Zinc-Calcium Bromide Solution

1. PRODUCT AND COMPANY IDENTIFICATION

| TETRA Technologies, Inc. 25025 I-45 North The Woodlands, TX 77380 |
|-------------------------|-------------------------|
| CHEMTREC (24-Hr Emergency Response): | U.S. Toll Free (800) 424-9300 International +1 703-527-3887 |
| Poison Control: | (800) 222-1222 |
| Non-emergency Customer Service: | (281) 367-1983 |

Synonyms: Zinc-Calcium Bromide, Liquid Zinc-Calcium Bromide
Chemical Family: Inorganic Salt Solution
MSDS Creation Date: 08 Oct 96
MSDS Revision Date: 09 Apr 08

2. HAZARDS IDENTIFICATION

| NFPA Ratings: (Scale 0-4) | Health: 2 Fire: 0 Reactivity: 0 |

EMERGENCY OVERVIEW:

WARNING: Irritant; Marine Pollutant; Explosion potential with mixtures containing potassium or sodium. Odorless, clear, colorless to amber liquid. May cause irritation to skin, eyes and respiratory system. Avoid breathing mists, contact with eyes, skin and clothing. Harmful if swallowed. Do not ingest. Keep container tightly closed. Wash thoroughly after handling. Keep container tightly closed. Use only with adequate ventilation.

Potential Health Effects

Skin Contact: Dermal sensitizer. Single, short exposure not likely to cause significant skin irritation. However, direct contact with solution may cause irritation, redness and pain, possibly severe. Additional effects may include blistering, erythema, exfoliation, ulceration, necrosis, and scarring.

Eye Contact: May cause irritation of eyes with redness and pain and superficial injury. Additional effects may include tearing, eye discharge, conjunctivitis, and blurred vision.

Inhalation: Inhalation may cause irritation to mucous membranes and respiratory system. Additional effects may include coughing, labored breathing, and shortness of breath.

Ingestion: Ingestion may cause burning sensation in mouth and throat, yellowing of the skin and eyes, nausea, vomiting, diarrhea, blood in urine, inability to urinate, low blood pressure, blood disorders, kidney damage, liver damage, convulsions and unconsciousness.

3. COMPOSITION, INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Wt. %</th>
<th>Ingredient Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>7789-41-5</td>
<td>18 - 21</td>
<td>Calcium Bromide</td>
</tr>
<tr>
<td>7699-45-8</td>
<td>53 - 56</td>
<td>Zinc Bromide</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Skin Contact: Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent, and large amounts of water. In cases of burns, cover lightly with sterile, dry dressing. Get medical attention immediately.

Eye Contact: Immediately flush eyes thoroughly with large amounts of water for 15-20 minutes. Hold eyelids open during flushing. Get medical attention immediately.

Inhalation: Remove from exposure area to fresh air. Obtain medical attention immediately.

Ingestion: Do not attempt to give anything by mouth to an unconscious person. Get medical attention immediately.
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Notes to Physician:
Treat symptomatically and supportively. If ingested, consider gastric lavage. The decision as to whether the severity of poisoning requires administration of any antidote and actual dose required should be made by qualified medical personnel only.
The following antidote(s) can be considered:
Calcium disodium edentate/dextrose, intravenous
Calcium disodium edentate/procaine, intramuscular
Sodium chloride, oral, intravenous

5. FIRE FIGHTING MEASURES
Flash Point: Not applicable
Extinguishing Media: Dry chemical or CO₂ water spray or regular foam.
Fire Fighting: Move container(s) from fire area if you can do so without risk. Apply cooling water to sides of containers that are exposed to flames until well after the fire is out. Keep away from ends of drums and/or ends of tanks. Extinguish fire using agent suitable for type of surrounding fire and/or chemicals. Avoid breathing vapors. Keep upwind. Dike area to prevent runoff and contamination of water sources.
Fire and Explosion Hazard: Negligible fire hazard when exposed to heat or flame.
Products of Combustion: Thermal decomposition products may include acrid smoke and fumes of zinc oxides and hydrogen bromide.

6. ACCIDENTAL RELEASE MEASURES
Evacuation and Safety: Wear appropriate protective gear for the situation. See personal protection information in Section 8.
Containment of Spill: Do not touch spilled material. Stop leak if you can do so without risk. For larger spills, dig holding area such as a pond or pit for containment. Dike far ahead of spill for later disposal. Keep unnecessary people away. Isolate hazard area and deny entry. Minimize air borne spreading of vapors. Prevent entry into waterways, sewers, basements or confined areas.
Cleanup and Disposal: Neutralize with lime, crushed limestone, or sodium bicarbonate to pH 7. For small spills, take up with sand or other non-combustible material. Use cement powder or fly ash to absorb liquid. Place material in covered, clean, dry container for disposal.

7. HANDLING AND STORAGE
Handling: Avoid skin and eye contact and breathing vapors. Wash thoroughly after handling. Launder contaminated clothing before reuse.
Storage: Observe all federal, state, and local regulations when storing this product. Store in a covered, clean and dry container away from incompatible materials.

8. EXPOSURE CONTROLS/PERSOANL PROTECTION
Engineering Controls: Provide local exhaust ventilation system. Where there is possibility of exposure, eye wash fountain and safety shower should be provided within the immediate work area for emergency use.

Exposure Limits: None
Personal Protective Equipment (PPE)
Eyes: Wear safety glasses with side shields or safety goggles/shields.
Hands and Feet: Wear appropriate chemical protective gloves and boots.
Body: Wear appropriate protective (impervious) clothing.
Respiratory: A respirator is not indicated under normal operating conditions. Use of a NIOSH approved respirator should be used based on contamination levels found in the

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<table>
<thead>
<tr>
<th>9. PHYSICAL AND CHEMICAL PROPERTIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description: Colorless to yellow liquid</td>
</tr>
<tr>
<td>Odor: Odorless</td>
</tr>
<tr>
<td>Boiling Point: 313°F (156°C) for 55% solution ZnBr₂, 19% CaBr₂</td>
</tr>
<tr>
<td>Melting Point: Not Applicable</td>
</tr>
<tr>
<td>Specific Gravity (H₂O=1): 2.3 @ 77°F (25°C) for 55% solution ZnBr₂, 19% CaBr₂</td>
</tr>
<tr>
<td>Water Solubility: Completely</td>
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<tr>
<td>pH: 5 – 6 (1:10 dilution)</td>
</tr>
<tr>
<td>Vapor Pressure: Not Available</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>10. STABILITY AND REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability and Reactivity: Stable under normal temperatures and pressures. Can evolve hydrogen bromide and/or bromine when heated. Can evolve bromine gas under oxidizing conditions.</td>
</tr>
<tr>
<td>Incompatibilities: Metals. Mixtures containing potassium or sodium produce a strong explosion on impact.</td>
</tr>
<tr>
<td>Hazardous Decomposition: Decomposition products may include acrid smoke and fumes of zinc oxides and hydrogen bromide.</td>
</tr>
<tr>
<td>Polymerization: Does not occur under normal temperatures and pressures.</td>
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<tr>
<td>Conditions to Avoid: Contact with incompatible materials.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>11. TOXICOLOGICAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity Data: Toxicity data not available for zinc-calcium bromide. Calcium Bromide: LD₅₀: 740 mg/kg, mouse, interperitoneal LD₅₀: 1580 mg/kg, mouse, subcutaneous See Registry of Toxic Effects of Chemical Substances (RTECS) file for mutagenic and tumorigenic data.</td>
</tr>
<tr>
<td>Local Effects – Eye, mucous membrane and skin irritant</td>
</tr>
<tr>
<td>Health Effects – Moderately toxic by ingestion. Slightly toxic by dermal absorption. Repeated or prolonged dermal exposure to zinc salts may cause dermatitis with erythematous, popular, and granulomatous reactions in susceptible individuals. Repeated or prolonged ingestion of zinc salts may cause digestive and/or renal disorders. Ingestion of large amounts of astringent zinc salts may cause a burning sensation in the mouth and throat, nausea, vomiting, diarrhea, hemolysis, hematuria, kidney damage with anuria, liver damage with jaundice, and possibly hypotension, convulsions, and unconsciousness.</td>
</tr>
<tr>
<td>Carcinogen Status: OSHA – No NTP – No IARC – No</td>
</tr>
</tbody>
</table>

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12. **ECOLOGICAL INFORMATION**

Solutions containing zinc bromide are considered **Marine Pollutants and Environmentally Hazardous.**

13. **DISPOSAL INFORMATION**

Observe all federal, state, and local regulations when disposing of this substance.

14. **DEPARTMENT OF TRANSPORTATION (DOT) TRANSPORT INFORMATION**

<table>
<thead>
<tr>
<th>Shipping Name:</th>
<th>Environmentally Hazardous Substances liquid, N.O.S., Class 9, UN 3082, PG III (contains Zinc Bromide) Marine Pollutant, RQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID Number:</td>
<td>UN 3082</td>
</tr>
<tr>
<td>Hazard Class or Division:</td>
<td>9</td>
</tr>
<tr>
<td>Packing Group:</td>
<td>III</td>
</tr>
<tr>
<td>Labeling Requirements:</td>
<td>Class 9 and Marine Pollutant</td>
</tr>
<tr>
<td>Packing Authorizations:</td>
<td></td>
</tr>
<tr>
<td>Exceptions:</td>
<td>49 CFR § 173.203</td>
</tr>
<tr>
<td>Non-bulk Packing:</td>
<td>49 CFR § 173.203</td>
</tr>
<tr>
<td>Bulk Packing:</td>
<td>49 CFR § 173.241</td>
</tr>
<tr>
<td>Quantity Limitations:</td>
<td></td>
</tr>
<tr>
<td>Passenger Aircraft:</td>
<td>none</td>
</tr>
<tr>
<td>Cargo Aircraft Only:</td>
<td>none</td>
</tr>
</tbody>
</table>

15. **REGULATORY INFORMATION**

| TSCA Status:          | Yes                                                                                                                           |
| Marine Pollutant:     | Yes                                                                                                                           |
| Reportable Quantity (zinc bromide): | 1000 lb. (454 KG)                                                                 |
| SARA Section 302:     | No                                                                                                                            |
| SARA Section 304:     | Yes                                                                                                                           |
| SARA Section 313:     | Yes                                                                                                                           |
| CERCLA Section 103:   | Yes                                                                                                                           |
| SARA Title III:       | 311, 312 – Acute Hazard                                                                                                      |
| OSHA Process Safety:  | No                                                                                                                            |
| California Proposition 65: | No ingredients found on the list                                                                                             |

16. **OTHER INFORMATION**

Individuals handling this product should be informed of the recommended safety precautions and should have access to this information.

This information relates to the specific product designated and may not be valid for such product used in combination with any other materials or in any other processes. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability, or completeness. It is the users’ responsibility to satisfy themselves as to the suitability and completeness of such information for their own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

TETRA Technologies, Inc. reserves the right to refuse shipment of this product to any consumer who fails to
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demonstrate the ability to consistently handle and use it safely and in compliance with all applicable laws, rules and regulations. Such demonstration may require on-site inspection of any or all storage, processing, packaging and other handling systems that come in contact with it.

Customers are responsible for compliance with local, state and federal regulations that may be pertinent in the storage, application and disposal of this product.