

## SAFETY DATA SHEET

### AQF-2 FOAMING AGENT

Product Trade Name:

Revision Date: 21-Nov-2017

Revision Number: 31

#### 1. Identification

##### 1.1. Product Identifier

Product Trade Name: AQF-2 FOAMING AGENT  
Synonyms: None  
Chemical Family: Blend  
Internal ID Code: HM000071

##### 1.2 Recommended use and restrictions on use

Application: Foaming Agent  
Uses advised against: No information available

##### 1.3 Manufacturer's Name and Contact Details

###### Manufacturer/Supplier

Halliburton Energy Services, Inc.  
P.O. Box 1431  
Duncan, Oklahoma 73536-0431  
Telephone: 1-281-871-6107

Halliburton Energy Services, Inc.  
645 - 7th Ave SW Suite 1800  
Calgary, AB  
T2P 4G8  
Canada

Prepared By: Chemical Stewardship  
Telephone: 1-281-871-6107  
e-mail: fdunexchem@halliburton.com

##### 1.4. Emergency telephone number:

Emergency Telephone Number: 1-866-519-4752 or 1-760-476-3962  
Global Incident Response Access Code: 334305  
Contract Number: 14012

#### 2. Hazards Identification

##### 2.1 Classification in accordance with paragraph (d) of §1910.1200

Skin Corrosion / Irritation	Category 2 - H315
Serious Eye Damage/Irritation	Category 2 - H319
Acute Aquatic Toxicity	Category 2 - H401
Flammable liquids.	Category 4 - H227

##### 2.2. Label Elements

Hazard Pictograms



**Signal Word:** Warning

**Hazard Statements**  
 H227 - Combustible liquid  
 H315 - Causes skin irritation  
 H319 - Causes serious eye irritation  
 H401 - Toxic to aquatic life

**Precautionary Statements**

**Prevention**  
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
 P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P273 - Avoid release to the environment

**Response**  
 P280 - Wear protective gloves/eye protection/face protection  
 P302 + P352 - IF ON SKIN: Wash with plenty of water.  
 P332 + P313 - If skin irritation occurs: Get medical advice/attention  
 P362 + P364 - Take off contaminated clothing and wash before reuse  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P337 + P313 - If eye irritation persists: Get medical advice/attention  
 P370 + P378 - In case of fire: Use water spray for extinction

**Storage**  
**Disposal**  
 P403 + P235 - Store in a well-ventilated place. Keep cool  
 P501 - Dispose of contents/container in accordance with local/regional/national/international regulations

**2.3 Hazards not otherwise classified**

None known

**3. Composition/information on Ingredients**

Substances	CAS Number	PERCENT (w/w)	GHS Classification - US
Salts of aliphatic sulfonic acids	Proprietary	30 - 60%	Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Aquatic Acute 2 (H401)
Ethylene glycol monobutyl ether	111-76-2	10 - 30%	Acute Tox. 4 (H302) Acute Tox. 4 (H312) Acute Tox. 4 (H332) Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Flam. Liq. 4 (H227)
Diethylene glycol	111-46-6	5 - 10%	Acute Tox. 4 (H302) STOT RE 2 (H373)

The specific chemical identity of the composition has been withheld as proprietary. The exact percentage (concentration) of the composition has been withheld as proprietary.

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## 4. First Aid Measures

### 4.1. Description of first aid measures

<b>Inhalation</b>	If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.
<b>Eyes</b>	In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.
<b>Skin</b>	In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

### 4.2 Most important symptoms/effects, acute and delayed

Causes skin irritation. Causes eye irritation. May be harmful if swallowed.

### 4.3. Indication of any immediate medical attention and special treatment needed

**Notes to Physician** Treat symptomatically.

## 5. Fire-fighting measures

### 5.1. Extinguishing media

#### Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

#### Extinguishing media which must not be used for safety reasons

Do NOT spray pool fires directly with water. A solid stream of water directed into hot burning liquid can cause splattering.

### 5.2 Specific hazards arising from the substance or mixture

#### Special exposure hazards in a fire

Decomposition in fire may produce harmful gases. Vapors are heavier than air and may accumulate in low areas. Vapors may travel along the ground to be ignited at distant locations.

### 5.3 Special protective equipment and precautions for fire-fighters

#### Special protective equipment for firefighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Ensure adequate ventilation. Avoid breathing vapors. Avoid contact with skin, eyes and clothing. Remove sources of ignition.

See Section 8 for additional information

### 6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

### 6.3. Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove. Do NOT spread spilled product with water.

## 7. Handling and storage

### 7.1. Precautions for safe handling

#### Handling Precautions

Use appropriate protective equipment. Ensure adequate ventilation. Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Remove sources of ignition. Ground and bond containers when transferring from one container to another.

### Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

## 7.2. Conditions for safe storage, including any incompatibilities

### Storage Information

Store away from oxidizers. Keep from heat, sparks, and open flames. Store in a cool well ventilated area. Keep container closed when not in use. Keep from freezing. Product has a shelf life of 36 months.

## 8. Exposure Controls/Personal Protection

### 8.1 Occupational Exposure Limits

Substances	CAS Number	OSHA PEL-TWA	ACGIH TLV-TWA
Salts of aliphatic sulfonic acids	Proprietary	Not applicable	Not applicable
Ethylene glycol monobutyl ether	111-76-2	TWA: 50 ppm TWA: 240 mg/m <sup>3</sup>	TWA: 20 ppm
Diethylene glycol	111-46-6	Not applicable	Not applicable

### 8.2 Appropriate engineering controls

#### Engineering Controls

Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits. Ensure adequate ventilation, especially in confined areas

### 8.3 Individual protection measures, such as personal protective equipment

#### Personal Protective Equipment

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

#### Respiratory Protection

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

When the potential exists for vapors of this product to be present, use a respirator with an organic-vapor filter or a supplied-air respirator as needed for adequate protection.

#### Hand Protection

Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced.

#### Skin Protection

Wear protective clothing appropriate for the work environment.

#### Eye Protection

Chemical goggles; also wear a face shield if splashing hazard exists.

#### Other Precautions

None known.

## 9. Physical and Chemical Properties

### 9.1. Information on basic physical and chemical properties

<b>Physical State:</b> Liquid	<b>Color</b>	Clear light yellow
<b>Odor:</b> Bland	<b>Odor</b>	No information available
	<b>Threshold:</b>	

<u>Property</u>	<u>Values</u>
Remarks/ - Method	
<b>pH:</b>	6.5-8.5 (10%)
<b>Freezing Point / Range</b>	-16 °C / 3.2 (pour point: 15.8) °F
<b>Melting Point / Range</b>	No data available
<b>Boiling Point / Range</b>	> 100 °C / 212 °F
<b>Flash Point</b>	61 °C / 142 °F PMCC
<b>Flammability (solid, gas)</b>	No data available
Upper flammability limit	No data available
Lower flammability limit	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	< 1 mmHg
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	1.038
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available
<b>9.2. Other information</b>	
<b>VOC Content (%)</b>	No data available

## **10. Stability and Reactivity**

### **10.1. Reactivity**

Not expected to be reactive.

### **10.2. Chemical stability**

Stable

### **10.3. Possibility of hazardous reactions**

Will Not Occur

### **10.4. Conditions to avoid**

Keep away from heat, sparks and flame.

### **10.5. Incompatible materials**

Strong oxidizers.

### **10.6. Hazardous decomposition products**

Oxides of sulfur. Carbon monoxide and carbon dioxide.

## **11. Toxicological Information**

### **11.1 Information on likely routes of exposure**

**Principle Route of Exposure** Eye or skin contact, inhalation. Ingestion.

### **11.2 Symptoms related to the physical, chemical and toxicological characteristics**

**Acute Toxicity****Inhalation**

May cause respiratory irritation.

**Eye Contact**

Causes eye irritation.

**Skin Contact**

Causes skin irritation.

**Ingestion**

May be harmful if swallowed.

**Chronic Effects/Carcinogenicity** No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

**11.3 Toxicity data****Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Salts of aliphatic sulfonic acids	Proprietary	2310 mg/kg (Rat) 2079 mg/kg (Rat) 6314 mg/kg (Rat) 4000 mg/kg (Rat)	6300 mg/kg (Rabbit) > 6000 mg/kg	> 52 mg/L (Rat) 4h
Ethylene glycol monobutyl ether	111-76-2	1414 mg/kg-bw (guinea pig)	>2000 mg/kg (Rabbit)	No data available
Diethylene glycol	111-46-6	12565 - 19600 mg/kg (Rat)	11890 - 13300 mg/kg (Rabbit)	> 4.6 mg/L (Rat) 4h

Substances	CAS Number	Skin corrosion/irritation
Salts of aliphatic sulfonic acids		Irritating to skin. (Rabbit)
Ethylene glycol monobutyl ether	111-76-2	Causes moderate skin irritation. (Rabbit) Skin, rabbit:
Diethylene glycol	111-46-6	Non-irritating to the skin (Rabbit)

Substances	CAS Number	Serious eye damage/irritation
Salts of aliphatic sulfonic acids		Irritating to eyes (Rabbit)
Ethylene glycol monobutyl ether	111-76-2	Causes moderate eye irritation (Rabbit) Eye, rabbit:
Diethylene glycol	111-46-6	Non-irritating to the eye (Rabbit)

Substances	CAS Number	Skin Sensitization
Salts of aliphatic sulfonic acids		Did not cause sensitization on laboratory animals (guinea pig)
Ethylene glycol monobutyl ether	111-76-2	Did not cause sensitization on laboratory animals (guinea pig)
Diethylene glycol	111-46-6	Did not cause sensitization on laboratory animals (guinea pig)

Substances	CAS Number	Respiratory Sensitization
Salts of aliphatic sulfonic acids		No information available
Ethylene glycol monobutyl ether	111-76-2	No information available
Diethylene glycol	111-46-6	No information available

Substances	CAS Number	Mutagenic Effects
Salts of aliphatic sulfonic acids		In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects.
Ethylene glycol monobutyl ether	111-76-2	In vitro tests did not show mutagenic effects. In vivo tests did not show mutagenic effects.
Diethylene glycol	111-46-6	In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects.

Substances	CAS Number	Carcinogenic Effects
Salts of aliphatic sulfonic acids		Did not show carcinogenic effects in animal experiments (Rat)
Ethylene glycol monobutyl ether	111-76-2	Not regarded as carcinogenic.
Diethylene glycol	111-46-6	Did not show carcinogenic effects in animal experiments (Rat)

Substances	CAS Number	Reproductive toxicity
Salts of aliphatic sulfonic acids		No significant toxicity observed in animal studies at concentration requiring classification.

acids		
Ethylene glycol monobutyl ether	111-76-2	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.
Diethylene glycol	111-46-6	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.

Substances	CAS Number	STOT - single exposure
Salts of aliphatic sulfonic acids		No significant toxicity observed in animal studies at concentration requiring classification.
Ethylene glycol monobutyl ether	111-76-2	No data of sufficient quality are available.
Diethylene glycol	111-46-6	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	STOT - repeated exposure
Salts of aliphatic sulfonic acids		No significant toxicity observed in animal studies at concentration requiring classification.
Ethylene glycol monobutyl ether	111-76-2	No data of sufficient quality are available.
Diethylene glycol	111-46-6	Causes damage to organs through prolonged or repeated exposure: Kidney

Substances	CAS Number	Aspiration hazard
Salts of aliphatic sulfonic acids		No information available
Ethylene glycol monobutyl ether	111-76-2	Not applicable
Diethylene glycol	111-46-6	No information available

## 12. Ecological Information

### 12.1. Toxicity

#### Ecotoxicity effects

Toxic to aquatic life.

#### Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Salts of aliphatic sulfonic acids	Proprietary	EC50 (72h) 5.2 mg/L (Skeletonema costatum)	LC50 (96h) 4.2 mg/L (Danio rerio)	No information available	EC50 (48h) 4.53 mg/L (Ceriodaphnia sp) NOEC (21d) 6.3 mg/L (Daphnia magna)
Ethylene glycol monobutyl ether	111-76-2	EC50(72 h)=1840 mg/L (Pseudokirchneriella subcapitata)	LC50(96 h)=1474 mg/L (Oncorhynchus mykiss) NOAEC(21 d)>100 mg/L (Danio rerio)	No information available	EC50(48 h)=1800 mg/L (Daphnia magna) EC50(21 d)=297 mg/L (Daphnia magna)
Diethylene glycol	111-46-6	TGK (8d) 2700 mg/L (Scenedesmus quadricauda)	LC50 75200 mg/L (Pimephales promelas)	EC20 (30m) > 1995 mg/L (domestic activated sludge)	EC50 84000 mg/L (Daphnia magna) EC50 >10000 mg/L (Daphnia magna)

### 12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Salts of aliphatic sulfonic acids	Proprietary	Readily biodegradable (80-96% @ 28d)
Ethylene glycol monobutyl ether	111-76-2	Readily biodegradable (90.4% @ 28d)
Diethylene glycol	111-46-6	Readily biodegradable (90-100% @ 28d)

### 12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Salts of aliphatic sulfonic acids	Proprietary	- 1.3
Ethylene glycol monobutyl ether	111-76-2	Log Pow=2.4
Diethylene glycol	111-46-6	BCF: 100 (Leuciscus idus melanotus)

**12.4. Mobility in soil**

Substances	CAS Number	Mobility
Salts of aliphatic sulfonic acids	Proprietary	No information available
Ethylene glycol monobutyl ether	111-76-2	No information available
Diethylene glycol	111-46-6	No information available

**12.5 Other adverse effects**

No information available

**13. Disposal Considerations****13.1. Waste treatment methods**

**Disposal methods** Follow all applicable community, national or regional regulations regarding waste management methods.

**Contaminated Packaging** Follow all applicable national or local regulations.

**14. Transport Information****US DOT**

**UN Number** Not restricted  
**UN proper shipping name:** Not restricted  
**Transport Hazard Class(es):** Not applicable  
**Packing Group:** Not applicable  
**Environmental Hazards:** Not applicable

**US DOT Bulk**

NA1993, Combustible Liquid, N.O.S. (Contains Ethylene Glycol Monobutyl Ether), Combustible Liquid, III

**Canadian TDG**

**UN Number** Not restricted  
**UN proper shipping name:** Not restricted  
**Transport Hazard Class(es):** Not applicable  
**Packing Group:** Not applicable  
**Environmental Hazards:** Not applicable

**IMDG/IMO**

**UN Number** Not restricted  
**UN proper shipping name:** Not restricted  
**Transport Hazard Class(es):** Not applicable  
**Packing Group:** Not applicable  
**Environmental Hazards:** Not applicable

**IATA/ICAO**

**UN Number** Not restricted  
**UN proper shipping name:** Not restricted  
**Transport Hazard Class(es):** Not applicable  
**Packing Group:** Not applicable  
**Environmental Hazards:** Not applicable

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** Not applicable

**Special Precautions for User** None

**15. Regulatory Information**



## US Regulations

### US TSCA Inventory

All components listed on inventory or are exempt.

### TSCA Significant New Use Rules - S5A2

Substances	CAS Number	TSCA Significant New Use Rules - S5A2
Salts of aliphatic sulfonic acids	Proprietary	Not applicable
Ethylene glycol monobutyl ether	111-76-2	Not applicable
Diethylene glycol	111-46-6	Not applicable

### EPA SARA Title III Extremely Hazardous Substances

Substances	CAS Number	EPA SARA Title III Extremely Hazardous Substances
Salts of aliphatic sulfonic acids	Proprietary	Not applicable
Ethylene glycol monobutyl ether	111-76-2	Not applicable
Diethylene glycol	111-46-6	Not applicable

### EPA SARA (311,312) Hazard Class

Acute Health Hazard  
Chronic Health Hazard  
Fire Hazard

### EPA SARA (313) Chemicals

Substances	CAS Number	Toxic Release Inventory (TRI) - Group I	Toxic Release Inventory (TRI) - Group II
Salts of aliphatic sulfonic acids	Proprietary	Not applicable	Not applicable
Ethylene glycol monobutyl ether	111-76-2	1.0%	Not applicable
Diethylene glycol	111-46-6	Not applicable	Not applicable

### EPA CERCLA/Superfund Reportable Spill Quantity

Substances	CAS Number	CERCLA RQ
Salts of aliphatic sulfonic acids	Proprietary	Not applicable
Ethylene glycol monobutyl ether	111-76-2	Not applicable
Diethylene glycol	111-46-6	Not applicable

### EPA RCRA Hazardous Waste Classification

If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.

### California Proposition 65

Substances	CAS Number	California Proposition 65
Salts of aliphatic sulfonic acids	Proprietary	Not applicable
Ethylene glycol monobutyl ether	111-76-2	Not applicable
Diethylene glycol	111-46-6	Not applicable

### U.S. State Right-to-Know Regulations

Substances	CAS Number	MA Right-to-Know Law	NJ Right-to-Know Law	PA Right-to-Know Law
Salts of aliphatic sulfonic acids	Proprietary	Not applicable	Not applicable	Not applicable
Ethylene glycol monobutyl ether	111-76-2	Present	0275 3138	Present Environmental hazard
Diethylene glycol	111-46-6	Not applicable	Not applicable	Present

### NFPA Ratings:

Health 1, Flammability 2, Reactivity 0

### HMIS Ratings:

Health 1, Flammability 2, Physical Hazard 0, PPE: C

## Canadian Regulations

**Canadian Domestic Substances List (DSL)** All components listed on inventory or are exempt.

**16. Other information****Preparation Information**

**Prepared By** Chemical Stewardship  
Telephone: 1-281-871-6107  
e-mail: fdunexchem@halliburton.com

**Revision Date:** 21-Nov-2017

**Reason for Revision** SDS sections updated:  
2

**Additional information**

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

**Key or legend to abbreviations and acronyms used in the safety data sheet**

bw – body weight  
CAS – Chemical Abstracts Service  
d - day  
EC50 – Effective Concentration 50%  
ErC50 – Effective Concentration growth rate 50%  
h - hour  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL50 – Lethal Loading 50%  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
mg/m<sup>3</sup> - milligram/cubic meter  
mm - millimeter  
mmHg - millimeter mercury  
NIOSH – National Institute for Occupational Safety and Health  
NTP – National Toxicology Program  
OEL – Occupational Exposure Limit  
PEL – Permissible Exposure Limit  
ppm – parts per million  
STEL – Short Term Exposure Limit  
TWA – Time-Weighted Average  
UN – United Nations  
w/w - weight/weight

**Key literature references and sources for data**

[www.ChemADVISOR.com/](http://www.ChemADVISOR.com/)

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**End of Safety Data Sheet**