

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006, Annex II

| | | |
|---------------|--|-------------|
| Product name | Zinc Bromide and Calcium Bromide Solution | |
| Product id | 2072 | |
| Revision date | 01/02/2012 | Revision: 9 |
| Supersedes | 11/09/2007 | |

SECTION 1: Identification of the substance/mixture and of the company/undertaking

| | |
|--|--|
| 1.1 Product identifier | Zinc bromide and calcium bromide water solution |
| Chemical formula | ZnBr ₂ / CaBr ₂ in water |
| REACH Registration No. | 01-2119490043-45-0000 (ZnBr) 01-2119490040-51-0000 (CaBr) |
| Molecular weight | 225.19 (ZnBr ₂); 199.88 (CaBr ₂) |
| Chemical family | Inorganic bromide |
| 1.2. Relevant identified uses of the substance or mixture and uses advised against | For use in oil and gas well workover, completion and packer fluids. |
| 1.3. Details of the supplier of the Safety Data Sheet | DDC Kimya San. Tic. Ltd. Şti. Küçükyalı Mh. Bağdat Cad.Cami Sok.Lokman İş Merkezi No:2 Kat:3 D:22-23 Maltepe /İstanbul |

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

| | |
|--|---|
| Classification in accordance with Regulation (EC) No 1272/2008 [CLP/GHS] | Skin Corr. 1B, H314 Causes severe skin burns and eye damage Acute Tox. 4 H302 Harmful if swallowed Skin Sens. 1 H317 May cause an allergic skin reaction Eye Damage 1 H318 Causes serious eye damage Aquatic Chronic 2 H411 Toxic to aquatic life with long lasting effects |
|--|---|

| | |
|--|--|
| Classification in accordance with Directive 67/548/EEC | Corrosive (C), R34; Causes burns Harmful (Xn), R22: Harmful if swallowed Irritant (Xi), R41: Risk of serious damage to eyes Irritant (Xi), R43: May cause sensitization by skin contact Dangerous for the environment (N); R 51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment |
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2.2. Label elements

Labelling in accordance with the CLP Regulation EC (No) 1272/2008



Signal word

Danger

Hazard statements

H302 - Harmful if swallowed
H314 - Causes severe skin burns and eye damage
H317 - May cause an allergic skin reaction
H318 - Causes serious eye damage
H411 - Toxic to aquatic life with long lasting effects

Precautionary statements

P260 - Do not breathe fume/gas/mist/vapours/spray
P272 - Contaminated work clothing should not be allowed out of the workplace.
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water.
P304 + P340- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician

2.3. Other hazards

None

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SECTION 3: Composition/information on ingredients

| Components | Weight % | Index No. | EC No. | EU Classification |
|------------------------------|----------|-----------|-----------|--|
| Calcium Bromide 7789-41-5 | 19-23 | | 232-164-6 | Eye Dam. 1: H318 (in accordance with CLP 1272/2008) Xi; R41 (in accordance with DSD 67/548/EEC) |
| Zinc bromide 7699-45-8 | 54-58 | | 231-718-4 | Skin Corr. 1B H314 Acute Tox. 4 H302 Skin Sens. 1 H317 Aquatic Chronic 2 H411 (in accordance with CLP 1272/2008) C; R34 Xn; R22 Xi; R43 N; R51/53 (in accordance with DSD 67/548/EEC) |

SECTION 4: First aid measures

4.1. Description of 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 Flood skin with water directing a stream of water under the clothing while it is being removed. Wash skin thoroughly with mild soap and plenty of water for at least 15 minutes. Get medical attention immediately.
Wash clothing before reuse.

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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.

NOTE: Never give an unconscious person anything to drink.

4.2. Most important symptoms and effects, both acute and delayed

- Ocular May cause severe irritation
- Dermal Irritant
- Inhalation May cause severe irritation to mucous membranes and upper respiratory tract
- Ingestion Harmful if swallowed
- Sensitization May cause skin sensitization

4.3. Indication of any immediate medical attention and special treatment needed No specific antidote. Treat symptomatically and supportively. In case of ingestion DO NOT induce vomiting.

SECTION 5: Fire-fighting measures

5.1. Extinguishing media Material is not combustible. Use extinguishing media appropriate to surrounding fire conditions.

5.2 Special hazards arising from the substance or mixture Will decompose above 690°C releasing poisonous and corrosive fumes of hydrogen bromide and bromine.

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SECTION 6: Accidental release measures

- 6.1. Personal precautions, protective equipment and emergency procedures** Full protective clothing, including self-contained breathing apparatus, must be used.
- 6.2. Environmental precautions** Avoid access to streams, lakes or ponds.
- 6.3. Methods and materials for containment and cleaning up** Absorb on sand or vermiculite and place in closed container for disposal. Ventilate area and wash spill site after material pickup is complete.

SECTION 7: Handling and storage

- 7.1. Precautions for safe handling** Keep containers tightly closed. Avoid bodily contact. Upon contact with skin or eyes, wash off with water.
- 7.2. Conditions for safe storage, including any incompatibilities** Keep in a well-ventilated place away from incompatible materials (see Section 10).
- 7.3. Specific end use(s)** No specific requirements

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

| Components | Weight % | ACGIH-TLV Data | UK (WEL) - TWA | Germany MAK (TRGS 900) data |
|------------------------------|----------|----------------|----------------|-----------------------------|
| Calcium Bromide 7789-41-5 | 19-23 | Not determined | Not determined | Not determined |
| Zinc bromide 7699-45-8 | 54-58 | Not determined | Not determined | Not determined |

8.2. Exposure controls

Ventilation requirements Provide adequate ventilation.
Use local exhaust as necessary, especially under mist conditions.

Personal protective equipment:
- **Respiratory protection** Approved respirator

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| | |
|-----------------------------------|---------------------------------|
| - Hand protection | Protective gloves |
| - Eye protection | Chemical safety goggles |
| - Skin and body protection | Body covering clothes and boots |

Hygiene measures Do not eat, smoke or drink where material is handled, processed or stored. Wash hands carefully before eating or smoking.
Safety shower and eye bath should be provided.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|---------------------------------------|---------------------------------------|
| Appearance | Clear colorless to light amber liquid |
| Melting point/range | < -7°C |
| Boiling point/range | 136°C |
| Evaporation rate (ether=1) | As of water |
| Vapour pressure | Not available |
| Vapor density | Not available |
| Flash point | None |
| Flammable/Explosion limits | Not flammable |
| Specific gravity | 2.30-2.33 |
| Solubility: | |
| - Solubility in water | Soluble |
| - Solubility in other solvents | Soluble in methanol and ethanol |
| Auto-ignition temperature | Not applicable |
| Decomposition temperature | ca. 690 °C (ZnBr ₂ 100%) |
| Viscosity | Not available |
| Explosive properties | Not available |
| Oxidising properties | Not available |

SECTION 10: Stability and reactivity

| | |
|--|---|
| 10.1 Reactivity | Stable under normal conditions |
| 10.2 Chemical stability | Stable under normal conditions |
| 10.3 Possibility of hazardous | Not expected to occur |
| 10.4 Conditions to avoid | Heating above decomposition temperature |
| 10.5 Incompatible materials | Metallic sodium and potassium and strong oxidants |
| 10.6 Hazardous decomposition products | Hydrogen bromide and bromine |

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

| | |
|--|---|
| Acute toxicity: | |
| - Rat oral LD50 | ZnBr ₂ 100%: 1047 mg/kg |
| Serious eye damage/ irritation | Corrosive (ZnBr) |
| Skin corrosion/irritation | Corrosive (Transcutaneous Electrical Resistance assay using epidermal rat skin tissue) |
| Respiratory or skin sensitisation | Skin sensitiser (ZnBr) |
| Mutagenicity | Not mutagenic by the Ames Test |
| Carcinogenicity | Not classified by IARC Not included in NTP 12th Report on Carcinogens |
| Specific Target Organ Toxicity (STOT) - Single exposure | No data available |
| Specific Target Organ Toxicity (STOT) - Repeat exposure | Repeated oral intake of bromides (>9 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. |

SECTION 12: Ecological information

Note: The following data refer to ZnBr₂

12.1 Toxicity

Aquatic toxicity :

| | |
|--------------------------------|---------------------------------|
| - 96 Hour-LC50, Fish | 115.9 ml/ (Juvenile turbot) |
| - 72 hour - EC50, Marine algae | 6.6 mg/l (Skeletonema costatum) |
| - 48 Hour-EC50,Marine | |

| | |
|-------------------------------|--------------------------|
| Invertebrate | 2.4 mg/l (Acartia tonsa) |
| - 48 Hour-EC50, Daphnia magna | 8.8 mg/l |

| | |
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| 12.2 Persistence and degradability | No data available |
|---|-------------------|

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|--|--|
| 12.3 Bioaccumulative potential | Bioconcentration factor values for zinc ions in freshwater fish and marine fish were reported as 1000 and 2000 respectively. After exposing rainbow trout to zinc for a period of 30 days in river water, it was concluded that zinc accumulates in the gills, liver, kidney and opercular bone, but not in the muscle. In the case of zinc, the BCF is not useful for relating uptake to adverse effects, because it does not consider physiological parameters (World Health Organization (WHO) Geneva, 2001 report). |
| 12.4 Mobility in soil | Based on monitoring data, zinc compounds are expected to adsorb to suspended solids and sediment in water. Due to ionic nature of zinc salts, volatilization from water surfaces is not expected to be important fate process. |
| 12.5 Results of PBT and vPvB assessment | Not expected to be PBT or vPvB |
| 12.6 Other adverse effects | No data available |

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste disposal

In suitable containers, cover waste with sodium carbonate or bicarbonate. Remove to approved incinerator or landfill.
Observe all federal, state and local environmental regulations when disposing of this material.

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SECTION 14: Transport information

| | |
|---|---|
| UN No. | 1760 |
| ADR/RID | Proper shipping name: Corrosive Liquid, n.o.s. (contains zinc bromide) Class: 8 - Corrosives Label No.: 8 Classification Code: C9 Hazard identification No. 80 Packing group: II Marking: Environmentally hazardous substance |
| IMO | Proper shipping name: Corrosive Liquid, n.o.s. (contains zinc bromide) Class: 8 - Corrosives Label: CORROSIVE (8) Packing Group: II Mark: MARINE POLLUTANT |
| ICAO/IATA | Proper shipping name: Corrosive Liquid, n.o.s. (contains zinc bromide) Class: 8 Hazard Label (s): Corrosive Packing group: II Marking: Environmentally hazardous substance |
| Transport in bulk according to Annex II of Marpol 73/78 and the IBC Code | Drilling brines (containing Zinc salts) Ship type- 2.1.2.2 Pollution category- X |

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

| | |
|------------------------|-------------------------------------|
| EU | Reported in EINECS |
| USA | Reported in the EPA TSCA Inventory. |
| Australia | Listed in AICS |
| Canada | Listed in DSL |
| China inventory | Listed in IECSC |

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| Korea | Listed in the Korea Existing Chemicals Inventory (KECI), number KE- 35532, 04485 |
| New Zealand Inventory | Listed in NZIoC |
| Philippines | Listed in PICCS |

15.2 Chemical Safety Assessment A Chemical Safety Assessment has not yet been carried out under the REACH Regulation.

SECTION 16: Other information

Note:

All sections reformatted in accordance with REACH Annex II revision

Health, Safety & Environment Policy

We will strive to ensure that our operations and products meet the needs of the present global community without compromising the ability of future generations to meet their needs

We accept that the success of our business is dependent on the supply of products and services that will benefit society whilst ensuring human safety and protection of the environment and natural resources

Within the framework of our commitment to the Responsible Care program, we will provide a healthy and safe work environment for employees and will responsibly manage our products at all stages of their life cycle in order to protect human health and the environment whilst maintaining high production standards of operation

TO MEET THIS COMMITMENT WE WILL: Comply with or exceed applicable national and international regulatory requirements and other requirements to which we subscribe Communicate openly and actively encourage dialogue with employees, customers and community concerning our products and operations Implement documented management systems consistent with and for promotion of the Responsible Care ethics

Develop and supply products that can be manufactured, transported, used and disposed of safely whilst best meeting the needs of our customers Regularly assess, continually improve and responsibly manage health, safety and environmental risks associated with products and processes throughout their life-cycles Share knowledge and expertise with others and seek to learn from and incorporate improved practices into our own operations

Educate and train employees, contractors and customers to improve their HSE performance Communicate up-to-date information to enable our workers, customers and other interested parties to handle our products in a safe and environmentally responsible manner Endeavor to work with customers, suppliers, distributors and contractors to foster the safe use, transport and disposal of our chemicals Support Product Stewardship programs in cooperation with customers, distributors and transporters

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