MATERIAL SAFETY DATA SHEET

<table>
<thead>
<tr>
<th>NFPA</th>
<th>HMIS</th>
<th>Personal Protective Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product code:</th>
<th>B1055</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Name:</td>
<td>BARIUM SULFATE, POWDER, REAGENT</td>
</tr>
<tr>
<td>Chemical Name:</td>
<td>Barium Sulfate</td>
</tr>
<tr>
<td>Synonyms:</td>
<td>Actybaryte, Bakontal, Baridol, Barite, Baritop, Citobaryum, Esophotrast, Finemeal, Raybar, Sulfuric acid, barium salt (1:1), Barium sulfate (1:1), Barium sulphate, Barosperse, Barotras, Barytes, Bayrites, Unibaryt</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>CAS #:</th>
<th>7727-43-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTECS #:</td>
<td>CR0600000</td>
</tr>
<tr>
<td>CI#:</td>
<td>Not available</td>
</tr>
<tr>
<td>Formula:</td>
<td>BaSO4</td>
</tr>
<tr>
<td>Supplier:</td>
<td>Spectrum Chemicals and Laboratory Products, Inc. 14422 South San Pedro St. Gardena, CA 90248 (310) 516-8000</td>
</tr>
<tr>
<td>Order Online At:</td>
<td><a href="https://www.spectrumchemical.com">https://www.spectrumchemical.com</a></td>
</tr>
<tr>
<td>Emergency Telephone Number:</td>
<td>CHEMTREC: 1-800-424-9300</td>
</tr>
</tbody>
</table>

See Section 8.
2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

- May cause skin and eye irritation
- May cause irritation of respiratory tract


OSHA Regulatory Status

This material is not considered hazardous by the OSHA Hazard Communication Standard (29 1910.1200)

POTENTIAL HEALTH EFFECTS

Principal Routes of Exposure:
Ingestion. Inhalation.

Acute Potential Health Effects:

Skin Contact:
May cause skin irritation.

Eye Contact:
May cause eye irritation.

Inhalation:
May cause irritation of respiratory tract. Prolonged or repeated inhalation may cause Baritosis. Baritosis is one of the benign pneumoconioses.

Ingestion:
May cause stomach cramping. May cause nausea and vomiting. May cause diarrhea.

Chronic Potential Health Effects:

<table>
<thead>
<tr>
<th>Component</th>
<th>Carcinogen Status:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
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</tr>
<tr>
<td>7727-43-7 (100)</td>
<td></td>
</tr>
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</table>

Target Organs: Lungs.

Mutagenic Effects: No information available

Teratogenic Effects: No information available

Aggravated Medical Conditions: No information available

See Section 11 for additional Toxicological Information

POTENTIAL ENVIRONMENTAL EFFECTS

No information available

Product code: B1055

Product name: BARIUM SULFATE,
POWDER, REAGENT
3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td>7727-43-7</td>
<td>100</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

**General Advice:**
Poison information centres in each State capital city can provide additional assistance for scheduled poisons (13 1126)

**Skin Contact:**
Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Get medical attention if irritation develops. Consult a physician if necessary.

**Eye Contact:**
Flush eye with water for 15 minutes. Get medical attention if irritation occurs. If symptoms persist, call a physician.

**Inhalation:**
Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:**
Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician if necessary.

**Notes to Physician:**
Treat symptomatically

5. FIRE-FIGHTING MEASURES

**Flammable Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashpoint (°C/°F)</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flash Point Tested according to</td>
<td>Not available</td>
</tr>
<tr>
<td>Lower Explosion Limit (%)</td>
<td>No information available.</td>
</tr>
<tr>
<td>Upper Explosion Limit (%)</td>
<td>No information available.</td>
</tr>
<tr>
<td>Autoignition Temperature (°C/°F)</td>
<td>No information available.</td>
</tr>
</tbody>
</table>

| Suitable Extinguishing Media       | The product is not flammable. If it is involved in a fire, extinguish the fire using an agent suitable for the type of surrounding fire. |
| Unsuitable Extinguishing Media     | No information available.                     |
| Hazardous Combustion Products     | If involved in a fire, the following can be released: Sulfur oxides, Barium oxide |
| Specific hazards                  | No information available.                     |
| Special Protective Equipment for Firefighters | As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear |
| Specific Methods                  | No information available.                     |
6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Avoid dust formation.

Environmental Precautions:
Prevent further leakage or spillage if safe to do so. Prevent entry into waterways, sewers.

Methods for Cleaning Up:
Sweep up and shovel into suitable containers for disposal. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Handling

Technical Measures/Precautions:
Provide sufficient air exchange and/or exhaust in work rooms. Avoid dust formation. Keep away from incompatible materials.

Safe Handling Advice:
Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Avoid dust formation. Do not ingest. Do not breathe vapours/dust. Handle in accordance with good industrial hygiene and safety practice.

Storage

Technical Measures/Storage Conditions:
Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Store away from incompatible materials.

Incompatible Materials:
Aluminum. Phosphorus.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures to reduce exposure:
Ensure adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protective Equipment

Eye protection: Safety glasses. Safety glasses with side-shields.
Skin and body protection: Long sleeved clothing. Chemical resistant apron. Gloves.
Respiratory protection: Effective dust mask. Wear respirator with dust filter.
Hygiene measures: Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. When using, do not eat, drink or smoke.

National occupational exposure limits

United States
U.S Occupational Exposure Limits: Not determined

Product code: B1055
Product name: BARIUM SULFATE, POWDER, REAGENT
<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>AIHA WHEEL</th>
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<tbody>
<tr>
<td>Barium Sulfate - 7727-43-7</td>
<td>15 mg/m³ TWA</td>
<td>10 mg/m³ TWA</td>
<td>10 mg/m³ TWA</td>
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**Canada**

Canada Occupational Exposure Limits: Not determined

<table>
<thead>
<tr>
<th>Components</th>
<th>Alberta</th>
<th>British Columbia</th>
<th>Ontario</th>
<th>Quebec</th>
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</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td>10 mg/m³ TWA</td>
<td>10 mg/m³ TWA total dust</td>
<td>10 mg/m³ TWA</td>
<td>10 mg/m³ TWA total dust</td>
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<tr>
<td>7727-43-7</td>
<td></td>
<td>3 mg/m³ TWA respirable fraction</td>
<td></td>
<td>5 mg/m³ TWA respirable dust</td>
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</table>

**Australia and Mexico**

Occupational Exposure Limits for Australia and Mexico: Not determined

<table>
<thead>
<tr>
<th>Components</th>
<th>Australia</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td>10 mg/m³ TWA</td>
<td>None</td>
</tr>
<tr>
<td>7727-43-7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**9. PHYSICAL AND CHEMICAL PROPERTIES**

- **Physical state:** Solid.
- **Appearance:** Powder.
- **Odor:** Odorless.
- **Taste:** Tasteless.
- **Color:** White. Off-white.
- **Molecular/Formula weight:** 233.39
- **Flash point (°C):** No data available
- **Lower Explosion Limit (%):** No information available
- **Upper Explosion Limit (%):** No information available
- **Autoignition Temperature (°C/°F):** No information available
- **Melting point/range (°C/°F):** 1580 °C/2876 °F
- **Boiling point/range (°C/°F):** No information available
- **pH:** No information available
- **Specific gravity:** No information available
- **Density (g/cm³):** 4.49
- **Bulk density:** No information available
- **Vapor pressure @ 20°C (kPa):** No information available
- **Evaporation rate:** No information available
- **Vapor density:** No information available
- **Odor threshold (ppm):** No information available
- **Partition coefficient (n-octanol/water):** No information available
- **Miscibility:** No information available
- **Solubility:** Very slightly soluble in water
  Solubility in Water: 2.2 mg/l @ 18 °C
  Practically insoluble in organic solvents

**10. STABILITY AND REACTIVITY**

- **Stability:** Stable at normal conditions
- **Conditions to avoid:** Incompatible materials.
- **Incompatible Materials:** Aluminum. Phosphorus.
- **Hazardous decomposition products:** When heated to decomposition it emits toxic fumes. Sulphur oxides. Barium oxides.
Possibility of Hazardous Reactions: Heating Barium Sulfate with Aluminum can produce an explosion

Polymerization: Hazardous polymerization does not occur

Corrosivity: No information available

Special Remarks on Corrosivity: No information available

## 11. TOXICOLOGICAL INFORMATION

### Acute Toxicity

#### Component Information

**Barium Sulfate - 7727-43-7**

- **LD50/oral/rat** = 307000 mg/kg (European Commission IUCLID dataset)
- **LD50/oral/mouse** = > 3000 mg/kg (European Commission IUCLID dataset)
- **LD50/dermal/rat** = No information available
- **LD50/dermal/rabbit** = No information available
- **LC50/inhalation/rat** = No information available
- **LC50/inhalation/mouse** = No information available

**Other LD50 or LC50 information** = No information available

#### Product Information

- **LC50/inhalation/rat** No information available
- **LC50/inhalation/mouse** No information available
- **LD50/dermal/rabbit** No information available
- **LD50/dermal/rat** No information available
- **LD50/oral/mouse** = > 3000 mg/kg
- **LD50/oral/rat** = 307000 mg/kg (European Commission IUCLID dataset)

#### Local Effects

**Skin irritation:** May cause skin irritation.

**Eye irritation:** May cause eye irritation.

**Inhalation:** May cause irritation of respiratory tract.

**Ingestion:** May cause stomach cramping
- May cause nausea
- May cause vomiting
- May cause diarrhea

Ingestion of Barium and Barium soluble compounds may cause muscular weakness, tremors, paralysis, increased or decreased blood pressure or irregular heartbeat, Barium compounds that do not dissolve well and are not well absorbed, such as Barium sulfate, are not generally harmful and are not likely to cause these side effects.

**Sensitization:** No information available

### Chronic Toxicity
Chronic Toxicity

Prolonged or repeated inhalation may cause Baritosis. Baritosis is one of the benign pneumoconioses in which inhaled particulate matter lies in the lungs for years without producing symptoms of bronchitis or emphysema, or without abnormal physical signs, incapacity for work, interference with lung function, or liability to develop pulmonary or bronchial infections or other thoracic disease.

Carcinogenic effects: Not considered carcinogenic

<table>
<thead>
<tr>
<th>Components</th>
<th>NTP</th>
<th>IARC</th>
<th>OSHA HCS - Carcinogens</th>
<th>ACGIH - Carcinogens</th>
<th>Australia - Prohibited Carcinogenic Substances</th>
<th>Australia - Notifiable Carcinogenic Substances</th>
</tr>
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<tbody>
<tr>
<td>Barium Sulfate</td>
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<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
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</tr>
</tbody>
</table>

Mutagenic Effects: No information available

Reproductive Effects: No information available

Teratogenic Effects: No information available

Target Organs: Lungs.

12. ECOLOGICAL INFORMATION

ECOTOXICITY

Toxicity to terrestrial and aquatic plants and animals: Information given is based on data on the components and the ecotoxicology of similar products

Ecotoxicity effects: Aquatic environment.

Aquatic toxicity:

Barium Sulfate - 7727-43-7

Water Flea Data: 32 mg/l EC50 48 hr Daphnia magna
52.8-68.1 EC50 24 hr Daphnia magna

Mobility: No information available

Persistence and degradability: No information available

Bioaccumulative potential: No information available

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging: Empty containers should be taken for local recycling, recovery or waste disposal

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
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<td>Barium Sulfate</td>
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<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

14. TRANSPORT INFORMATION

DOT UN-No: Not Regulated

Product code: B1055 Product name: BARIUM SULFATE, POWDER, REAGENT
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: None
Subsidiary Risk: Not applicable
Marine Pollutant: No data available
ERG No: No information available
DOT RQ (lbs): No information available

TDG (Canada)
UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available
Subsidiary Risk: No information available
Description: No information available

ADR
UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available
Subsidiary Risk: No information available
Classification Code: No information available
Description: No information available
CEFIC Tremcard No: No information available

IMO / IMDG
UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available
Subsidiary Risk: No information available
Description: No information available
IMDG Page: No information available
Marine Pollutant: No information available
MFAG: No information available
Maximum Quantity: No information available

RID
UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available
Subsidiary Risk: No information available
Classification Code: No information available
Description: No information available

ICAO
UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available
Subsidiary Risk: No information available
Description: No information available

IATA
UN-No: Not regulated
Proper Shipping Name: No information available

Product code: B1055
Product name: BARIUM SULFATE, POWDER, REAGENT
15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Components</th>
<th>U.S. TSCA</th>
<th>Philippines ( PICCS )</th>
<th>KOREA KECL</th>
<th>Japan ENCS</th>
<th>CHINA</th>
<th>Australia ( AICS )</th>
<th>EINECS-No.</th>
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<tbody>
<tr>
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<td>Present</td>
<td>KE-02092</td>
<td>Present (1)-89</td>
<td>Present</td>
<td>Present</td>
<td>Present 231-784-4</td>
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</tbody>
</table>

U.S. Regulations

**Barium Sulfate**

- Massachusetts RTK: Present
- New Jersey RTK Hazardous Substance List: Present
- New Jersey (EHS) List: Present (listed as Barium compounds)
- New Jersey - Discharge Prevention - List of Hazardous Substances: Present (Listed as Barium compounds)
- Pennsylvania RTK: Present
- Minnesota - Hazardous Substance List: Present
- Louisiana Reportable Quantity List for Pollutants: 100 lb. RQ (listed as Barium compounds)

**California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.**

- **Chemicals Known to the State of California to Cause Cancer:**
  This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

- **Chemicals Known to the State of California to Cause Reproductive Toxicity:**
  This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

<table>
<thead>
<tr>
<th>Components</th>
<th>Carcinogen</th>
<th>Developmental Toxicity</th>
<th>Male Reproductive Toxicity</th>
<th>Female Reproductive Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
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</tbody>
</table>

**CERCLA/SARA**

<table>
<thead>
<tr>
<th>Components</th>
<th>CERCLA - Hazardous Substances and their Reportable Quantities</th>
<th>Section 302 Extremely Hazardous Substances and TPQs</th>
<th>Section 302 Extremely Hazardous Substances and RQs</th>
<th>Section 313 - Chemical Category</th>
<th>Section 313 - Reporting de minimis</th>
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</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
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</table>

**U.S. TSCA**

<table>
<thead>
<tr>
<th>Components</th>
<th>TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)</th>
<th>TSCA 8(d) - Health and Safety Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

**Canada**

**WHMIS hazard class:**
Non-controlled

**Barium Sulfate**
Uncontrolled product according to WHMIS classification criteria

**Product code:** B1055  **Product name:** BARIUM SULFATE, POWDER, REAGENT
Canada Controlled Products Regulation:
This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

Inventory

<table>
<thead>
<tr>
<th>Components</th>
<th>Canada (DSL)</th>
<th>Canada (NDSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td>Present</td>
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<table>
<thead>
<tr>
<th>Components</th>
<th>CEPA Schedule I - Toxic Substances</th>
<th>CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

EU Classification

**R-phrase(s)**
not determined

**S-phrase(s)**
none

<table>
<thead>
<tr>
<th>Components</th>
<th>Classification</th>
<th>Concentration Limits:</th>
<th>Safety Phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Sulfate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The product is classified in accordance with Annex VI to Directive 67/548/EEC

**Indication of danger:**
Not dangerous

16. OTHER INFORMATION

The MSDS format complies with ANSI Z400.1/Z129.1-2010 standards.

**Preparation Date:** 27-Jan-2015

**Reason for revision:** Not applicable

**Prepared by:** Sonia Owen

**Literature reference:** No information available

**Product code:** B1055  **Product name:** BARIUM SULFATE, POWDER, REAGENT
All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. The physical properties reported in this MSDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user’s responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.

Product code: B1055

Product name: BARIUM SULFATE, POWDER, REAGENT