TECHNICAL DATA

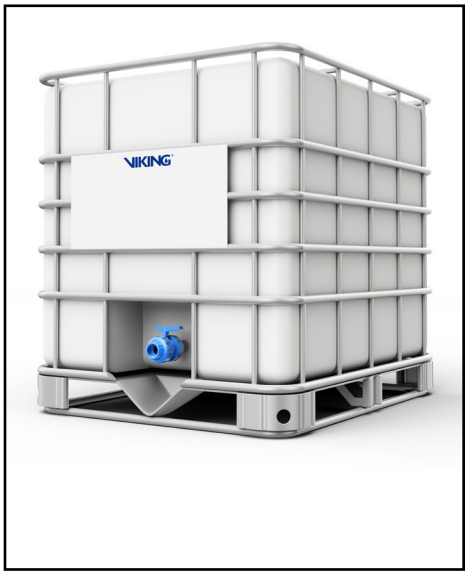
VIKING USP SFFF FLUORINE FREE FOAM CONCENTRATE

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. DESCRIPTION

The Viking USP concentrate concentrate is specially designed and tested to be an effective fluorine free fire protection system foam alternative. This concentrate is approved for use with fresh water when proportioned at 3%.

Features:
- New generation hydrocarbon risk fluorine free foam (SFFF)
- For Class A & B fires
- 100% Biodegradable



WARNING: Cancer and Reproductive Harm- www.P65Warnings.ca.gov

2. LISTINGS AND APPROVALS

This product must be used in accordance with the certifications listed below. Approved and listed system components can be found at www.approvalguide.com and https://iq.ulprospector.com

FM Approved

FM Approved Refer to the FM Approval guide for systems and devices that are approved for use with this concentrate. Refer to the system and device data sheets from Viking, NFPA, FM Global Property Loss Prevention Data Sheets, and relevant local codes and/or standards for correct system design. FM Approval of the foam extinguishing system is contingent upon the design, installation, testing and maintenance performed in accordance with NFPA and/or FM Global Property Loss Prevention Data Sheet 4-12, Foam/ Water Sprinkler Systems.

UL Listed – GFGV.EX27255

Underwriters Laboratories, UL 162 7th Edition Refer to the UL Listing for systems and devices that are approved for use with this concentrate. Refer to the system and device data sheets from Viking, NFPA, and relevant local codes and/or standards for correct system design.

"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.

The following additional approvals are in the name of the manufacturer.
- EN 1568 Part 1 / EN 1568 Part 2 / EN 1568 part 3, Class 1A fresh water*
- ICAO Level B*
- GESIP approved for hydrocarbon fuels*
- IMO 1312*
- MED Module B and D*
- Boeing Specification Support Standard BSS 7432*

3. TECHNICAL DATA

Physical Data

Appearance	Clear to yellowish liquid
Specific gravity at 68 °F (20 °C)	1.04 +/- 0.01 g/mll
Viscosity	Pseudoplastic*
pH	6.5 to 8.5
Freezing point	12 °F (-11 °C)
UL Listed storage temperature	35 °F (1,6 °C)
FM Approved storage temperature	35 °F to 120 °F (1.7 to 49 °C)
Suspended sediment (v/v)	Less than 0.2%

*see detailed viscosity data in section 16

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TABLE 1: ORDERING INFORMATION

Volume	Packaging	Part Number	Approximage Shipping Weight*		Dimensions* In (mm)		Sales Region
			Lbs.	Kg	Inches	mm	
25 Liters	Can	V-SFFFUSP/25	59**	26.7**	11x10x17	295x260x441	EMEA/APAC
200 Liters	Drum	V-SFFFUSP/200	469**	212.5**	23x23x37	581x581x935	EMEA/APAC
1000 Liters	IBC Tote	V-SFFFUSP/1000	2381	1080	47x39x45	1200x1000x1150	EMEA/APAC
6.5 US Gallons	Can	F21720-6.5	62**	28**	11x10x29	295x260x737	AMERICAS
55 US Gallons	Drum	F21720-55	487**	220.7**	23x23x37	581x581x935	AMERICAS
265 US Gallons	IBC Tote	F21720-265	2389	1083.6	47x39x45	1200x1000x1150	AMERICAS
Bulk	Bulk tanker deliveries available by special request. Contact Viking for availability.						

*Shipping weight and dimensions are approximate. **Weight does not include pallet.

4. ENVIRONMENTAL IMPACT

The Viking USP concentrate is formulated using specially selected raw materials for their fire performance and their environmental profile. The product contains no intentionally added fluorinated surfactants, polymers, and other organohalogens. The Viking USP concentrate is biodegradable and contains NO PFOS NOR PFOA. The handling of foam concentrate or foam solution spills should be in accordance with local regulations. Sewage systems should have no processing issues with foam solution based on the Viking USP concentrate but local sewage operators should be consulted in this respect. The Viking USP concentrate is formulated without the use of fluorinated surfactants. Full details can be found in the Safety Data Sheet (SDS).

5. APPLICATION

The Viking USP concentrate is intended for use on class B hydrocarbon fuel fires such as oil, diesel, aviation fuel and gasoline. It is also suitable for class A fires such as wood, paper, textiles etc. The Viking USP concentrate is especially suited whenever a fluorine-free alternative with high fire performance is required. The Viking USP concentrate is tested for use in sprinkler systems. Refer to listing or approval for further details of approved use combinations.
Note: Not for use as a premixed solution.

6. PROPORTIONING

The Viking USP concentrate can be proportioned at the correct dilution using conventional equipment like bladder tanks and proportioners. Refer to the FM Approval or UL Listing for proportioning equipment approved for use with this concentrate.

7. FIRE PERFORMANCE & FOAMING

The fire performance of this product has been measured and documented according to “International Approvals” stated in this document. The foaming properties are depending on equipment used and other variables such as water and ambient temperatures.

8. SPRINKLER APPLICATION

Sprinkler applications are especially challenging for any foam due to the low operating pressure and the very low expansion reached. Applying foam through a sprinkler is a forceful application method and requires foam that can handle direct application and partial submersion into the fuel without losing its fire performance and burnback resistance. Foams that shall be regarded as suitable for sprinkler applications shall also be able to withstand limited time of water deluge directly onto the foam blanket and still maintain the burnback properties. The Viking USP concentrate has passed above described tests showing very good extinguishing and burnback properties. Refer to the FM Approval Guide or UL Product iQ for acceptable system configurations used with this concentrate and specific sprinkler SINs and their associated minimum application densities.

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9. STORAGE / SHELF LIFE

KEEP OUT OF DIRECT SUNLIGHT

WARNING:
Fluctuating environmental conditions such as temperature and sunlight can severely degrade foam concentrate.

- **Do not expose to direct sunlight**
- **Store in climate controlled areas not subject to environmental fluctuations.**
- **Evaluate all storage containers for suitability based on expected environmental conditions.**

Stored in original unbroken packaging, the product will have a long shelf life. Shelf life in excess of 10 years will be found in temperate climates. As with all foams, shelf life will be dependent on storage temperatures and conditions.

NOTICE

Storage containers, whether for shipping or permanent storage, shall be evaluated for suitability based on location and temperature fluctuations. The temperature should be as stable as possible. Exposure to direct sunlight shall be avoided.

10. SCOPE OF DELIVERY

We supply this product in 25 liter and 6.5 US gallon cans, 200 liter and 55 US gallon drums, 1000 liter and 265 US gallon IBC containers and in bulk on special request.

11. INSPECTIONS, TESTS AND MAINTENANCE

The foam concentrate should be tested annually. Refer to respective requirements, according to the relevant codes and/or 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 the end of use the product packaging should be disposed of via the national recycling system. Some IBC Tote containers maybe part of a national collection scheme. Details will be attached to the IBC Tote if this service is available. Foam Concentrate should be disposed of according to local regulations.

13. AVAILABILITY

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
techsvcs@vikingcorp.com

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69 Tuas View Square
Westlink Techpark, Singapore 637621
Tel: (+65) 6 278 4061
Fax: (+65) 6 278 4609
vikingAPAC@vikingcorp.com

14. GUARANTEE

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

15. COMPATIBILITY

Contact Viking with questions regarding the compatibility of this product.

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16. VISCOSITY

The viscosity flow curves are determined by Brookfield RST rheometer from low to high shear rates. The viscosity curves below are determined by calculating the average value of at least 8 different measurements and add a safety margin of three standard deviations to the average. The viscosity curves are determined for 68 °F and 41 °F (20 °C and 5 °C). In the table below the kinematic viscosity (mm²/s) is calculated as dynamic viscosity (mPa·s) divided by the specific gravity of the concentrate.

TABLE 2: Viscositiy Information

RPM	Shear Rate (s^{-1})	Dynamic Viscosity (mPa/s)		Kinetic Viscosity (mm^2/s)	
		68 °F (20 °C)	41 °F (5 °C)	68 °F (20 °C)	41 °F (5 °C)
5	10.7	3793	3716	3647	3573
10	21.5	1948	1921	1873	1847
25	53.7	910	916	875	881
50	107.4	541	531	521	510
100	214.8	328	325	316	312
175	375.0	224	229	215	220
250	537.0	176	189	169	182
500	1074.0	139	158	134	152
750	1611.0	86	99	82	96
1000	2148.0	70	83	67	80
1300	2792.2	91	128	88	123

Viscosity vs Shear Rate