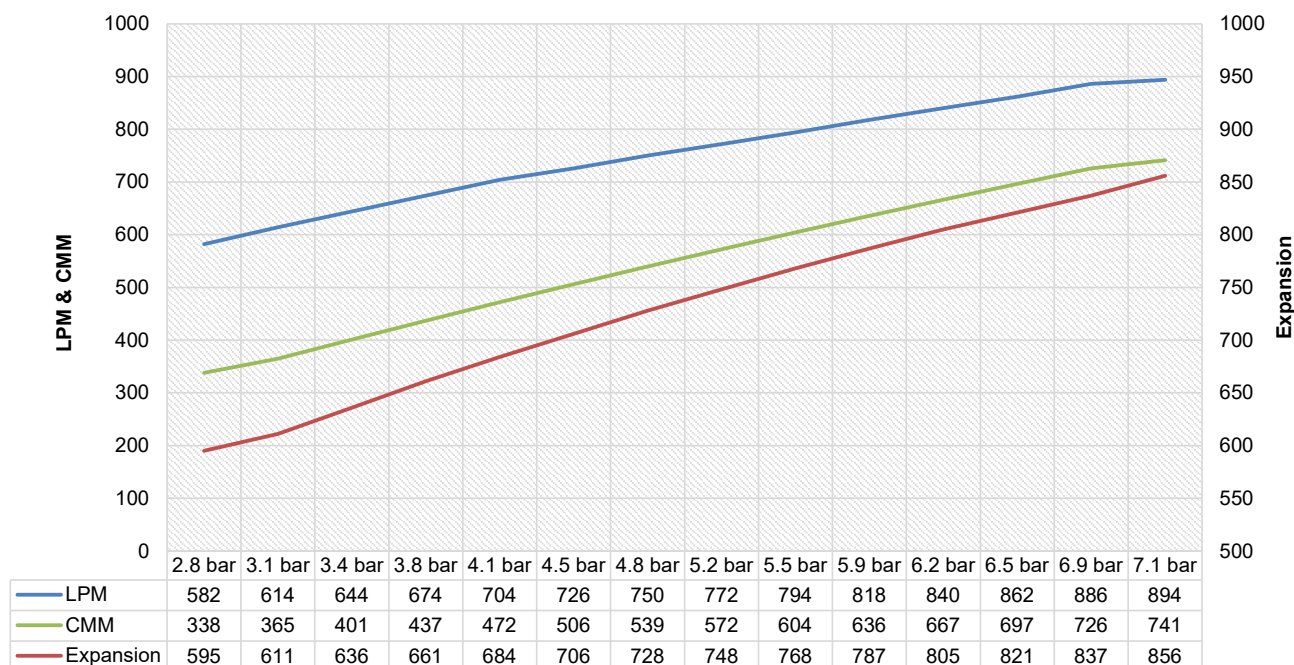
Model	Expansion ratio	Pressure	Solution flow	Volume	Pressure	Solution flow	Volume
		bar	LPM	CMM	psi	GPM	CFM
VGH10000 Single	595	2.8	291	169	40	77	5,970
	611	3.1	307	182	45	81	6,447
	636	3.4	322	201	50	85	7,089
	661	3.8	337	218	55	89	7,718
	684	4.1	352	236	60	93	8,334
	706	4.5	363	253	65	96	8,939
	728	4.8	375	270	70	99	9,531
	748	5.2	386	286	75	102	10,111
	768	5.5	397	302	80	105	10,678
	787	5.9	409	318	85	108	11,233
	805	6.2	420	333	90	111	11,776
	821	6.5	431	348	95	114	12,307
	837	6.9	443	363	100	117	12,825
	856	7.1	447	371	103	118	13,098



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Glossary of terms.

LPM=litres per minute, GPM=gallons per minute, CMM=cubic metres per minute, CFM=cubic feet per minute, Expansion = The ratio of final foam volume compared to the original foam solution volume.

Graph 7.3.3 - VGH10000 Paired with Viking 3% XMAX foam

Table 7.3.4 - Performance data - VGH10000 Paired with 3% XMAX foam concentrate

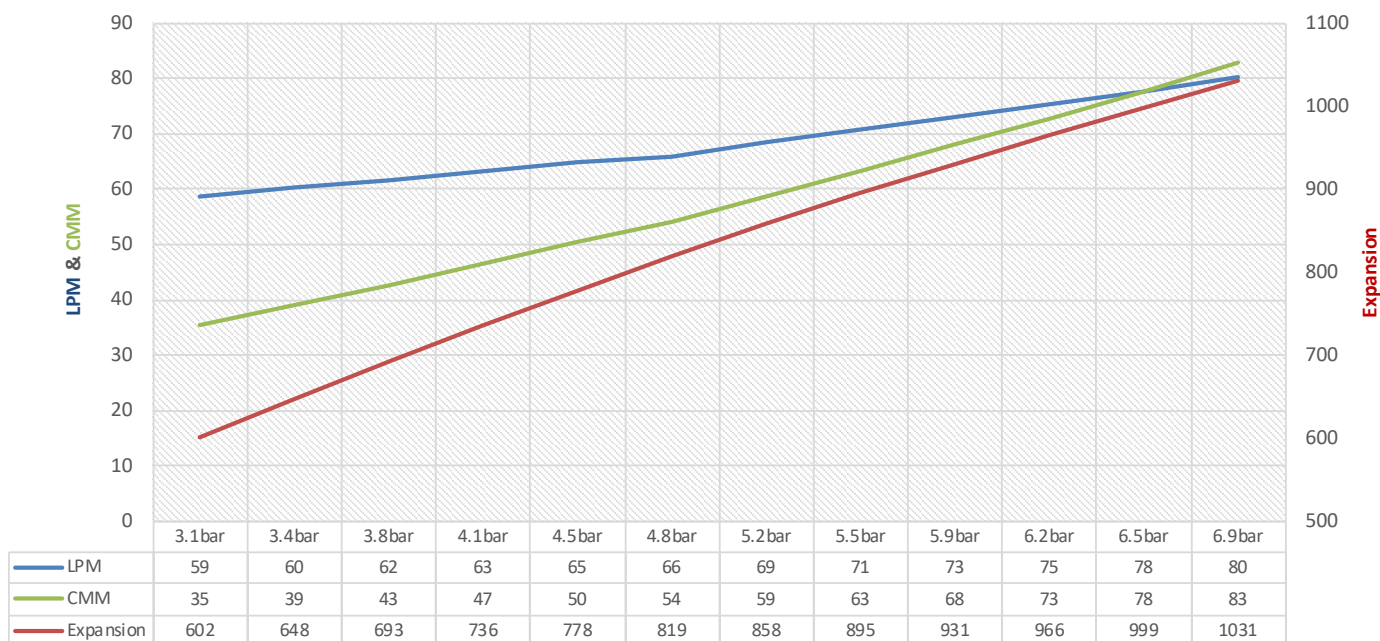
Model	Expansion ratio	Pressure	Solution flow	Volume	Pressure	Solution flow	Volume
		bar	LPM	CMM	psi	GPM	CFM
VGH10000 Paired	595	2.8	582	338	40	154	11,940
	611	3.1	614	365	45	162	12,894
	636	3.4	644	401	50	170	14,178
	661	3.8	674	437	55	178	15,436
	684	4.1	704	472	60	186	16,668
	706	4.5	726	506	65	192	17,878
	728	4.8	750	539	70	198	19,062
	748	5.2	772	572	75	204	20,222
	768	5.5	794	604	80	210	21,356
	787	5.9	818	636	85	216	22,466
	805	6.2	840	667	90	222	23,552
	821	6.5	862	697	95	228	24,614
	837	6.9	886	726	100	234	25,650
	856	7.1	894	741	103	236	26,196



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Graph 7.3.5 - VGH2000 with Viking 3% XMAX foam

Table 7.3.6 - Performance data - VGH2000Single with 3% XMAX foam concentrate							
Model	Expansion ratio	Pressure	Solution flow	Volume	Pressure	Solution flow	Volume
		bar	LPM	CMM	psi	GPM	CFM
VGH2000 Single	602	3.1	59	35	45	15.5	1,248
	648	3.4	60	39	50	15.9	1,378
	693	3.8	62	43	55	16.3	1,511
	736	4.1	63	47	60	16.7	1,644
	778	4.5	65	50	65	17.1	1,779
	819	4.8	66	54	70	17.4	1,910
	858	5.2	69	59	75	18.1	2,077
	895	5.5	71	63	80	18.7	2,238
	931	5.9	73	68	85	19.3	2,403
	966	6.2	75	73	90	19.9	2,571
	999	6.5	78	78	95	20.5	2,739
	1031	6.9	80	83	100	21.2	2,923



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8. INSTALLATION

Refer to appropriate installation standards (i.e. NFPA, EN13565-2 etc.) In addition, the "Authority Having Jurisdiction" (AHJ) may have additional installation requirements that must be followed.

Some key system related requirements are detailed in this section.

For detailed information on the high expansion generators installation, please refer to **Operation & Maintenance Manual TM1.3.4.25**.

8.1 Position

The high expansion generator can be installed in the vertical or horizontal position with a comparable performance.

8.2 Strainer

It is good practice to ensure the water foam solution fed into the nozzle manifold during operation is free of debris. For this reason, we recommend a main system or individual generator strainer with screen size of 4-5 mm.

8.3 Detection

High expansion foam systems should be activated quickly after the onset of fire, so suitable detection and release systems need to be provided, e.g. Viking UniVario Industrial Detectors and/or Viking control and release panels. Detection via heat activated bulbs or links such as sprinklers shall not be used due to the inherent delay of operation.

8.4 Proportioning equipment

The Listed high expansion generator and foam concentrate are approved and compatible with bladder tanks and ratio controllers detailed in the UL system Listing. Other listed and/or approved proportioning technologies such as pump skids with Listed ILBP's or water driven pumps can also be used.

8.5 Single unit connection

Both the single and paired generators have a 3" grooved connection. The single generator configuration can be fed with smaller diameter pipework according to hydraulic calculations.

9. OPERATION

High expansion foam generators are part of a fixed fire protection system incorporating a water supply, system pipework, foam concentrate, foam storage tank and proportioning / admixing system.

In a fire condition, the detection system will activate and sound the warning alarms. The deluge or flow control system(s) will then be opened via a releasing panel working in conjunction with the detection system. It is generally accepted that this delay will be around 30 seconds, giving time for activation before the discharge begins. Once the deluge or flow control valve is in operation, the incoming water supply is mixed with the foam concentrate using a proportioning / admixing system thereby creating foam solution. Once the system pipework has filled and is up to the required pressure – high expansion foam discharge will begin.

The protected area will be filled within a certain submergence time which is defined during the planning/design phase. The high volume of foam is design to suffocate the fire resulting in suppression or extinguishment. The submergence volume should be maintained as per the applicable design rules applied.

Once the fire is extinguished, the high expansion foam can be left to break down naturally or for a quicker cleanup, a fine hose spray can be employed to break down the bubbles. It is recommended to add an "Anti-Foam" compound to the resulting foam solution to assist with the collection and transfer of the foam solution to prevent agitation and re-foaming.



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10. GUARANTEE

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

11. INSPECTION, TESTS AND MAINTENANCE

Refer to respective requirements of NFPA and/or EN13565-2. In addition, the "Authority Having Jurisdiction" (AHJ) may have additional maintenance, testing and inspection requirements that must be followed.

For manufacturer's additional recommendations and requirements, please refer to **Operation & Maintenance Manual TM1.3.1.25**.

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

12. DISPOSAL



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

13. ACCESSORIES AND SPARE PARTS

Table 13.1.1 - Accessories

Part number	Description	Size
F-DEFOAM/SB/25	Anti-Foam	25 litre
F-DEFOAM/SB/200	Anti-Foam	200 litre
F-DEFOAM/SB/1000	Anti-Foam	1,000 litre
YSG-0300	Generator grooved strainer	3" (88.9 mm) grooved
YSG-0250-076	Generator grooved strainer	2.5" (76.1 mm) grooved

14. DECLARATION OF CONFORMITY

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