HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **OPTIFLO-II DELAYED RELEASE BREAKER**

Revision Date: 26-Mar-2014 **Revision Number:** 12

1. Product and Company Identification

Product Identifier

Product Trade Name: OPTIFLO-II DELAYED RELEASE BREAKER
Synonyms: None
Chemical Family: Oxidant
Internal ID Code HM001138

Product Use

Application: Breaker

Manufacturer's Name and Contact Details

Name and Address Halliburton Energy Services
645 - 7th Ave SW Suite 2200
Calgary, AB
T2P 4G8
Canada

Emergency Telephone Number (281) 575-5000

Prepared By Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. Hazard(s) Identification

WHIMIS Classification

WHMIS Hazard Class
C Oxidizing Materials
D2B Toxic Materials
D2A Very Toxic Materials
Crystalline silica

WHMIS Symbol(s)

Summary of hazards of the product

Hazard Overview

May cause eye, skin, and respiratory irritation. May cause allergic skin and respiratory reaction. May be harmful if swallowed. Oxidizer. Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	HMIRA Registry Number	Filing Date
Ammonium persulfate	7727-54-0	60 - 100%	Not applicable	Not applicable
Crystalline silica, quartz	14808-60-7	5 - 10%	Not applicable	Not applicable

4. First aid measures

Description of first aid measures

Inhalation 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.

Eyes 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.

Skin 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.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

May cause eye, skin, and respiratory irritation. May cause allergic skin and respiratory reaction. Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

5. Fire Fighting Measures

Extinguishing media

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons

None known.

Special hazards arising from the substance or mixture

Special Exposure Hazards

Oxidizer. May ignite combustibles. Decomposition in fire may produce toxic gases.

Advice for firefighters

Special Protective Equipment for Fire-Fighters

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

Hazardous combustion products

Toxic fumes. Ammonia. Sulfuric acid. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).

6. Accidental release measures

Personal precautions and emergency producedures

Protective Equipment

Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures

Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption

Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. Handling and Storage

Precautions for safe handling

Avoid contact with eyes, skin, or clothing. Wash hands after use. Launder contaminated clothing before reuse. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

Conditions for safe storage and Incompatible materials for storage

Store away from reducing agents. Store away from combustibles. Store in a cool, dry location. Store between 20 F (-6 C) and 100 F (38 C). Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Product has a shelf life of 12 months.

8. Exposure Controls/Personal Protection

Occupational Exposure Limits

Exposure Limits

Substances	CAS Number	ACGIH TLV-TWA	OSHA PEL-TWA
Ammonium persulfate	7727-54-0	0.1 mg/m^3	Not applicable
Crystalline silica, quartz	14808-60-7	TWA: 0.025 mg/m^3	10 mg/m^3 %SiO2 + 2

Appropriate engineering controls

Engineering Controls Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits.

Personal Protective Equipment (PPE)

Respiratory Protection Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), AS/NZS 1715:2009, or equivalent respirator when using this product.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron. Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

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

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical State:	Solid	**Color:**	Off white to tan
Odor:	Mild acrid	**Odor Threshold:**	No information available

Property Remarks/ - Method	Values
pH:	5
pH Concentration of Solution:	No information available.
Freezing Point/Range	No information available.
Melting Point/Range	No information available
Boiling Point/Range (C):	No information available.
Flash Point/Range (C):	No information available.
Flash Point Method:	Not Determined
Autoignition Temperature (C):	No information available.
Flammability Limits in Air - Lower (%):	No information available.
Flammability Limits in Air - Upper (%):	No information available.
Evaporation Rate (Butyl Acetate=1):	No information available.
Vapor Pressure @ 20 C (mmHg):	No information available.
Vapor Density (Air=1):	No information available.
Specific Gravity @ 20 C (Water=1):	1.98
Solubility in Water (g/100ml):	79
Solubility in other solvents	No information available.
Partition Coefficient/n-Octanol/Water:	No information available.
Decomposition Temperature (C):	No information available.
Viscosity	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available

Other Information

Molecular Weight (g/mole):	228.22
VOC Content (%)	No information available

10. Stability and Reactivity

Conditions of Reactivity

Conditions to Avoid	Avoid contact with readily oxidizable materials.
Hazardous Polymerization:	Will Not Occur

Chemical Stability
Stable

Sensitivity to Static Discharge
Not available

Sensitivity to Mechanical Impact
Not available

Incompatible materials
Organic matter. All flammables, especially petroleum products, asphalt & other volatile flammables. Amphoteric metals such as aluminum, magnesium, lead, tin, or zinc. Strong acids. Avoid halogens.

Hazardous Decomposition Products
Toxic fumes. Ammonia. Sulfuric acid. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).

11. Toxicological Information

Routes of entry
Eye or skin contact, inhalation.

Information on Toxicological Effects

Acute effects from exposure

Inhalation

May cause allergic respiratory reaction. Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Eye Contact May cause eye irritation

Skin Contact May cause skin irritation. May cause an allergic skin reaction.

Ingestion Causes burns of the mouth, throat and stomach.

Chronic effects from exposure

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Irritancy of product

Irritation Irritating to eyes Irritating to skin

Sensitization of product

Sensitization May cause an allergic skin reaction. May cause allergic respiratory reaction.

Mutagenicity

Mutagenic Effects Not regarded as mutagenic

Carcinogenicity

Carcinogenic Effects No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC, NTP, or OSHA.

Reproductive Toxicity

Reproductive Toxicity This product does not contain any known or suspected reproductive hazards

Teratogenicity/embryotoxicity

Teratogenic Not a teratogen or embroytoxin.

Toxicologically synergistic material Not available

Acute Toxicity

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ammonium persulfate	7727-54-0	495 mg/kg (Rat)	No data available	520 mg/L (Rat) 1 h
Crystalline silica, quartz	14808-60-7	500 mg/kg (Rat)	No data available	No data available

12. Ecological Information

Toxicity
Ecotoxicity Effects

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Ammonium persulfate	7727-54-0	No information available	LC50; 103 mg/l (Lepomis macrochirus)	No information available	EC50: 120 mg/L (Daphnia magna)
Crystalline silica, quartz	14808-60-7	EC50(72h): 89 mg/L (biomass) (Scenedesmus subspicatus) (similar substance)	LC50(96h): 508 mg/L (Danio rerio) (similar substance)	No information available	LC50(48h): 731 mg/L (Daphnia magna) (similar substance) LC50(48h) 33.5 mg/L (Ceriodaphnia dubia) (similar substance)

Persistence and Degradability
No information available

Bioaccumlation potential
No information available

Mobility in soil
No information available

Results of PBT and vPvB assessment
No information available.

Other adverse effects
Endocrine Disruptor Information
This product does not contain any known or suspected endocrine disruptors

13. Disposal Considerations

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging This bag may contain residue of a hazardous material. Some authorities may regulate such containers as hazardous waste. Dispose of container according to national or local regulations.

14. Transport Information

Canadian TDG

UN Number: UN1444,
UN Proper Shipping Name: Ammonium Persulfate
Transport Hazard Class(es): , 5.1
Packing Group: , III
EMS: EmS F-A, S-Q

IATA/ICAO

UN Number:	UN1444,
UN Proper Shipping Name:	Ammonium Persulfate
Transport Hazard Class(es):	, 5.1
Packing Group:	, III

IMDG/IMO

UN Number:	UN1444,
UN Proper Shipping Name:	Ammonium Persulfate
Transport Hazard Class(es):	, 5.1
Packing Group:	, III
EMS:	EmS F-A, S-Q

Special Precautions for User None

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

15. Regulatory Information

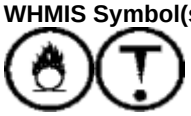
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Canadian Regulations

Canadian DSL Inventory Product contains one or more components not listed on the inventory.

WHMIS Hazard Class
C Oxidizing Materials
D2B Toxic Materials
D2A Very Toxic Materials
Crystalline silica

WHMIS Symbol(s)



US Regulations

US TSCA Inventory All components listed on inventory or are exempt.

16. Other Information

Preparation Information

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

Revision Date: 26-Mar-2014

Not applicable

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 Compliance at 1-580-251-4335.

Key or legend to abbreviations and acronyms
WHMIS: Workplace Hazardous Materials Information System

Key literature references and sources for data
www.ChemADVISOR.com/

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*****END OF MSDS*****