

SAFETY DATA SHEET

Product Trade Name: BE-6™ Bactericide

Revision Date: 22-Oct-2021

Revision Number: 9

1. Identification

1.1. Product Identifier

Product Trade Name: BE-6™ Bactericide
Synonyms None
Chemical Family: Not applicable
Internal ID Code HB000124

1.2 Recommended use and restrictions on use

Application: Microbiocide
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 Group Canada
645 - 7th Ave SW Suite 1800
Calgary, AB, T2P 4G8, Canada
Telephone: 1-403-231-9300

Prepared By

Chemical Stewardship
e-mail: fdunexchem@halliburton.com

1.4. Emergency telephone number:

Emergency Telephone Number 1-866-519-4752 or 1-760-476-3962 (accessible 24 hours a day / 7 days a week)
Global Incident Response Access Code: 334305
Contract Number: 14012

2. Hazards Identification

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

Acute Oral Toxicity	Category 4 - H302
Acute toxicity - Dermal	Category 4 - H312
Skin Corrosion / Irritation	Category 1 - H314
Serious Eye Damage/Irritation	Category 1 - H318
Specific Target Organ Toxicity - (Single Exposure)	Category 3 - H335
Acute Aquatic Toxicity	Category 1 - H400
Chronic Aquatic Toxicity	Category 2 - H411
Flammable solids.	Category 2 - H228

2.2. Label Elements

Hazard Pictograms



Signal Word:

Danger

Hazard Statements

H228 - Flammable solid
 H302 - Harmful if swallowed
 H312 - Harmful in contact with skin
 H314 - Causes severe skin burns and eye damage
 H318 - Causes serious eye damage
 H335 - May cause respiratory irritation
 H400 - Very toxic to aquatic life
 H411 - Toxic to aquatic life with long lasting effects

Precautionary Statements

Prevention

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P240 - Ground and bond container and receiving equipment.
 P241 - Use explosion-proof electrical/ventilating/lighting/equipment
 P260 - Do not breathe dust/fume/gas/mist/vapors/spray
 P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
 P264 - Wash face, hands and any exposed skin 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 - Avoid release to the environment

Response

P280 - Wear protective gloves/eye protection/face protection
 P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
 P330 - Rinse mouth
 P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
 P362 + P364 - Take off contaminated clothing and wash before reuse
 P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 P310 - Immediately call a POISON CENTER or doctor/physician
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 P370 + P378 - In case of fire: Use water spray for extinction

Storage

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
 P405 - Store locked up

Disposal

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
2-Bromo-2-nitro-1,3-propanediol	52-51-7	60 - 100%	Acute Tox. 4 (H302) Acute Tox. 4 (H312) Skin Corr. 1 (H314) Eye Corr. 1 (H318) STOT SE 3 (H335) Aquatic Acute 1 (H400) Aquatic Chronic 2 (H411) Flam. Sol. 2 (H228)

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

4. First Aid Measures**4.1. Description of first aid measures**

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Eyes	Immediately flush eyes with large amounts of water for at least 30 minutes. Seek prompt medical attention.
Skin	In case of contact, immediately flush skin with plenty of soap and water for at least 30 minutes and remove contaminated clothing, shoes and leather goods immediately. Get medical attention immediately.
Ingestion	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

4.2 Most important symptoms/effects, acute and delayed

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. May cause respiratory irritation. Harmful if swallowed. Harmful in contact with skin.

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

None known.

5.2 Specific hazards arising from the substance or mixture**Special exposure hazards in a fire**

Decomposition in fire may produce harmful gases.

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.
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

Scoop up and remove. Flush area with water.

7. Handling and storage

7.1. Precautions for safe handling

Handling Precautions

Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust. Wash hands after use. Launder contaminated clothing before reuse.

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. Store in a cool, dry location. Store in a well ventilated area. Store locked up. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Store at temperatures below 104 F (40 C) and 140 F (60 C) for short periods. Product has a shelf life of 48 months.

8. Exposure Controls/Personal Protection

8.1 Occupational Exposure Limits

Substances	CAS Number	OSHA PEL-TWA	ACGIH TLV-TWA
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable	Not applicable

8.2 Appropriate engineering controls

Engineering Controls Use in a well ventilated area.

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. Organic vapor respirator with a dust/mist filter. (A2P2/P3)

Hand Protection Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Nitrile gloves. (>= 8 mm thickness)
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

Skin Protection Eye Protection Other Precautions	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. Manufacturer's directions for use should be observed because of great diversity of types. Rubber apron. Rubber boots. Dust proof goggles. Eyewash fountains and safety showers must be easily accessible.
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9. Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Physical State: Solid Powder	Color	White
Odor: Characteristic	Odor	No information available
	Threshold:	

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
pH:	5 - 7
Freezing Point / Range	130 °C / 266 °F
Melting Point / Range	No data available
Pour Point / Range	No data available
Boiling Point / Range	> 130 °C / > 266 °F
Flash Point	> 93 °C / 199 °F (PMCC)
Flammability (solid, gas)	No data available
Upper flammability limit	No data available
Lower flammability limit	No data available
Evaporation rate	No data available
Vapor Pressure	0.0005 @ 20 C (mmHg)
Vapor Density	> 1 (air = 1)
Specific Gravity	1.1
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	0.18
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

9.2. Other information

VOC Content (%)	No data available
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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. Contact with alkalis. Contact with metals. Amines.

10.6. Hazardous decomposition products

Oxides of nitrogen. Bromine. Hydrogen bromide. Carbon monoxide and carbon dioxide. Formaldehyde.

11. Toxicological Information

11.1 Information on likely routes of exposure

Principle Route of Exposure Eye or skin contact, inhalation.

11.2 Symptoms related to the physical, chemical and toxicological characteristics

Acute Toxicity

Inhalation

Causes severe respiratory irritation.

Eye Contact

Causes severe eye irritation which may damage tissue.

Skin Contact

Harmful in contact with skin. Causes severe burns.

Ingestion

Harmful if swallowed. Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.

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
2-Bromo-2-nitro-1,3-propane diol	52-51-7	305 mg/kg (Rat) 307 mg/kg (Rat)	1600 mg/kg (Rat)	> 0.588 mg/L (Rat) 4h > 5 mg/L (Rat) 4h

Substances	CAS Number	Skin corrosion/irritation
2-Bromo-2-nitro-1,3-propane diol	52-51-7	Causes severe skin irritation with tissue destruction. (Rabbit)

Substances	CAS Number	Serious eye damage/irritation
2-Bromo-2-nitro-1,3-propane diol	52-51-7	Causes severe eye irritation which may damage tissue. (Rabbit)

Substances	CAS Number	Skin Sensitization
2-Bromo-2-nitro-1,3-propane diol	52-51-7	Patch test on human volunteers did not demonstrate sensitization properties Did not cause sensitization on laboratory animals (guinea pig)

Substances	CAS Number	Respiratory Sensitization
2-Bromo-2-nitro-1,3-propane diol	52-51-7	No information available

Substances	CAS Number	Mutagenic Effects
2-Bromo-2-nitro-1,3-propane diol	52-51-7	Some in vitro tests have shown mutagenic effects. In vivo tests did not show mutagenic effects.

Substances	CAS Number	Carcinogenic Effects
2-Bromo-2-nitro-1,3-propane diol	52-51-7	Did not show carcinogenic effects in animal experiments

Substances	CAS Number	Reproductive toxicity
2-Bromo-2-nitro-1,3-propane diol	52-51-7	Animal testing did not show any effects on fertility. Did not show teratogenic effects in animal experiments.

Substances	CAS Number	STOT - single exposure
2-Bromo-2-nitro-1,3-propane diol	52-51-7	May cause respiratory irritation.

Substances	CAS Number	STOT - repeated exposure
2-Bromo-2-nitro-1,3-propanediol	52-51-7	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable

12. Ecological Information

12.1. Toxicity

Ecotoxicity effects

Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Acute Fish Toxicity

TLM96: 41 ppm (Oncorhynchus mykiss)
 TLM96: 36 ppm (Lepomis macrochirus)
 LC50 (96): 58 ppm (Pimephales promelas)

Acute Crustaceans Toxicity:

TLM48: 1.4 ppm (Daphnia magna)
 TLM96: 5.9 ppm (Americamysis bahia)

Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
2-Bromo-2-nitro-1,3-propanediol	52-51-7	EC50 (72h) 0.25 mg/L (Skeletonema costatum) EC50 (72h) 0.37 mg/L (Pseudokirchnerella subcapitata) EC50 (72h) 0.89 mg/L (Chlorella vulgaris)	LC50 (96h) 58 mg/l (Pimephales promelas) LC50 (96h) 35.7 mg/L (Lepomis macrochirus) LC50 (96h) 41.2 mg/L (Oncorhynchus mykiss) LC50 (96h) 57.6 mg/L (Cyprinodon variegatus) NOEC (49d) 21.5 mg/L (Oncorhynchus mykiss) LC50 (49d) 39.1 mg/L (Oncorhynchus mykiss)	EC20 (150m) 2 mg/L (Activated Sludge, Respiration Inhibition) EC50 (150m) 43 mg/L (Activated sludge)	EC50 (48h) 1.4 mg/L (Daphnia magna) EC50 (48h) 3.5 mg/L (Acartia tonsa) NOEC (21d) 0.27 mg/L (Daphnia magna) EC50 (21d) 0.27-0.88 mg/L (Daphnia magna)

12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Readily biodegradable (70% @ 28d)

12.3. Bioaccumulative potential

Substances	CAS Number	Bioaccumulation
2-Bromo-2-nitro-1,3-propanediol	52-51-7	0.22

12.4. Mobility in soil

Substances	CAS Number	Mobility
2-Bromo-2-nitro-1,3-propanediol	52-51-7	KOC = > 4

12.5 Other adverse effects

No information available

13. Disposal Considerations

13.1. Waste treatment methods

Disposal methods

Disposal should be made in accordance with federal, state, and local regulations. Incineration recommended in approved incinerator according to federal, state, and

Contaminated Packaging local regulations. Substance should NOT be deposited into a sewage facility. Follow all applicable national or local regulations.

14. Transport Information

US DOT

UN Number UN3241
 UN proper shipping name: 2-Bromo-2-Nitropropane-1,3-Diol
 Transport Hazard Class(es): 4.1
 Packing Group: III
 Environmental Hazards: Marine Pollutant
 NAERG: NAERG 133

Canadian TDG

UN Number UN3241
 UN proper shipping name: 2-Bromo-2-Nitropropane-1,3-Diol
 Transport Hazard Class(es): 4.1
 Packing Group: III
 Environmental Hazards: Marine Pollutant

IMDG/IMO

UN Number UN3241
 UN proper shipping name: 2-Bromo-2-Nitropropane-1,3-Diol
 Transport Hazard Class(es): 4.1
 Packing Group: III
 Environmental Hazards: Marine Pollutant
 EMS: EmS F-J, S-G

IATA/ICAO

UN Number UN3241
 UN proper shipping name: 2-Bromo-2-Nitropropane-1,3-Diol
 Transport Hazard Class(es): 4.1
 Packing Group: III
 Environmental Hazards: Marine Pollutant

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	TSCA Section 5(E) Consent Orders
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable	Not applicable

EPA SARA Title III Extremely Hazardous Substances

Substances	CAS Number	EPA SARA Title III Extremely Hazardous Substances
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable

EPA SARA (311,312) Hazard Class

Flammable (gases, aerosols, liquids, or solids)

Acute toxicity (any route of exposure)
 Skin Corrosion or Irritation
 Serious eye damage or eye irritation
 Specific target organ toxicity (single or repeated exposure)

EPA SARA (313) Chemicals:

Substances	CAS Number	Toxic Release Inventory (TRI) - Group I	Toxic Release Inventory (TRI) - Group II
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable	Not applicable

EPA CERCLA/Superfund Reportable Spill Quantity

Substances	CAS Number	CERCLA RQ
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable

EPA RCRA Hazardous Waste Classification

If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of:

Ignitability D001

Federal Insecticide, Fungicide and Rodenticide Act:

Label in accordance with Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requirements.

FIFRA Information

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

Signal Word:

DANGER
 CORROSIVE

Hazard Statements

Causes irreversible eye damage or skin burns.
 Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.
 This pesticide is toxic to fish and wildlife.

California Proposition 65

Substances	CAS Number	California Proposition 65
2-Bromo-2-nitro-1,3-propanediol	52-51-7	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
2-Bromo-2-nitro-1,3-propanediol	52-51-7	Not applicable	Not applicable	Not applicable

Canadian Regulations

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

16. Other information**Preparation Information****Prepared By**

Chemical Stewardship
 e-mail: fdunexchem@halliburton.com

Revision Date:

22-Oct-2021

Reason for Revision

Update to Format

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.

NFPA Ratings: Health 3, Flammability 1, Reactivity 2
HMIS Ratings: Health 3, Flammability 1, Physical Hazard 2 , PPE: X

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/m³ - 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/
NZ CCID
OSHA

Disclaimer Statement

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End of Safety Data Sheet