

## SAFETY DATA SHEET

### 1. IDENTIFICATION

**Product identifier used on the label**

: **Flottec F181 Frother**

**Recommended use of the chemical and restrictions on use**

: Flotation chemical used in mining industry

**Chemical family**

: Mixed alcohols, heavy aldehydes, esters and polyglycols

**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 4)

Skin corrosion/irritation (Category 2)

Serious eye damage/eye irritation (Category 1)

Skin sensitizer (Category 1)

Germ cell mutagenicity (Category 2)

Reproductive toxicity (Category 2)

**Label elements**

**Signal Word**

Danger

**Hazard statement(s)**

H227: Combustible liquid

H318: Causes serious eye damage

H315: Causes skin irritation

H317: May cause an allergic skin reaction

H341: Suspected of causing genetic defects

H361F: Suspected of damaging fertility

H412: Harmful to aquatic life with long lasting effects

**Precautionary statement(s)**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, sparks, open flames and other ignition sources. No smoking.

P261: Avoid breathing vapors, mist and spray.

P264: Wash face, hands and any exposed skin thoroughly after handling.

P272: Contaminated work clothing should not be allowed out of the workplace.

P273: Avoid release to the environment.

P280: Wear protective gloves, protective clothing and eye protection.

P302+352: IF ON SKIN: Wash with soap and water.

P333+313: If skin irritation or a rash occurs: Get medical advice/attention.

P305+351+338: IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

P310: Immediately call a doctor/physician.

P362+364: Take off contaminated clothing and wash before reuse.

P370+378: In case of fire: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide for extinction.

P403: Store in a well-ventilated place.

P405: Store locked up.

P501: Dispose of contents and container to a licensed chemical disposal agency in accordance with local, regional and national regulations.

**Hazard pictogram(s)**



**Other hazards**

Acute hazard to the aquatic environment (Category 3).

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

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

| Common name   | CAS #      | Concentration / wt % |
|---|------------|----------------------|
| 1-Propene, hydroformylation products, high-boiling                        | 68551-11-1 | 75-95                |
| Cyclohexane, oxidized, non-acidic by-products, distn. residues            | 68609-04-1 | 1-20                 |
| High boiling by-products from the manufacturing process of 2-ethylhexanol | 68609-68-7 | 1-20                 |
| n-Butyl Alcohol   | 71-36-3    | 0-5                  |

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. Never give anything by mouth if victim is unconscious or convulsing. 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. 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 an allergic reaction of the skin.

**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*

- : Dried powder, water spray, carbon dioxide (CO<sub>2</sub>), chemical foam.

*Unsuitable extinguishing media*

- : Do not use direct water jet.

**Special hazards arising from the substance or mixture**

: Combustible 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. Small spill - dilute with water and mop up. Then wash the contaminated surface with water. Large spill - Absorb with inert material (soil, sand, vermiculite) and place in an appropriate waste disposal clearly identified. Finish cleaning by rinsing with soapy water the contaminated surface. Dispose via a licensed waste disposal contractor.

**7. HANDLING AND STORAGE**

**Precautions for safe handling**

: Keep away from heat, sparks and open flame. Ground/bond all containers when transfer large quantities (5 gallons US or 20 L and more). Use only in well-ventilated area. 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**

: 10 to 35°C (50 to 95°F)

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Immediately Dangerous to Life or Health**

: N-Butyl Alcohol: 1400 ppm.

**Exposure limits**

|                        |           |        |                                     |
|------------------------|-----------|--------|-------------------------------------|
| <b>n-Butyl Alcohol</b> | : Ceiling | 30 ppm | BC                                  |
|                        |           | 50 ppm | 152 mg/m <sup>3</sup> RSST (Pc, RP) |
|                        | TWA (8h)  | 15 ppm | BC                                  |
|                        |           | 20 ppm | ACGIH , ON                          |

**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.

**Respiratory protection**

: Respiratory protection is not required in normal use. Respiratory protection equipment (PPE) must be selected, fitted, maintained and inspected in accordance with regulations and CSA Standard Z 94.4 and approved by NIOSH / MSHA. 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 appropriate cartridges fitted with P100 filters. For an APF until maximum 100 times of exposure limit, wear a full face respirator mask with appropriate 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. If necessary, wear an apron or long-sleeve protective coverall suit.
- Eye / face protection** : Wear chemical splash goggles. If risk of contact with eyes or the face, wear a face shield.
- Hands** : Wear nitrile or neoprene gloves. Chemical-resistant, impervious gloves should be worn at all times when handling this chemical product. Wear nitrile or neoprene 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
- Other protective equipment** : Wear rubber boots to clean up a spill.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                                    |                                   |  |                           |
|------------------------------------|-----------------------------------|--|---------------------------|
| <b>Physical state</b>              | : Liquid                          | <b>Flammability limits (% by vol.)</b>         | : 0.9 to 8.0%             |
| <b>Color</b>                       | : Dark straw yellow               | <b>Flash point</b>                             | : 67°C (152.6°F) PMCC     |
| <b>Odor</b>                        | : Slight alcohol odor             | <b>Auto-ignition temperature</b>               | : N/Av                    |
| <b>Odor threshold</b>              | : N/Av                            | <b>Sensibility to electrostatic charge</b>     | : Yes                     |
| <b>pH</b>                          | : 5                               | <b>Sensibility to sparks/friction</b>          | : No                      |
| <b>Melting/Freezing point</b>      | : -51°C (-59.8°F)                 | <b>Vapor density (Air = 1)</b>                 | : > 1                     |
| <b>Boiling point/range</b>         | : 181 to 183°C (357.8 to 361.4°F) | <b>Relative density (Water = 1)</b>            | : 0.89 kg/L @ 25°C (77°F) |
| <b>Solubility in water</b>         | : Slightly soluble                | <b>Partition coefficient (n-octanol/water)</b> | : 0.6 to 3.2              |
| <b>Evaporation rate (BuAc = 1)</b> | : N/Av                            | <b>Decomposition temperature</b>               | : N/Av                    |
| <b>Vapor pressure</b>              | : 2.07kPa (15.5 mm Hg)            | <b>Viscosity</b>                               | : N/Av                    |
| <b>Volatiles (% by weight)</b>     | : 100%                            | <b>Molecular mass</b>                          | : N/Av                    |
| <b>Flammability (solid, gas)</b>   | : 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.
- 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).
- 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 <sub>50</sub><br>(Inhalation, rat) | LD <sub>50</sub> / mg/kg |                  |
|---|---------------------------------------|--------------------------|------------------|
|   |                                       | (Oral, rat)              | (Dermal, rabbit) |
| 1-Propene, hydroformylation products, high-boiling                        | >3.2 mg/l/4h                          | >5000                    | >2000            |
| Cyclohexane, oxidized, non-acidic by-products, distn. residues            | N/Av                                  | 8412                     | >10000           |
| High boiling by-products from the manufacturing process of 2-ethylhexanol | >5.4 mg/l/4h                          | >5000                    | >2000            |
| Polyether polyol  | N/Av                                  | <2000                    | >2000            |
| 2-Ethylhexanol  | >2000 ppm/6h<br><5 mg/l/4h            | 2040                     | >2000            |
| n-Butyl Alcohol   | 24.2 mg/l/4h                          | 2510                     | 3400             |

### 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 irritation of the skin. The complex mixture of Cyclohexane, oxidized, non-acidic by-products, distn. residues (CAS no 68609-04-1) are skin irritating (Rabbit, OECD Guideline 404). High boiling by-products from the manufacturing process of 2-ethylhexanol (CAS no 68609-68-7) is moderately irritating to rabbit skin (OECD TG 404). 1-Propene, hydroformylation products, high-boiling (CAS no 68551-11-1) is not irritating to rabbit skin (OECD TG 404). 2-Ethylhexanol causes skin irritation in rabbits (OECD TG 404). Severe erythema and oedema was reported in all treated animals at 24 hours after treatment, persisting until 72 hours. The data indicate that butyl alcohol are irritating to the skin (Draize test).
- Eye** : May cause severe eye irritation or eye damage. 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. High boiling by-products from the manufacturing process of 2-ethylhexanol (CAS no 68609-68-7) is minimally irritating to rabbit eye (OECD TG 405). 2-Ethylhexanol causes eye irritation in rabbits (OECD TG 405). Severe iritis and moderate corneal opacity were seen in all animals at 24 and 48 hours after treatment. The complex mixture of Cyclohexane, oxidized, non-acidic by-products, distn. residues (CAS no 68609-04-1) are slightly irritating to eye (Rabbit, OECD Guideline 405). Butyl Alcohol instilled in rabbit eyes resulted in severe corneal irritation and eye damage (OECD 405).
- Inhalation** : May be harmful by inhalation. 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. Ingestion of large amounts may cause cyanosis (blue-grey skin discoloration), headache, vertigo, weakness, drowsiness.
- Sensitization to material** : May cause an allergic reaction of the skin. The complex mixture of Cyclohexane, oxidized, non-acidic by-products, distn. residues (CAS no 68609-04-1) are skin sensitizing (Mousse, OECD Guideline 429). This product is not a respiratory sensitizer.
- 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** : Ames tests with the complex mixture of Cyclohexane, oxidized, non-acidic by-products, distn. residues (CAS no 68609-04-1) have shown bacterial mutation effect (OECD Guideline 471).
- Reproductive Effects** : 2-Ethylhexanol was reported to cause developmental toxicity, but not teratogenicity, in rats following exposure via the oral route, in the absence of signs of marked maternal toxicity (OECD TG 414). 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** : No target organ is listed.
- 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 (dust/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 - Branchydanio Renio - fresh water                  | LC50 | 68 mg/L; 96h (CAS no 68551-11-1) OEDC 203     |
|             | Aquatic Invertebrate - Daphnia magna                     | EC50 | 63.6 mg/L; 48h (CAS no 68551-11-1) OEDC 202   |
|             | Aquatic Plant - Algea, Pseudokirchnerilla subcapitata    | EC50 | 98 mg/L; 72h (CAS no 68551-11-1) OEDC 201     |
|             | Aquatic Invertebrates (Chronic toxicity) – Daphnia magna | NOEC | 10 mg/L; 21 days (CAS no 68551-11-1) OEDC 211 |
|             | Fish - Leuciscus idus                                    | LC50 | 46 mg/L; 96h (CAS no 68609-04-1) OEDC 203     |
|             | Aquatic Invertebrate - Daphnia magna                     | EC50 | 29.2 mg/L; 48h (CAS no 68609-04-1) OEDC 203   |
|             | Fish - Branchydanio Renio - fresh water                  | LC50 | 50 mg/L; 96h (CAS no 68609-68-7) OEDC 203     |



|   |                  |  |
|---|------------------|--|
| Aquatic Invertebrate - Daphnia magna                          | EC50             | >38 mg/L; 48h (CAS no 68609-68-7) OEDC 202 |
| Fish - Golden Orfe  | LC <sub>50</sub> | 17.1 mg/L; 96h (2-Ethylhexanol) OEDC 203   |
| Aquatic Invertebrate - Daphnia Magna, Water flea, fresh water | EC <sub>50</sub> | 39 mg/L; 48h (2-Ethylhexanol) OEDC 202     |
| Aquatic Plant - Algea, Scenedesmus subspicatus                | EC <sub>50</sub> | 11.5-16.6 mg/L; 72h (2-Ethylhexanol)       |
| Fish - Pimephales promelas [static]                           | LD <sub>50</sub> | 1376 mg/L; 96h (n-Butyl Alcohol) OEDC 203  |

- Persistence** : Polypropylene glycol ethers may persist in aquatic environment.
- Degradability** : No information available for this product. 2-Ethylhexanol is readily biodegradable (OECD TG 301C). Degradation by BOD (O<sub>2</sub> consumption) was reported as 79 % in 14 days. 1-Propene, hydroformylation products, high-boiling (CAS no 68551-11-1) are readily biodegradable, 100% in 23 days (OECD 301F ready biodegradability test guideline). All tests in water showed that High boiling by-products from the manufacturing process of 2-ethylhexanol (CAS no 68609-68-7) was not ready biodegradable under the test conditions within 28 days (OECD Guideline 301). However, the BOD<sub>5</sub>/COD ratio of 85% at day 14 confirms the suitability degradation in the activated sludge. n-Butyl Alcohol is readily biodegradable. Degradation by Biochemical Oxygen Demand BOD (O<sub>2</sub> consumption) was reported as 92% after 20 days.
- Bioaccumulation potential** : No information available for this product. 1-Propene, hydroformylation products, high-boiling (CAS no 68551-11-1) have a partition factors Log Kow of 0.6 to 3.2, indicating that they should not accumulate in the food chain. 2-Ethylhexanol has a Bioconcentration Factor (BCF) value of 30, and its Log Kow value is 2.73, indicating its potential to bioaccumulate is low. High boiling by-products from the manufacturing process of 2-ethylhexanol (CAS no 68609-68-7) has a partition factors Log Kow of 1.6 indicating that it should not accumulate in the food chain. n-Butyl alcohol has a Bioconcentration Factor (BCF) value of 3, and its Log Kow value is from 0.8 to 1, indicating its potential to bioaccumulate is very low.
- Mobility in soil** : No information available for this product. 1-Propene, hydroformylation products, high-boiling (CAS no 68551-11-1) have low volatility and low soluble in water. Then product should migrate towards the soil. High boiling by-products from the manufacturing process of 2-ethylhexanol (CAS no 68609-68-7) has low volatility and low soluble in water. Then product should migrate towards the soil. The estimated Koc value of 35 suggests that 2-Ethylhexanol is expected to have very high mobility in soil (TOXNET Databases).
- 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 throw residual to sewer, streams, sewers or drinking water supply. DO NOT puncture, cut, heat or burn container, even after use. 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                           | NA1993   | COMBUSTIBLE LIQUID, N.O.S. (OXYGENATED HYDROCARBONS, ALDEHYDES) | 3                          | III           | Combustible |
| <b>Additional Information</b> | Not regulated in containers less than 120 gallons (450 L)<br>Permit required for transportation with proper placards displayed on vehicle. |   |                            |               |             |
| TDG                           | Not regulated  |   |                            |               |             |
| <b>Additional Information</b> | Emergency response guidebook 2012 - 128  |   |                            |               |             |
| IMO/IMDG                      | Not regulated  |   |                            |               |             |
| <b>Additional Information</b> |  |   |                            |               |             |
| IATA                          | Not regulated  |   |                            |               |             |

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:  
n-Butyl Alcohol (CAS no. 71-36-3).
- CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):  
n-Butyl Alcohol (CAS no. 71-36-3).
- EPCRA Section 302/304 Extremely Hazardous Substances:  
No material is listed.
- Clean Water Act (CWA) 311 Hazardous Substances:  
n-Butyl Alcohol (CAS no. 71-36-3).
- Clean Water Act (CWA) Priority Pollutants:  
No material is listed.
- Clean Air Act (CAA) 111:  
Polypropylene glycol (CAS no 29434-03-5 or CAS no 25322-69-4).
- Clean Air Act (CAA 112b) HON - Hazardous Organic National Emission Air Pollutants:  
Polypropylene glycol (CAS no 29434-03-5 or CAS no 25322-69-4).
- 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):  
n-Butyl Alcohol (CAS no. 71-36-3).

### WHMIS 1988:

- Class B3 : Combustible Liquid
- Class D2A : Very toxic material causing other toxic effects
- Class D2B : Toxic material causing other toxic effects

### NFPA



## 16. OTHER INFORMATION

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

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**Prepared by:** Flottec, LLC

**Revised by:** C. Yuen

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**REASON FOR REVISION:** Section 1: Updated Flottec address

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### DISCLAIMER

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