TECHNICAL DATA

Foam Maker

Discharge Devices | Model KLF

1 General description

Foam makers are in-line fixed foam aspirating devices. They are used in low expansion foam discharge applications to protect tank farm dikes and other low-level discharge applications.
Foam makers are used in the dike foam delivery system as referred to in design standards such as NFPA 11. Foam makers are part of a low-level foam delivery system that also incorporates foam storage bladder tanks, proportioning devices and suitable foam concentrates.
Foam solution can also be supplied by foam pumping systems or in semi-fixed systems supplied from a portable supply such as a fire brigade appliance.

This technical data is intended for trained experts.

Technical data can be found on the KCA website at http://www.kcantincendi.com.

The website may include a more recent edition of this technical data sheet.

For further information, please contact KCA or refer to the technical documentation.

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



Images for illustrative purposes only.

2 Listings and approvals

The foam maker is FM Approved and UL Listed as part of a fire extinguishing system combining designated foam concentrates, proportioning devices and bladder tanks. Approved and Listed system components can be found at www.approvalguide.com and https://iq.ulprospector.com.

- FM Approved - Low Expansion Foam Systems (FM5130)
- UL Listing - GFUT.EX16314

NOTICE

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 recognised standards. Not all configurations are available. Please consult technical data and/or the Approval/Listing for usage requirements

3 Technical data

3.1 Construction features

- Available in 1.5", 2.5", 3", 4" sizes to cover a wide range of design configurations
- Painted carbon steel or painted stainless steel for increased corrosion protection
- Available with ANSI 150 or PN16 flanges
- Available with foam pourer
- Vertical or horizontal installation
- Specifically FM Approved and UL Listed with Fomtec foam concentrates

3.2 Standard materials

	Carbon steel version	Stainless steel version
Body	Carbon steel ASME SA-106 Gr.B/EN P265GH	Stainless steel ASME SA-182 F316 / EN 1.4401 AISI-316
Flanges (ANSI 150 or PN16)	Carbon steel ASME SA-105 / EN P245GH	Stainless steel ASME SA-182 F316 / EN 1.4401 AISI-316
Calibrated orifice material	Stainless steel UNS-S30400	Stainless steel ASME SA-182 F316 / EN 1.4401 AISI-316
Paint	Epoxy zinc-rich primer with aliphatic polyurethane finish	Epoxy zinc rich primer with aliphatic polyurethane finish
Standard colour	RAL3000 Red	RAL3000 Red
Inlet flange gasket	Composite	Composite

Table 3.2.1 - Standard materials

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3.3 Standard design specifications

Model	Inlet size	Working pressure[1]				Flow range				Orifice range		Approval[2,3]
		Minimum		Maximum		Minimum		Maximum				
		PSI	bar	PSI	bar	GPM	LPM	GPM	LPM	inches	mm	
KLF	1-1/2"	30	2.07	125	8.62	6	24	83	313	0.250 - 0.635	6.4 - 16.1	FM/UL
	2-1/2"	30	2.07	125	8.62	26	98	226	855	0.510 - 1.050	13.0 - 26.7	FM/UL
	3"	30	2.07	125	8.62	82	312	480	1818	0.906 - 1.531	23.0 - 33.9	FM/UL
	4"	30	2.07	125	8.62	131	496	740	2800	1.142 - 1.900	29.0 - 48.3	FM/UL

Footnotes:
1 Working pressure at the inlet orifice of the foam maker.
2 Please refer to www.approvalguide.com for specific approval data. Note that approved working pressures and flow ranges are specific to the tested foam concentrate.
3 Please refer to www.database.UL.com for specific listing data. Note that listed working pressures and flow ranges are specific to the tested foam concentrate.

Table 3.3.1 - Standard design specifications

3.3.1 Determining orifice size

After determining the required foam flow rate and available pressure, the orifice must be sized using the following formula:

$$d=\left(\frac{Q}{18.327 \cdot P^{1/2}}\right)^{1/2}$$

d = Orifice Ø (in.)
Q = Solution flow rate (GPM)
P = Pressure at orifice inlet (PSI)

3.4 Ordering information

The inlet orifice plate(s) are manufactured according to your specific project requirements. The following steps should be followed to ensure the correct order processing information is specified.

1. Use the tables in ***section 7 (Performance data)*** to determine what size foam maker will satisfy the flow and pressure requirements for your specific project. (Required)
2. Check the FM Approval or UL Listing for the specific foam concentrate model to ensure the inlet pressure, orifice size and fuel type is approved or listed. (Recommended)
3. Select the foam maker size, flange pattern and material from ***table 3.4.1.*** (Required)
4. Select a foam pourer with the flange pattern that matches the outlet flange pattern of the foam maker. (Required)
5. When the official purchase order is made for a foam maker, the size, orifice inlet pressure, and desired flow rate must be provided. Please use the foam maker order form to ensure your order is processed correctly. (Required)

NOTE: The inlet orifice size will be manufactured to match the pressure and flow information that you provide in step 5.
Refer to your customer service representative for further information and order form.

Description	Material	Finish	Part number		Weight	
			ANSI 150	PN16	lbs	kg
1-1/2" Foam maker	Carbon steel	Painted	KLF21216	KLF21217	17.2	7.8
Foam pourer for 1-1/2"	Carbon steel	Painted	VF-02 ANSI C.S PT	VF-02 UNI C.S PT	18.0	8.3
1-1/2" Foam maker	Stainless steel	Painted	KLF21218	KLF21219	18.1	8.2
Foam pourer for 1-1/2"	Stainless steel	Painted	VF-02 ANSI 316	VF-02 EN 316	19.0	8.8
2-1/2" Foam maker	Carbon steel	Painted	KLF21221	KLF21222	25.6	11.6
Foam pourer for 2-1/2"	Carbon steel	Painted	VF-02 ANSI C.S PT	VF-02 UNI C.S PT	18.0	8.3
2-1/2" Foam maker	Stainless steel	Painted	KLF21223	KLF21224	26.9	12.2
Foam pourer for 2-1/2"	Stainless steel	Painted	VF-02 ANSI 316	VF-02 EN 316	19.0	8.8
3" Foam maker	Carbon steel	Painted	KLF21226	KLF21227	43.0	19.5
Foam pourer for 3"	Carbon steel	Painted	VF-04 ANSI C.S PT	VF-04 UNI C.S PT	23.0	10.4
3" Foam maker	Stainless steel	Painted	KLF21228	KLF21229	45.2	20.5
Foam pourer for 3"	Stainless steel	Painted	VF-04 ANSI 316	VF-04 EN 316	24.0	11.1
4" Foam maker	Carbon steel	Painted	KLF21231	KLF21232	68.6	31.1
Foam pourer for 4"	Carbon steel	Painted	VF-08 ANSI C.S PT	VF-08 UNI C.S PT	41.0	18.5
4" Foam maker	Stainless steel	Painted	KLF21233	KLF21234	72.1	32.7
Foam pourer for 4"	Stainless steel	Painted	VF-08 ANSI 316	VF-08 EN 316	43.0	19.6

Table 3.4.1 - Ordering information

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4 Scope of supply

Ensure that all components are complete and in good condition.

Included

- Foam maker
- Sized orifice (quantity x 1)
- Inlet flange gaskets (quantity x 2)

Not Included

- Foam pourer (Sold separately - ***see Table 3.4.1***)
- Nuts, bolts, washers
- System pipework and fittings

5 Availability

Please contact KCA for further information.
The product is available directly from KCA and official distributors only.

6 Product variants

6.1 Options

- Also available with galvanized or paint over galvanized finish (Not FM Approved or UL Listed)
- Various colours

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6.2 Dimensions: Foam makers

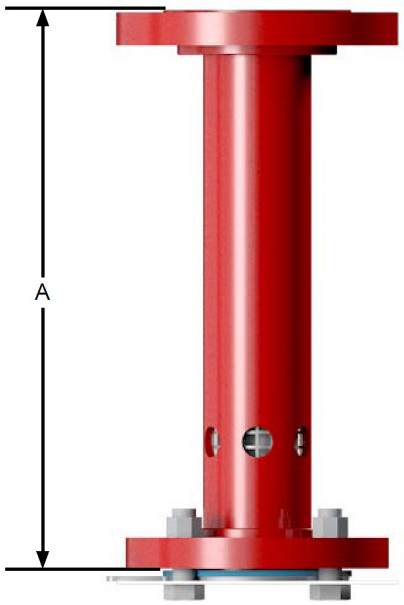


Figure 6.2.1 - Foam maker dimensions

Part number	Foam maker / Inlet flange size	Outlet flange size	Material	Flange	A	
					inches	mm
KLF21216	1-1/2″	3″	Steel	ANSI	13.68	322
KLF21217			Steel	PN16		
KLF21218			Stainless steel	ANSI		
KLF21219			Stainless steel	PN16		
KLF21221	2-1/2″	3″	Steel	ANSI	14.92	379
KLF21222			Steel	PN16		
KLF21223			Stainless steel	ANSI		
KLF21224			Stainless steel	PN16		
KLF21226	3″	4″	Steel	ANSI	30.00	762
KLF21227			Steel	PN16		
KLF21228			Stainless steel	ANSI		
KLF21229			Stainless steel	PN16		
KLF21231	4″	6″	Steel	ANSI	35.98	914
KLF21232			Steel	PN16		
KLF21233			Stainless steel	ANSI		
KLF21234			Stainless steel	PN16		

Table 6.2.1 - Foam maker dimensions

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6.3 Dimensions: Foam pourer

The foam pourer is used to discharge expanded foam back against the bund wall to ensure a uniform and gentle application on the bund floor / fuel surface.

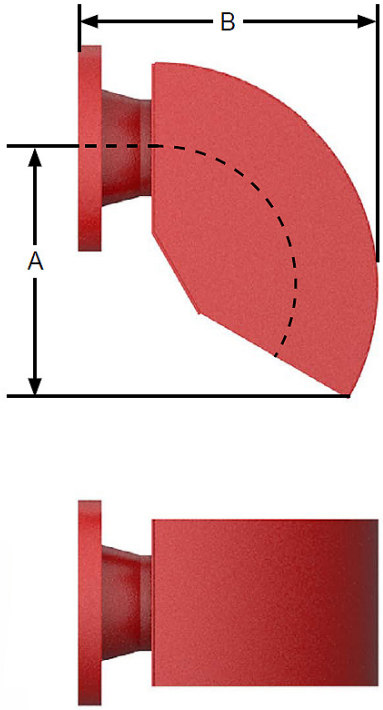


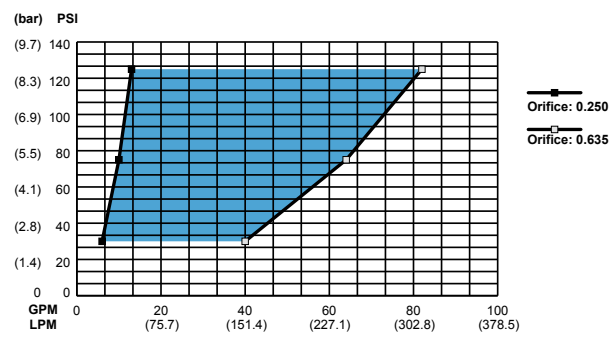
Figure 6.3.1 - Foam pourer dimensions

Part number	Foam maker size	Foam pourer / Flange size	Material	Flange	A		B	
					inches	mm	inches	mm
VF-02 ANSI C.S PT	1-1/2" and 2-1/2"	3"	Steel	ANSI	9.09	231	11.02	280
VF-02 UNI C.S PT			Steel	PN16			10.24	260
VF-02 ANSI 316			Stainless steel	ANSI			11.02	280
VF-02 EN 316			Stainless steel	PN16			10.24	260
VF-04 ANSI C.S PT	3"	4"	Steel	ANSI	9.09	231	11.26	286
VF-04 UNI C.S PT			Steel	PN16			10.31	262
VF-04 ANSI 316			Stainless steel	ANSI			11.26	286
VF-04 EN 316			Stainless steel	PN16			10.31	262
VF-08 ANSI C.S PT	4"	6"	Steel	ANSI	12.52	318	15.12	384
VF-08 UNI C.S PT			Steel	PN16			13.78	350
VF-08 ANSI 316			Stainless steel	ANSI			15.12	384
VF-08 EN 316			Stainless steel	PN16			13.78	350

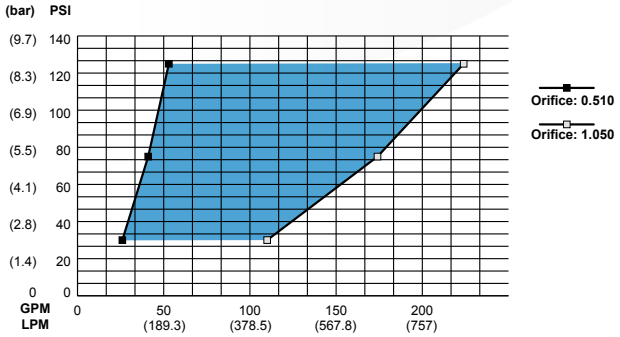
Table 6.3.1 - Foam pourer dimensions

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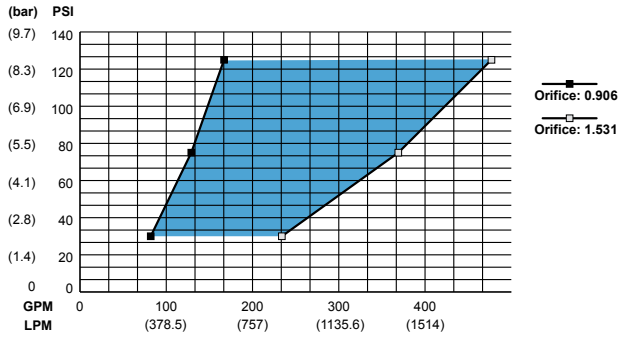
7 Performance data



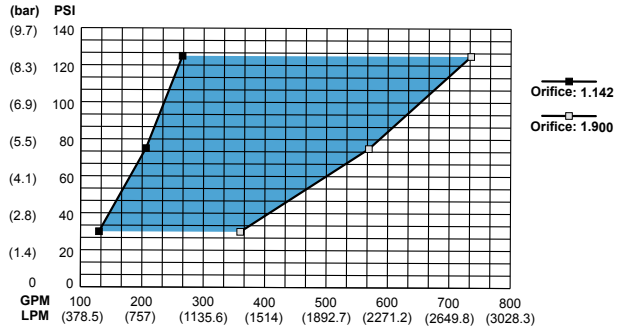
MINIMUM FLOW: 6 GPM (24 LPM)
MAXIMUM FLOW: 83 GPM (313 LPM)
1.5" FOAM MAKER



MINIMUM FLOW: 26 GPM (98 LPM)
MAXIMUM FLOW: 224 GPM (848 LPM)
2.5" FOAM MAKER



MINIMUM FLOW: 82 GPM (312 LPM)
MAXIMUM FLOW: 480 GPM (1818 LPM)
3" FOAM MAKER



MINIMUM FLOW: 131 GPM (496 LPM)
MAXIMUM FLOW: 740 GPM (2800 LPM)
4" FOAM MAKER

Graph 7.1.1 - Performance data

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8 Installation

The foam/water solution supply provided to the foam makers must be continuous, clean, and obstruction free. Foam makers should be installed with adequate clearance and be protected from physical damage. Adequate clearance should be maintained for maintenance and inspection.

Foam makers are deluge system discharge devices, and should be provided with adequate shutoff capabilities during adjustment or maintenance. The foam maker should be installed in accordance with NFPA 11: The Standard for Low-Expansion Foam or other applicable standards.

The foam maker inlet is to be mounted to a compatible piping flange. Piping to the foam maker should be self-supporting and installed in accordance with NFPA 11 or other applicable standards.

The foam maker orifice plate is to be installed between the inlet flange and the supply piping flange.

Orifice plate gaskets are to be installed against the inlet flange and the supply piping flange.

The orifice plate has a knife-edged or tapered-edge orifice. The flat side of the orifice plate is to be installed facing the supply piping flange. Orifice plates are identified according to size by numeric values indicated on the orifice plate. Prior to installation of an orifice plate, verify the suitability of the orifice plate for the specific range of flows and pressures required for the foam maker.

Discharge piping is to be sized in accordance with the outlet sizing charts for the specific foam maker. (***Table 6.2.1***)

Normal methods of piping the discharge outlet from the foam maker is to install the foam maker horizontal and rise up from the end of the foam maker with a 90 degree elbow, cross over the dike wall, drop down the dike wall and terminate with the foam pourer directed back towards the wall. ***See Figure 8.1.1 - Typical Installations***.

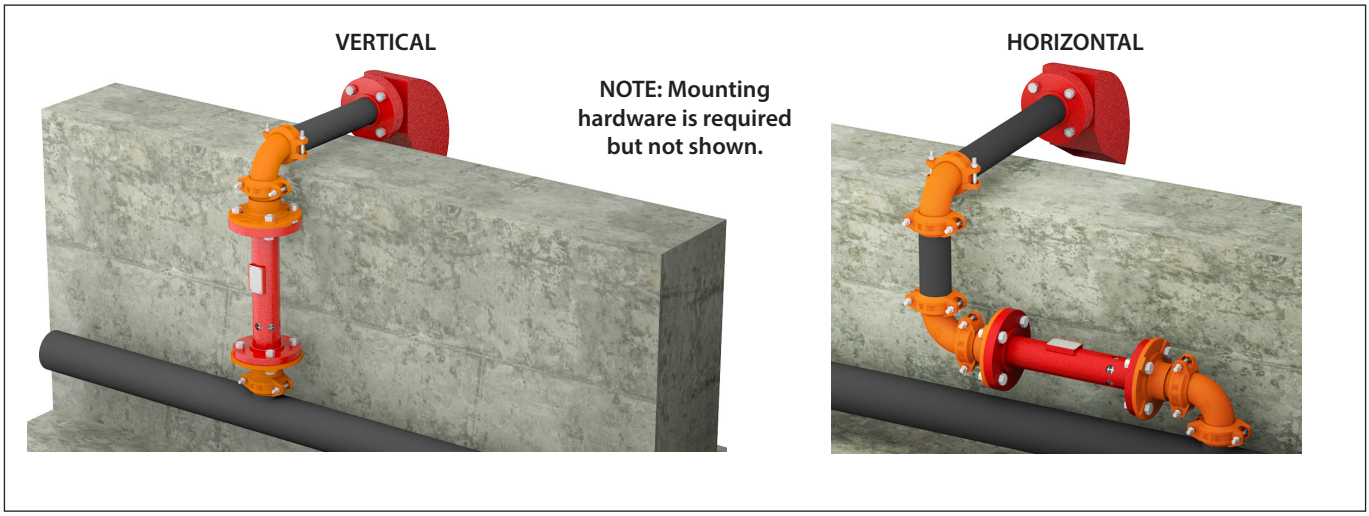


Figure 8.1.1 - Typical installations

9 Operation

The foam maker is an in-line foam discharge device. Foam/water solution is provided in a "pre-mix" condition through either an automatic or mobile proportioning system. The foam maker does not proportion foam concentrate into the water stream.

Foam/water solution is supplied to the inlet side of the foam maker. The inlet side of the foam maker is equipped with an orifice plate and air strainer. When foam solution initially passes through the air strainer, water will discharge from the vent holes. When the flow rate is of a greater velocity, a venturi effect will draw air into the fluid stream at a greater rate than water is escaping. At this point, solution will cease to flow from the air strainer.

The foam solution is aerated, which will cause the foam discharge to expand. The aerated foam solution will have enhanced foam qualities of greater expansion and normally longer drain times. The foam maker used with the foam pourer has an increased outlet size to allow for the foam expansion. The foam pourer then discharges foam indirectly at a burning liquid by deflecting the foam at the interior wall of a dike or bund area. Foam then spreads across the surface of the dike or bund area and covers the burning liquid, creating a vapor barrier to suppress or extinguish the fire.

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10 Guarantee

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

11 Inspections, tests and maintenance

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition. The Pilot Operated Pressure Control Valve must be kept from freezing conditions and physical damage that could impair its operation.

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 areas.

It is important that the system is inspected and tested on a regular basis. This is the owner's responsibility. System piping is to be hydrostatically tested as prescribed in NFPA 11: The Standard for Low-Expansion Foam. Foam maker supply piping is to be flushed after use in accordance with NFPA 11.

The air screen is to be inspected for obstruction of air inlet holes. If any obstruction exists, remove the obstruction and flush as necessary. The air strainer is over sized to prevent obstruction from nesting.

12 Disposal



At end of use the product described here should be disposed of via the national recycling system. Upon request, the manufacturer can take back and properly dispose of the electrical equipment and electronic devices.

13 Accessories and spare parts

1. When the official purchase order is made for the orifice plate, the foam maker size, the orifice inlet pressure and desired flow rate must be provided (required).
   NOTE: The inlet orifice size will be manufactured to match the pressure and flow information provided in step 2.
   Any modifications made after the release of the foam maker are the responsibility and at the risk of the authorized purchaser. Changes could include but are not limited to an entire system redesign, revamping of system components, restocking fees, etc.
2. The final (ordering) part number will contain the required orifice size.
   Example: An orifice plate for a 2-1/2" foam maker with a 0.750 inch orifice will be given the part number F20911/0750.

Orifice plates		
Part number	Orifice size range	Foam maker size
F21430	0.250" - 0.635"	1-1/2"
F20911	0.510" - 1.050"	2-1/2"
F20936	1.906" - 1.531"	3"
F20948	1.142" - 1.900"	4"

Table 13.1.1 - Accessories

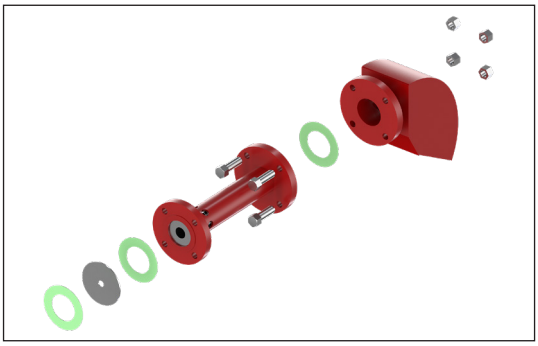


Figure 13.1.1 - Foam maker & pourer

14 Declaration of conformity

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

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