1. Identification

Product identifier: BARIUM CHLORIDE SOLUTION, 0.1 M

Other means of identification:

- Product code: 2034
- Recommended use: professional, scientific and technical activities: other professional, scientific and technical activities
- Recommended restrictions: None known.

Manufacturer/Importer/Supplier/Distributor information

- Manufacturer: GFS Chemicals, Inc.
- Address: P.O. Box 245, Powell, OH 43065
- Telephone: Phone 740-881-5501, Toll Free 800-858-9682, Fax 740-881-5989
- Website: www.gfschemicals.com
- E-mail: service@gfschemicals.com
- Emergency phone number: Emergency Assistance Chemtrec 800-424-9300

2. Hazard(s) identification

Physical hazards: Not classified.

Health hazards: Specific target organ toxicity, single exposure - Category 1

Environmental hazards: Not classified.

OSHA defined hazards: Not classified.

Label elements

- Signal word: Danger
- Hazard statement: Causes damage to organs.
- Precautionary statement:
  - Prevention: Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product.
  - Response: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. IF exposed or concerned: Call a POISON CENTER/doctor.
  - Storage: Store locked up.
  - Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC): None known.

Supplemental information: 2.4% of the mixture consists of component(s) of unknown acute dermal toxicity.

3. Composition/information on ingredients

Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER</td>
<td></td>
<td>7732-18-5</td>
<td>97.6</td>
</tr>
<tr>
<td>BARIUM CHLORIDE, DIHYDRATE</td>
<td></td>
<td>10326-27-9</td>
<td>2.4</td>
</tr>
</tbody>
</table>

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation: Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact: Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact: Rinse with water. Get medical attention if irritation develops and persists.

Ingestion: Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed: Direct contact with eyes may cause temporary irritation.

Indication of immediate medical attention and special treatment needed: Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information: If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media: Use extinguishing agent suitable for type of surrounding fire. Water.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical: During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters: Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions: Move containers from fire area if you can do so without risk.

Specific methods: Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards: No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up: This product is miscible in water.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Environmental precautions: Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Do not breathe mist or vapor. Avoid prolonged exposure. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities: Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits: The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BARIUM CHLORIDE, DIHYDRATE (CAS 10326-27-9)</td>
<td>PEL</td>
<td>0.5 mg/m3</td>
</tr>
</tbody>
</table>

Material name: BARIUM CHLORIDE SOLUTION, 0.1 M
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US. ACGIH Threshold Limit Values

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<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BARIUM CHLORIDE, DIHYDRATE (CAS 10326-27-9)</td>
<td>TWA</td>
<td>0.5 mg/m³</td>
</tr>
</tbody>
</table>

US. NIOSH: Pocket Guide to Chemical Hazards

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<td>TWA</td>
<td>0.5 mg/m³</td>
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</table>

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

- **Eye/face protection**: Wear safety glasses with side shields (or goggles).
- **Skin protection**: Wear appropriate chemical resistant gloves.
- **Hand protection**: Use of an impervious apron is recommended.
- **Respiratory protection**: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

- **Thermal hazards**: Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

- **Appearance**: Clear.
- **Physical state**: Liquid.
- **Form**: Liquid.
- **Color**: Colorless.
- **Odor**: Odorless.
- **Odor threshold**: Not available.
- **pH**: 5.2 - 8.2
- **Melting point/freezing point**: < 32 °F (< 0 °C)
- **Initial boiling point and boiling range**: > 212 °F (> 100 °C)
- **Flash point**: Not available.
- **Evaporation rate**: Not available.
- **Flammability (solid, gas)**: Not applicable.
- **Upper/lower flammability or explosive limits**
  - Flammability limit - lower (%): Not available.
  - Flammability limit - upper (%): Not available.
  - Explosive limit - lower (%): Not available.
  - Explosive limit - upper (%): Not available.
- **Vapor pressure**: Not available.
- **Vapor density**: Not available.
- **Relative density**: Not available.
- **Solubility(ies)**
  - Solubility (water): Completely miscible.
Partition coefficient (n-octanol/water) Not available.
Auto-ignition temperature Not available.
Decomposition temperature Not available.
Viscosity Not available.
Other information
  Density 1.02 g/cm³
  Explosive properties Not explosive.
  Molecular formula BaCl₂.2H₂O
  Molecular weight 244.28
  Oxidizing properties Not oxidizing.
  Percent volatile 97.6 % estimated
  Specific gravity 1.02

10. Stability and reactivity
Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability Material is stable under normal conditions.
Possibility of hazardous reactions No dangerous reaction known under conditions of normal use.
Conditions to avoid Contact with incompatible materials.
Incompatible materials Strong oxidizing agents.
Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information
Information on likely routes of exposure
  Inhalation May cause damage to organs by inhalation. Prolonged inhalation may be harmful.
  Skin contact No adverse effects due to skin contact are expected.
  Eye contact Direct contact with eyes may cause temporary irritation.
  Ingestion Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics
  Direct contact with eyes may cause temporary irritation.
Information on toxicological effects
Acute toxicity Not known.

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD₅₀</td>
<td>Rat</td>
<td>220 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>150 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>132 mg/kg</td>
</tr>
<tr>
<td>LDL₀</td>
<td>Dog</td>
<td>90 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Guinea pig</td>
<td>76 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Rabbit</td>
<td>170 mg/kg</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD₅₀</td>
<td>Mouse</td>
<td>19.2 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2 mg/kg</td>
</tr>
<tr>
<td>LDL₀</td>
<td>Rat</td>
<td>20 mg/kg</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.
May be irritating to eyes.

Respiratory or skin sensitization

Respiratory sensitization
Not a respiratory sensitizer.

Skin sensitization
This product is not expected to cause skin sensitization.

Germ cell mutagenicity
No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity
Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity
Not listed.

US OSHA Hazard Categories
- Not regulated.

US National Toxicology Program (NTP) Report on Carcinogens
Not listed.

Reproductive toxicity
This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity
- single exposure
Causes damage to organs.

Specific target organ toxicity
- repeated exposure
Not classified.

Aspiration hazard
Not an aspiration hazard.

Chronic effects
Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity
The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

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<td></td>
</tr>
<tr>
<td>Aquatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crustacea</td>
<td>EC50</td>
<td>Daphnia</td>
</tr>
<tr>
<td>Fish</td>
<td>LC50</td>
<td>Fish</td>
</tr>
<tr>
<td></td>
<td></td>
<td>604.1667 mg/l, 48 hours estimated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>43333.32 mg/l, 96 hours estimated</td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
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<td>Aquatic</td>
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<td></td>
</tr>
<tr>
<td>Crustacea</td>
<td>EC50</td>
<td>Water flea (Daphnia magna)</td>
</tr>
<tr>
<td>Fish</td>
<td>LC50</td>
<td>Mummichog (Fundulus heteroclitus)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14.5 mg/l, 48 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 1000 mg/l, 96 hours</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

Persistence and degradability
Bioaccumulative potential
No data available.

Mobility in soil
No data available.
Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions
Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations
Dispose in accordance with all applicable regulations.

Hazardous waste code
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products
Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging
Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT
Not regulated as dangerous goods.

IATA
Not regulated as dangerous goods.

IMDG
Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not established.

15. Regulatory information

US federal regulations
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)
BARIUM CHLORIDE, DIHYDRATE (CAS 10326-27-9) Listed.

SARA 304 Emergency release notification
Not regulated.

US OSHA Hazard Categories (1)
Not regulated.

US OSHA Hazard Categories (2)
Not regulated.

US OSHA Hazard Categories (3)
Not regulated.

US OSHA Hazard Categories (4)
Not regulated.

US OSHA Hazard Categories (5)
Not regulated.

US OSHA Hazard Categories (6)
Not regulated.

US OSHA Hazard Categories (7)
Not regulated.

US OSHA Hazard Categories (8)
Not regulated.

US OSHA Hazard Categories (9)
Not regulated.

US OSHA Hazard Categories (10)
Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No
Material name: BARIUM CHLORIDE SOLUTION, 0.1 M

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