

APPENDIX E
Material Safety Data Sheet



Hawks Chemical Company Limited

Section 2 - Information on ingredients

Material	Ref No.	% range	Hazards
Sodium sulphide	EEC No. 215-211-5	10-20	Corrosive; R31-34
Sodium Hydroxide (Potassium)	CAS No. 1310-73 -2 (-58-3)	3-6	Corrosive
Sulphur	EINECS No. 2317226	9-12	N/C
Water		Balance	N/C

Section 3 - Hazards identification

Contact with acids liberates toxic gas

Eyes : Corrosive to eyes

Skin : Corrosive to skin. Causes burns

Inhalation : Unlikely. Will cause lung damage if mist or spray is inhaled.

Ingestion : Causes severe irritation to mouth, throat and stomach.

Section 4 - First aid measures

Eyes : Rinse eyes immediately with plenty of water and seek medical advice.

Skin : Remove contaminated clothing immediately. Wash skin with soap and plenty of water. Apply hand cream. If irritation persists seek medical advice.

Inhalation : If mist or spray is inhaled remove to fresh air, place in recovery position and seek medical help.

Ingestion : Give water to drink. Seek medical advice.

General : In case of accident or if you feel unwell, seek medical advice immediately. Show label where possible.

2 Tower Street, Hyde, Cheshire SK14 IJW

Tel: 0161-367 9441 - Fax: 0161 367 9443 - Web Site: <http://www.hawks-chem.com>

VAT No.419 5916 25 - Reg. No. 2253887

Section 5 - Fire-fighting measures

Keep upwind to avoid fumes

Suitable extinguishing media :CO₂, Dry powder, foam, water.

Combustion products :Very toxic gases composed of oxides of carbon and sulphur.

Special protective equipment :Self contained breathing apparatus.

Section 6 - Accidental release measures

Keep away from drains. Wear suitable protective clothing, eye protection and impervious gloves. Contain and absorb spills. Dispose of in accordance with local regulations. Treat as special waste.

Section 7 - Handling & storage

Keep containers closed. Protect containers from extreme heat. Allow adequate ventilation. Handle in accordance with Manual Handling Operations Regulations or in accordance with local directives.

Section 8 - Exposure controls and personal protection

Use :Use in well ventilated areas.

Eye protection :Wear protective glasses or goggles

Hand protection :Wear impervious gloves

Skin protection :Wear suitable clean protective overalls

Respiratory protection :Not normally required if ventilation is good

Section 9 - Physical & chemical data

Appearance :Amber liquid

Boiling point :100°C

Flash point :N/A

Autoflammability :N/A

Relative density :Ca 1.18 @ 25°C

Solubility in water :Soluble

Solubility in oil :Insoluble

Partition coefficient :Log Pow less than 3 (estimated)

Viscosity :N/D

Section 10 - Stability & reactivity

Conditions to avoid :Extreme heat

Material to avoid :Acids

Hazardous decomposition :Toxic oxides of carbon and sulphur when burning products.

Section 11 - Toxicological information

Inhalation :Inhalation of mist and spray will cause lung damage

Ingestion :Ingestion causes mouth, throat and stomach irritation

Eyes :Corrosive to eyes

Skin :Corrosive to skin. Causes burns.

Section 12 - Ecological information

LC 50 :N/D

Section 13 - Disposal considerations

Preferred route : Neutralisation and digestion

Note that if landfill is chosen method then local regulations must be observed.

Section 14 - Transport information

Subject to International Transport Regulations

Classification : Corrosive liquid, basic, inorganic UN No.3266
Class 8.3 R31-34**Section 15 - Regulatory information**Labelling : Corrosive R31-34 contact with acid liberates toxic gas.
Causes burns. In case of contact with eyes rinse immediately
with plenty of water and seek medical advice. In case of
accident or if you feel unwell, seek medical advice immediately.
Avoid contact with skin and eyes. Wear face and eye protection.

COSHH : User must make own assessment of workplace risk.

Section 16 - Other informationMSDS prepared using "Information approved for the classification and labelling of
substances and preparations dangerous for supply" 1996 and "Safety data sheets for
substances and preparations dangerous for supply" (second edition).

26th January 1999

MATERIAL SAFETY DATA SHEET

//USL sodiumbromidesolution

Product**Sodium Bromide Solution**

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1 Identification of the substance & the company

Chemical name	Sodium bromide water solution
Chemical formula	NaBr
CAS number	7647-15-6
Chemical family	Inorganic bromide
Molecular weight	102.9 (NaBr)
Type of product and use	For use in completion and oil drilling fluids and for industrial use
Company identification	Bromine Compounds Ltd.
Address and telephone	P.O.B 180, Beer Sheva 84 1 01, Israel, Tel +972-7-6297830 Emergency
telephone number:	
- For Europe	(00 31) 115 689000
- For UK and Ireland	(01865)407333
- For USA	Chemtrec (800)424-9300

2. Composition I information on ingredients

Hazardous component(s)	Sodium bromide - 44 %
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3. Hazards identification

Adverse human health effects	None under recommended use instructions
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4. First-aid measures

Eye contact	Holding the eyelids apart, flush eyes promptly with copious flowing water for at least 20 minutes. Get medical attention immediately.
Skin contact	Remove contaminated clothing. Wash skin thoroughly with mild soap and plenty of water for at least 15 minutes. Wash clothing before re-use. Get medical attention if irritation occurs.
Inhalation	In case of mist inhalation or breathing fumes released from heated material, remove person to fresh air. Keep him quiet and warm. Apply artificial respiration if necessary and get medical attention immediately.
Ingestion	If swallowed, wash mouth thoroughly with plenty of water and give water to drink. Get medical attention immediately.

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NOTE: Never give an unconscious person anything to drink.

Note to the physician (*)

In case of ingestion induce vomiting in alert patient.

No specific antidote.

Treat symptomatically and supportively.

5. Fire - fighting measures

Flash point	None
Flammable/Explosion limits	Not flammable
Auto-ignition temperature	Not applicable
Extinguishing media	Material is not combustible. Use extinguishing media appropriate to surrounding fire conditions.
Fire fighting procedure	Cool containers with water spray. In closed stores, provide fire-fighters with self-contained breathing apparatus in positive pressure mode.
Unusual fire and explosion hazards	Will decompose from ca. 8000C releasing poisonous and corrosive fumes of hydrogen bromide and sodium oxide.

6. Accidental release measures

Personal precautions	Wear respirator, chemical safety goggles, rubber gloves and boots. Absorb on sand or vermiculite and place in closed container for disposal.
After spillage / leakage	

7. Handling and storage

Handling	Avoid bodily contact. Keep containers tightly closed.
Storage	Keep in a well-ventilated place away from incompatible materials (see " materials to avoid").

8. Exposure controls | personal protection

Exposure limits:	
- TLV -TWA	Not established
Ventilation requirements	Provide adequate ventilation Use local exhaust as necessary, especially under misting conditions.
Personal protection equipment:	
- Respiratory protection	Approved respirator

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- Gloves	Protective gloves
- Eye protection	Chemical safety goggles
- Others	Body covering clothes and boots
Industrial hygiene	Safety shower and eye bath should be provided. Do not eat, drink or smoke until after-work showering and changing clothes.

9. Physical and chemical properties

Appearance	Colourless liquid, odourless
Melting point/range	Not available
Boiling point/range	112°C
Vapour pressure	Not available
Relative vapour density (air=1)	Not available
Evaporation rate (ether=1)	Of water
Solubility:	
- Solubility in water	For NaBr 100%: 94.6 gr/100ml at 25°C
- Solubility in other solvents	ethanol 95%: 7 g/100g at 25°C methanol: 14.8 g/100g at 25°C
Specific gravity	1.46
Thermal decomposition	For NaBr 1 00%: From ca. 800°C

10. Stability and reactivity

Stability	Stable under normal conditions
Materials to avoid	Acids, heavy metal salts and bromine trifluoride
Conditions to avoid Hazardous decomposition	Heating above 800°C
--- products	Hydrogen bromide and sodium oxide
Hazardous polymerization	Will not occur

11. Toxicological information

Toxicity:	
- Rat oral LD50	>5000 mg/kg
- Rabbit dermal LD50	>2000 mg/kg
Dermal sensitization	
--(guinea pig)	Not a sensitizer

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Effects of overexposure:

- Ocular
- Dermal
- Inhalation
- Ingestion

Mild irritant

Not irritant to intact skin. Slightly irritant on prolonged contact to abraded skin. Irritant to upper respiratory tract

Abdominal pain, nausea and vomiting.

May cause failing asleep, muscular incoordination and respiratory depression. Repeated skin contact may cause dermatitis.

Chronic toxicity

Repeated oral intake of bromides (>g mg/kg body weight/day) may affect the central nervous system. Warning symptoms include mental dullness, slurred speech, weakened memory, apathy, anorexia, constipation, drowsiness and loss of sensitivity to touch and pain.

Mutagenicity

Does not induce DNA repair in cultured human epithelioid cells.

Not clastogenic in human lymphocytes metaphase analysis.

Not mutagenic by the Ames Test

Carcinogenicity

Not known to be a carcinogen.

Not included in NTP 8th Report on Carcinogens.

Not classified by IARC.

Reproductive toxicity

Sodium bromide has been shown to cause embryo-fetal toxicity and malformations in rats at dose levels which also produce maternal toxicity.

The No-Observed Effect Level (NOEL) is 1 00 mg/kg/day, and the Acceptable Daily Intake (ADI)

for sodium bromide from food and drinking water in humans is 1 mg/kg/day.

Comparable high doses of sodium chloride (table salt) similarly cause malformations, embryo-fetal toxicity, and maternal toxicity in mice.

12. Ecological information

Aquatic toxicity

- 96 Hour-LC50, fish >100 mg/l (bluegill sunfish)
- >1000 mg/l (rainbow trout)

- 48 Hour-EC50

- Daphnia magna >1000 mg/l

Avian toxicity

- Bobwhite quail, acute oral LD50 >2250 mg/kg
- Mallard duck, dietary LC50 >5633 ppm
- Bobwhite quail, dietary LC50 >5633 ppm

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13. Disposal considerations

Waste disposal

Drain into sewer with ample water.
Avoid access to streams, lakes or ponds.
Observe all federal, state and local environmental regulations when disposing of this material.

14. Transportation information

UN No.	Not regulated
IMO-IMDG code	Not regulated
ICAO/IATA	Not regulated
RID/ADR	Not regulated
US DOT	Not regulated

15. Regulatory information

EEC	Reported in EINECS (No. 2315999)
USA	Reported in the EPA TSCA Inventory
Canada (*)	Listed in DSL
Japan (*)	Listed in MITI (ENCS No. 1-113)
Australia (*)	Listed in AICS
South Korea (*)	Listed in ECL (KE-31368)

16. Other information

The Environmental Policy of DSBG

(*)

Dead Sea Bromine Group. (DSBG), an international producer and marketer of chemicals, and a leader in the field of bromine and its derivatives, emphasizes in all its fields of operation (development, production and marketing), preservation of the environment and protection of worker's health and safety in production and transportation, while maintaining high standards of production, quality and profitability. Company management has adopted the Total Quality Management concept. Within this framework, the management is committed to the fulfillment of the ISO 9000 quality management standard requirements and to the ISO 14000 Environmental Management System (EMS) standard while ensuring production of high quality products in compliance with international standards. DSBG will comply with existing legal and regulatory requirements both national

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and international, while cooperating with authorities and emergency services and will strive to prevent safety risks

and environmental damage in production, transportation and storage of its products, both in and outside the Company.

DSBG will develop and use environmentally sound processes to manufacture products which are safe throughout their life cycle.

DSBG will set targets for reduction of air emissions, soil contamination, effluents and hazardous waste, will strive to save energy and preserve natural resources.

The Company will evaluate its activities periodically and will work for continuous improvement in these fields. Evaluation of the Environmental Management System will be integrated into the Company's existing quality audits system.

Every employee and manager in the Company will be required to exercise total personal responsibility for promotion and maintenance of safety and environmental protection.

The Company views education, and training of workers as an essential means of maintaining their work quality and skills.

DSBG will endeavor to work with suppliers, carriers and distributors, committed to the preservation of the environment and safety, and will provide them with supporting information and expertise.

DSBG will distribute updated information concerning its products to its workers, customers and other interested parties within the scope of its professional responsibility. The Company will make the Environmental Management Policy available to the public.

The Company's management maintains a continual commitment to safety and environmental protection and will allocate the necessary resources for the implementation of this policy.

Note:

(*) Revised from previous version

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Prepared by HSE Division in ISRAEL

telefax: +/972-7-6297832

telephone: +/972-7-6297830

Internet: <http://bromine.esi.be>

End of document.
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