

SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier used on the label

: **Flottec F131SFFrother**

Recommended use of the chemical and restrictions on use

: Flotation chemical used in mining industry. Alcohol based frother.

Chemical family

: Mixed alcohols, heavy aldehydes, esters

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party:

Flottec, LLC

2505 Collingsworth Street, 2nd Floor

Houston, Texas 77026 U.S.A.

www.flottec.com

Information Telephone # : 1.713.425.7055

24 Hr. Emergency Tel # : Chemtrec 1.800.424.9300 (Within Continental U.S.); Chemtrec 1.703.527.3887 (Outside U.S.)

2. HAZARDS IDENTIFICATION

Classification of the chemical

Flammable liquids (Category 3)

Acute toxicity (Category 4)

Serious eye damage/irritation (Category 2A)

Reproductive toxicity (Category 2)

Specific target organ toxicity single exposure (Category 3)

Short-term hazard to the aquatic environment (Category 3)

Long-term hazard to the aquatic environment (Category 3)

Label elements

Signal Word

Danger

Hazard statement(s)

H226: Flammable liquid and vapor

H319: Causes eye irritation

H303: May be harmful if swallowed

H313: May be harmful in contact with skin

H332: Harmful if inhaled

H361: Suspected of damaging fertility or the unborn child

H402: Harmful to aquatic organisms

H412: Harmful to aquatic life with long lasting effects

Precautionary statement(s)

P201: Obtain instructions before use.

P202: Do not handle before you have read and understood all safety precautions.

P242: Do not use spark-producing tools.

P243: Take precautionary measures against electrostatic discharge.

P261: Avoid breathing dust/fume/gas/mist/vapours/spray.

P264: Wash... thoroughly after handling

P270: Do not eat, drink or smoke when using this product.

P271: Use only outdoors or in a well-ventilated area.

P273: Do not disperse in the environment

P280: Wear protective gloves/protective clothing/eye/face protection.

P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses when they are present and can be done easily. Continue with the wash.

P308 + P313 IF exposed or suspected: seek medical advice.

P312: Call a POISON CENTER/doctor/...if the person feels unwell.

P337 + P313: If eye irritation persists, seek medical advice.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard pictogram(s)



Other hazards

3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Common name	CAS #	Concentration / wt %
Hydroformylation products of 1-propene, high boiling point	68551-11-1	15-30%
Polypropylene Glycol - Mono Methyl Ether	37286-64-9	2.5-20%
1-Hexanol	111-27-3	40-80%
Polyether Polyol	25322-69-4	5-20%

The exact concentrations of the above listed chemicals are being withheld as a trade secret.

4. FIRST-AID MEASURES

Description of first aid measures

Ingestion : DO NOT induce vomiting, unless recommended by medical personnel. If victim is conscious wash out mouth with water and give 1-2 glasses of water to drink. Never give anything by mouth if victim is unconscious or convulsing. If spontaneous vomiting occurs, keep head below hips level to prevent aspiration into the lungs. Seek medical attention or contact a Poison Centre immediately.

Inhalation : Move person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen by trained personnel. If a problem develops or persists, seek medical attention.

Skin Contact : Flush with water for at least 15 minutes. Remove contaminated clothing and wash before reuse. Avoid touching eyes with contaminated body parts. If a problem develops or persists, seek medical attention.

Eye Contact : IMMEDIATELY flush with plenty of water. Remove contact lenses. Flush with water for at least 15 minutes. Hold eyelids apart to rinse properly. If a problem develops or persists, seek medical attention.

Symptoms : May cause severe eye irritation or eye damage. May cause redness and irritation of the skin. May cause irritation to nose, throat and respiratory tract. Swallowing will cause digestive tract disturbances resulting in nausea, vomiting, cramps and diarrhea.

Notes to the physician : Treat according to person's condition and specifics of exposure. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media

: Dry chemicals, chemical foam, carbon dioxide (CO₂).

Unsuitable extinguishing media

: Do not use direct water jet.

Special hazards arising from the substance or mixture

: Flammable liquid and vapors. May be ignited by heat, sparks, flame or static electricity.

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

- : Firefighters must wear self contained breathing apparatus with full face mask. Firefighting suit may not be efficient against chemicals.

Special fire-fighting procedures

- : Use water spray to cool fire-exposed containers. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

- : Do not touch spilled material. Make sure to wear personal protective equipment mentioned in this Safety Data Sheet.

Environmental precautions

- : Prevent entry in sewer and other enclosed area. For a large spillage, consult the Department of Environment or the relevant authorities.

Methods and material for containment and cleaning up

- : Remove sources of ignition. Ventilate the area well. Stop leak, if it's possible to do so without risk. Absorb with inert material (soil, sand, vermiculite) and place in an appropriate waste disposal clearly identified. Use non-sparking and antistatic tools. Dispose via a licensed waste disposal contractor. Finish cleaning by rinsing with soapy water the contaminated surface.

7. HANDLING AND STORAGE

Precautions for safe handling

- : Keep away from heat, sparks and open flame. Avoid all sources of ignition. Use non-sparking and antistatic tools. Ground/bond all containers when transfer large quantities (5 gallons US or 20 L and more). Use only in well ventilated area. Do not breathe vapors, mists or aerosols. Avoid contact with skin, eyes and clothing. Wear eye protection, gloves and other protective clothing that are adapted to the task being performed and the risks involved. Keep in the workplace only the quantities necessary for the work being performed. Keep containers tightly closed when not used. Do not eat, do not drink and do not smoke during use. Wash hands, forearms and face thoroughly after handling this compound and before eating, drinking or using toilet articles. Remove contaminated clothing and wash before reuse.

Conditions for safe storage

- : Storage and handling should follow the NFPA 30 Flammable and/or Combustible Liquids Code and the National Fire Code of Canada (NFCC). Ground or bond large containers. Store tightly close and in properly labelled containers in a cool, dry and well ventilated place. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Keep away from direct sunlight and heat. Store away from oxidizing materials and incompatible materials (see section 10).

Storage temperature

- : <30°C (86°F)

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Immediately Dangerous to Life or Health

Methyl amyl alcohol : 400 ppm.

Exposure limits

Methyl amyl alcohol	: STEL	40 ppm	ACGIH, BC, ON
		40 ppm	167 mg/m ³ RSST (Pc)
	TWA (8h)	25 ppm	ACGIH, BC, ON, OSHA
		25 ppm	104 mg/m ³ RSST (Pc)

Exposure controls

Appropriate engineering controls: Provide sufficient mechanical ventilation (general and/or local exhaust) to keep the airborne concentrations of vapors, mists, aerosols or dust below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are close to the workstation

Respiratory protection

- : Respiratory protection is not required in normal use. In case of insufficient ventilation or in confined or enclosed space and for an assigned protection factor (APF) up to 10 times the exposure limit: wear a half mask respirator with organic vapor cartridges fitted with P100 filters. For an APF until maximum 100 times of exposure limit, wear a full face respirator mask with organic vapor cartridges and P100 filters.

Skin protection

- : Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Wear normal work clothing covering arms and legs as required by employer code. Wear an apron or long-sleeve protective coverall suit. To clean up a spill, if

necessary, wear a synthetic polyethylene coveralls such as the Tychem (DuPont) or equivalent coveralls manufactured to provide protection against liquid chemical

- Hands** : Chemical-resistant, impervious gloves should be worn at all times when handling this chemical product. Wear nitrile gloves, neoprene gloves, butyl rubber gloves or multilayer polymer laminate gloves. Before using, user should confirm impermeability. Discard gloves that show tears, pinholes, or signs of wear. Gloves must only be worn on clean hands. Wash gloves with water before removing them. After using gloves, hands should be washed and dried thoroughly.
- Eye / face protection** : Wear chemical splash goggles. If risk of contact with eyes or the face, wear a face shield.
- Other protective equipment** : Wear safety shoes. Wear rubber boots to clean up a spill.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	: Liquid	Flammability limits (% by vol.)	: N/Av
Color	: Light Brown	Flash point	: > 45°C (104°F) TCC
Odor	: Mild odor of alcohol	Auto-ignition temperature	: N/Av
Odor threshold	: >0.3 ppm	Sensibility to electrostatic charge	: Yes
pH	: 7	Sensibility to sparks/friction	: No
Melting/Freezing point	: N/Av	Vapor density (Air = 1)	: 1
Boiling point/range	: 132°C (269.6°F)	Relative density (Water = 1)	: 0.88 kg/L @ 25°C (77°F)
Solubility in water	: Insoluble (<2%)	Partition coefficient (n-octanol/water)	: N/Av
Evaporation rate (BuAc = 1)	: < N/Av	Decomposition temperature	: N/Av
Vapor pressure	: N/Av	Viscosity	: N/Av
Volatiles (% by weight)	: > N/Av	Molecular mass	: N/Av
Flammability (solid, gas)	: Combustible		

10. STABILITY AND REACTIVITY

- Reactivity** : No information available for this product.
- Chemical stability** : Stable under recommended storage conditions.
- Possibility of hazardous reactions (including polymerizations)** : Hazardous polymerization will not occur under recommended storage.
- Conditions to avoid** : Avoid heat, flame and sparks. Avoid contact with incompatible materials.
- Incompatible materials** : Strong oxidizing agents (such as nitric acid, perchloric acid, peroxides, chlorates and perchlorates), inorganic acids, strong acids, halogens.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. TOXICOLOGICAL INFORMATION

Toxicological data

Chemical name	LC ₅₀ (Inhalation, rat)	LD ₅₀ / mg/kg	
		(Oral, rat)	(Dermal, rabbit)
Methyl amyl alcohol	>16 mg/l/4h	2590	2870
1-Propene, hydroformylation products, high-boiling	>3.2 mg/l/4h	>5000	>2000
Polypropylene Glycol - Mono Methyl Ether	No disponible	46510	>19100
Polyether Polyol	No disponible	<2000	>2000
n-Hexanol	>21 mg/L/1 hr	720 - 4900	1500 - 2300

Likely routes of exposure

- Skin** : Yes
- Eye** : Yes
- Inhalation** : Yes
- Ingestion** : Yes

Potential Health Effects:

Signs and symptoms of delayed, immediate and chronic effects

- Skin** : May cause redness and slight irritation of the skin. Methyl amyl alcohol causes skin erythema with slight oedema fully reversible within 14 days (OECD TG 404). Dryness and sloughing also developed in all animals. 1-Propene, hydroformylation products, high-boiling (CAS no 68551-11-1) is not irritating to rabbit skin (OECD TG 404). May be harmful by skin contact. Widespread contact with skin for several hours can cause harmful amounts of material to be absorbed.
- Eye** : May cause severe eye irritation or eye damage. Methyl amyl alcohol causes eye irritation in rabbits (OECD TG 405). All animals developed corneal opacification, iridial inflammation, and conjunctival irritation. All reactions fully reversible within 7 to 14 days after instillation. 1-Propene, hydroformylation products, high-boiling (CAS no 68551-11-1) is irritating to eyes (rabbit, OECD TG 405). Moreover, it is not fully reversible within 20 days.
- Inhalation** : May be harmful by inhalation. May cause irritation to nose, throat and respiratory tract. High concentrations may cause central nervous system depression characterized by headache, dizziness, vertigo, nausea, drowsiness and fatigue.
- Ingestion** : May be harmful if swallowed. Swallowing will causes digestive tract disturbances resulting in nausea, vomiting, cramps and diarrhea.
- Sensitization to material** : Ingredients present at levels greater than or equal to 0.1% of this product are skin or respiratory sensitizers. Skin sensitization, Guinea pig (OECD 406): tests performed with each ingredient of this mixture gave negative results.
- IRAC/NTP Classification** : No ingredients listed
- Carcinogenicity** : Ingredients present at levels greater than or equal to 0.1% of this product are not listed as a carcinogen by IARC, ACGIH, NIOSH, NTP or OSHA.
- Mutagenicity** : Ingredients in this product present at levels greater than or equal to 0.1% are not known to cause mutagenic effect.
- Reproductive Effects** : Some of the components of 1-Propene, hydroformylation products, high-boiling (CAS no 68551-11-1) have been evaluated and found to have minimal reproductive toxicity. The substance may cause damage to the testes after repeated ingestion, as shown in animal studies.
- Specific target organ effects – single exposure**
: Respiratory system, central nervous system..
- Specific target organ effects – repeated exposure**
: No target organ is listed
- Other information** : The oral and skin acute toxicity estimates (ATE) of the mixture were calculated to be greater than 2000 mg/kg. The acute toxicity estimate (ATE) by inhalation (aerosol/mist) of the mixture was calculated to be greater than 5 mg/L/4h. These values are not classified according to WHMIS 2015 and OSHA HCS 2012.

12. ECOLOGICAL INFORMATION

- Ecotoxicity** :
- | | | |
|--|------------------|---|
| Fish- Brachydanio rerio- sweet water | LC ₅₀ | 68 mg/L; 96h (CAS no 68551-11-1) OCDE 203 |
| Aquatic invertebrate - Daphnia Magna | EC ₅₀ | 63.6 mg/L; 48h (CAS no 68551-11-1) OCDE 202 |
| Aquatic Plant - Algae, Pseudokirchnerilla subcapitata | EC ₅₀ | 98 mg/L; 72h (CAS no 68551-11-1) OCDE 201 |
| Aquatic invertebrate (Toxicidad crónica) - Daphnia magna | NOEC | 10 mg/L; 21 días (CAS no 68551-11-1) OCDE 211 |
| Fish - Pimephales promelas | LC ₅₀ | >100 mg/L; 96 h (CAS no 37286-64-9) |
| Fish - sweet water | LC ₅₀ | >100 mg/L; 96h (CAS no 111-27-3) |
| Aquatic invertebrate - Daphnia Magna - Daphnia magna | EC ₅₀ | 201 mg/L; 24h (CAS no 111-27-3) |
- Persistence** : No persistent in environment..
- Degradability** : Methyl amyl alcohol is readily biodegradable based on BOD5/COD >0.91. The product is degraded rapidly by photo-chemical reactions in air through indirect photolysis with production hydroxyl free radicals. 1-Propene, hydroformylation products, high-boiling are readily biodegradable, 100% in 23 days (OECD 301F ready biodegradability test guideline).
- Bioaccumulation potential** : This mixture is readily biodegradable (94% in 20 days). Degradation by Biochemical Oxygen Demand BOD5 (O2 consumption) was reported as 38-50% in 5 days. Chemical Oxygen Demand (COD) is 2.43 mg/mg. Methyl amyl alcohol has a Bioconcentration Factor (BCF) value of 7.2, and its Log Kow value is 1.43, indicating its potential to bioaccumulate is low. 1-Propene,

hydroformylation products, high-boiling have a partition factors Log Kow of 0.6 to 3.2, indicating that they should not accumulate in the food chain.

Mobility in soil : No information available for this product. The estimated Koc value of 35 suggests that Methyl amyl alcohol is expected to have very high mobility in soil (TOXNET Databases). 1-Propene, hydroformylation products, high-boiling have low volatility and low soluble in water. Then product should migrate towards the soil.

Other adverse environmental effects : This chemical does not deplete the ozone layer.

13. DISPOSAL CONSIDERATIONS

Handling for Disposal : Important! Prevent waste generation. Use in full. DO NOT puncture, cut, heat or burn container, even after use. DO NOT throw residual to sewer, streams, sewers or drinking water supply. Return empty container properly labeled to supplier or everywhere there is a recovery program. Dispose via a licensed waste disposal contractor. Observe all federal, state/provincial and municipal regulations. If necessary consult the Department of Environment or the relevant authorities.

14. TRANSPORTATION INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
DOT	UN 1993	FLAMMABLE LIQUID, N.O.S. (contains METHYL ISOBUTYL CARBINOL, COMPLEX OXYGENATED/HYDROCARBON MIXTURE)	3	III	Flammable Liquid
Additional Information		This material is not listed as a marine pollutant. Permit required for transportation with proper placards displayed on vehicle.			
TDG	UN 1993	FLAMMABLE LIQUID, N.O.S. (contains METHYL ISOBUTYL CARBINOL, COMPLEX OXYGENATED/HYDROCARBON MIXTURE)	3	III	Flammable Liquid
Additional Information		Emergency response guidebook 2012 - 128			
IMO/IMDG	UN 1993	FLAMMABLE LIQUID, N.O.S. (contains METHYL ISOBUTYL CARBINOL, COMPLEX OXYGENATED/HYDROCARBON MIXTURE)	3	III	Flammable Liquid
Additional Information		Emergency schedules (EmS-No) F-E, S-E			
IATA	UN 1993	FLAMMABLE LIQUID, N.O.S. (contains METHYL ISOBUTYL CARBINOL, COMPLEX OXYGENATED/HYDROCARBON MIXTURE)	3	III	Flammable Liquid
Additional Information					

15 - REGULATORY INFORMATION

US Federal Information:

- Toxic Substance Control Act (TSCA) :
All ingredients are listed in the TSCA inventory or otherwise comply with TSCA requirements.
- EPCRA Section 313 Toxic Chemicals:
No material is listed.
- CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):
No material is listed.
- EPCRA Section 302/304 Extremely Hazardous Substances:
No material is listed.
- Clean Water Act (CWA) 311 Hazardous Substances:
No material is listed.
- Clean Water Act (CWA) Priority Pollutants:
No material is listed.

- Clean Air Act (CAA) 111:
Methyl amyl alcohol (CAS no 108-11-2).
- Clean Air Act (CAA 112b) HON - Hazardous Organic National Emission Air Pollutants:
Methyl amyl alcohol (CAS no 108-11-2).
- Clean Air Act (CAA 112b) HAP - Hazardous Air Pollutants:
No material is listed.
- CAA 112(r) Regulated Chemicals for Accidental Release Prevention:
No material is listed.
- California Proposition 65:
No material is listed.

Canadian Information:

- Canada DSL and NDSL:
All ingredients are listed in the Domestic Substances List (DSL).
- Canadian National Pollutant Release Inventory Substances (NPRI):
No material is listed.

WHMIS 1988:

- Class B3 : Combustible Liquid
- Class E : Corrosive material

NFPA



16. OTHER INFORMATION

Other special considerations for handling : Provide adequate information, instruction and training for operators.

Prepared by: Flottec, LLC **Revised by:**

REASON FOR REVISION: Section 1: updated Flottec address

DISCLAIMER

The above information is believed to be accurate and represents the best information currently available to us. However, we make no warrantee of merchantability or any other warrant, expressed or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular uses.

END OF DOCUMENT