SAFETY DATA SHEET


Product name: Zinc Bromide and Calcium Bromide Solution
Product id: 2072
Revision date: 01/02/2012
Revision: 9

1. Identification of the substance & the company

Chemical name: Zinc bromide and calcium bromide water solution
Chemical formula: ZnBr2 / CaBr2 in water
Chemical family: Inorganic bromide
Molecular weight: 225.19 (ZnBr2); 199.88 (CaBr2)
Type of product and use: For use in oil and gas well workover, completion and packer fluids.
Supplier: ICL-IP America Inc.
622 Emerson Road - Suite 500
St Louis, Missouri 63141, USA
Tel:(314)983-7884   Fax:(314)983-7607
e-mail:msdsinfo@icl-group.com

Emergency Telephone: Chemtrec: (800) 424-9300
Medical: PROSAR 1-888-875-1685 (24HRS)

2. Hazards identification

GHS classification:
- 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

Labels and other form of warning

Symbol(s):

Signal Word: DANGER
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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/vapors/spray
P272 - Contaminated work clothing should not be allowed out of the workplace
P270 - Do not eat, drink or smoke when using this product
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): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304 + P340 - IF INHALED: Remove person to fresh air and keep 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
P313 - If skin irritation or rash occurs: Get medical advice/attention
P314 - If contact with eyes, SODIUM CHLORIDE SOLUTION is preferred
P330 - Rinse mouth
P362 + P364 - Take off all contaminated clothing and wash it before reuse

3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Bromide</td>
<td>7789-41-5</td>
<td>19-23</td>
</tr>
<tr>
<td>Zinc bromide</td>
<td>7699-45-8</td>
<td>54-58</td>
</tr>
</tbody>
</table>

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: 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.

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.
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<td>01/02/2012</td>
</tr>
<tr>
<td>Supersedes</td>
<td>11/09/2007</td>
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<tr>
<td>Revision:</td>
<td>9</td>
</tr>
</tbody>
</table>

Ingestion
If swallowed, wash mouth thoroughly with plenty of water. Get medical attention immediately.

NOTE: Never give an unconscious person anything to drink

Most important symptoms and effects, acute or 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

Notes to the physician
In case of ingestion DO NOT induce vomiting.
Treat symptomatically and supportively.
No specific antidote.

5. Fire - fighting measures

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

Unusual fire and explosion hazards
Will decompose above 690°C releasing poisonous and corrosive fumes of hydrogen bromide and bromine.

Fire fighting procedure
Cool containers with water spray. In closed stores, provide fire-fighters with self-contained breathing apparatus in positive pressure mode.

6. Accidental release measures

Personal precautions
Full protective clothing, including self-contained breathing apparatus, must be used.

Methods for 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. Avoid access to streams, lakes or ponds.

Environmental precautions
Avoid access to streams, lakes or ponds.
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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:

<table>
<thead>
<tr>
<th>Components</th>
<th>ACGIH-TLV Data</th>
<th>OSHA (PEL) Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Bromide</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>7789-41-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc bromide</td>
<td>Not determined</td>
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</tr>
<tr>
<td>7699-45-8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Personal protective equipment:
- Respiratory protection: Approved respirator
- 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 thoroughly after handling and before eating or smoking. Safety shower and eye bath should be provided.

9. Physical and chemical properties

Appearance: Clear colorless to light amber liquid
Odor: Not available.
Odor threshold: Not available
pH: Not determined
Melting point/range: < -7°C
Boiling point/range: 136°C
Flash point: None
Evaporation rate (ether=1): As of water
Flammability (solid, gas): Not applicable
Flammable/Explosion limits: Not flammable
Vapor pressure: Not available
Vapor density: Not available
Density: Not determined
Solubility:
- Solubility in water: Soluble
- Solubility in other solvents: Soluble in methanol and ethanol

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Partition coefficient (n-octanol/water): Not determined
Auto-ignition temperature: Not applicable
Decomposition temperature: ca. 690 °C (ZnBr2 100%)
Viscosity: Not available
Specific gravity: 2.30-2.33
Explosive properties: Not available
Oxidising properties: Not available

10. Stability and reactivity

Reactivity: Stable under normal conditions.
Stability: Stable under normal conditions
Possibility of hazardous reactions: Not expected to occur
Conditions to avoid: Heating above decomposition temperature.
Materials to avoid: Metallic sodium and potassium and strong oxidants.
Hazardous decomposition products: Hydrogen bromide and bromine

11. Toxicological information

Acute toxicity:
- Rat oral LD50: ZnBr2 100%: 1047 mg/kg
- Eye irritation (rabbit): Corrosive (ZnBr2)
- Dermal irritation (rabbit): Corrosive (Transcutaneous Electrical Resistance assay using epidermal rat skin tissue)

Dermal sensitization: Skin sensitisier (ZnBr2)

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.

Chronic toxicity: 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.

Mutagenicity: Not mutagenic by the Ames Test.
Carcinogenicity: Not classified by IARC
Not included in NTP 13th Report on Carcinogens
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12. Ecological information

Note: The following data refer to ZnBr2

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

Persistence and degradability: No data available

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).

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.

13. Disposal considerations

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.

Disposal of Packaging: Empty containers should be disposed of in accordance with all applicable laws and regulations.
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14. Transportation information

UN No. 1760
DOT 
Proper shipping name: Corrosive Liquid, n.o.s. (contains zinc bromide)
Class: 8 - Corrosives
Packing Group: II
Marking: Marine Pollutant
Not regulated as a marine pollutant for surface and air transport in non-bulk packagings.

IMDG 
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

15. Regulatory information

USA 
Reported in the EPA TSCA Inventory.

- SARA 313 
ZnBr2 (CAS #7699-45-8) is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372.

Canada 
Listed in DSL

EU 
Reported in EINECS

Japanese METI 
ENCS No.1-118, 1-1038

Australia 
Listed in AICS

New Zealand Inventory 
Listed in NZIoC

China 
- China inventory 
Listed in IECSC

Korea 
Listed in the Korea Existing Chemicals Inventory (KECI), number KE- 35532, 04485

Philippines 
Listed in PICCS
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Switzerland
Listed in Giftliste 1 (G-7324, 7923)

16. Other information

Note:
All sections reformatted in accordance with OSHA Hazard Communication Standard 29 CFR 1910.1200 (GHS)

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.

Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ICL-IP America Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its safety and suitability for their purposes prior to use. In no event will ICL-IP America Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE, ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

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End of safety data sheet