ISOFLEX
Isotopes for Science, Medicine and Industry

# Safety Data Sheet

Version 1.5
Revision Date 04/05/2024

## 1. PRODUCT AND COMPANY IDENTIFICATION

| | |
|---|---|
| Product Name | **Barium Carbonate, Enriched Barium** |
| Chemical Formula | $BaCO_3$ |
| Molecular Weight | 197.37 |
| CAS No. | 513-77-9 |
| EINECS No. | 208-167-3 |
| Synonyms | Barium salt |
| Supplier Address* | ISOFLEX USA<br>PO Box 472615<br>San Francisco CA 94147<br>United States |
| Telephone | +1 415-440-4433 |
| Fax | +1 415-563-4433 |
| Emergency Phone Number (both supplier and manufacturer) | Infotrac/ +1 800-535-5053<br>*May include subsidiaries or affiliate companies/divisions |
| Email | iusa@isoflex.com |
| Website | www.isoflex.com |
| Preparation Information | ISOFLEX USA<br>Product Safety<br>+1 415-440-4433 |

## 2. HAZARDS IDENTIFICATION

**Emergency Overview** Hazardous product for human health. Presents hazards from its ionizing barium action on the neuromuscular system.

### Potential Health Effects

Principle Routes of Exposure

*Inhalation*
*Eye Contact*
*Skin Contact*
*Ingestion*

### Acute Toxicity

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| *Eyes* | Moderate Irritation. Risk of temporary eye lesions. |
| *Inhalation (Dusts)* | At high concentrations, nose and throat irritation. In case of repeated or prolonged exposure, there is a risk of bronchitis. |
| *Skin Contact* | May cause irritation with redness and pain. |
| *Ingestion* | Abundant salivation, nausea, vomiting, abdominal cramps and diarrhea. Risk of cardiac rhythm alteration. Trembling, muscle cramps followed by general weakness and paralysis of the extremities. Risk of shock. |

*Aggravated Medical Conditions* Hazard due to the formation of barium chloride in the presence of hydrochloric acid (stomach). Risk of cardiac, nervous and muscular disorders. Fatalities have been observed after a single dose of 4 grams or more taken by an adult weighing 70 kg (155 lbs.).

**NFPA Ratings:** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

**Health Hazard = 2** **Flammability = 0** **Reactivity = 1**


**HMIS Ratings:** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

**Health Hazard = 2** **Flammability = 0** **Physical Hazard = 1**

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| HEALTH HAZARD | 2 |
| FLAMMABILITY | 0 |
| PHYSICAL HAZARD | 1 |
| PERSONAL PROTECTION | |

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name: Barium Carbonate
CAS No.: 513-77-9
Chemical Formula: $BaCO_3$
Molecular Weight: 197.37

## 4. FIRST AID MEASURES

*Eye Contact* Flush eyes with running water for at least 15 minutes, while keeping the eyelids wide open. Consult an ophthalmologist in case of persistent pain.

*Skin Contact* Wash the affected skin with soap and water for at least 15 minutes and clean clothing.

*Ingestion* None under normal use. Get medical attention if symptoms occur. Ingestion is unlikely as product is a gas at room temperature. Consult with a physician in all cases and take to the hospital.

**If the subject is completely conscious**: Rinse mouth with fresh water. 250 ml of fresh water added with 30 grams of sodium sulfate. **If the subject presents nervous, respiratory or cardiovascular disorders**: administer oxygen.

**If the subject is unconscious**: NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Remove any evidence of the product from the person's mouth. Loosen collar and tight clothing, lay the victim on his/her left side. Administer oxygen or cardiopulmonary resuscitation if necessary, while keeping and patient warm.

*Notes to Physician* Do not give adrenergetic drugs.

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| *Ingestion* | If necessary, tracheal intubation. Gastric lavage after administration of 250 ml of water added with 30 grams of sodium sulfate. Surveillance of cardiovascular system (heart rate and blood pressure). Surveillance of neuromuscular reactions. Surveillance and treatment of hypokalemia. |

## 5. FIREFIGHTING MEASURES

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| *Flammable Properties* | Not flammable |
| *Flash Point* | Not applicable |
| *Autoignition Temperature* | Not applicable |
| *Flammability Limits* | Not applicable |
| *Unusual Fire and Explosion Hazards* | None |
| *Common Extinguishing Methods* | In case of fire in close proximity, all means of extinguishing are acceptable. |

## 6. ACCIDENTAL RELEASE MEASURES

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| *Personal Precautions* | Avoid excessive dust. |
| *Environmental Precautions* | Clean up residual material by washing area with water. Do not flush to drain. Prevent material from entering public sewer systems or any waterways. Dispose of waste in accordance with applicable federal, state, and local environmental laws and regulations. |
| *Cleanup Methods* | Clean up uncontaminated material and recycle into process. Place unusable material into a closed, labeled container compatible with the product. |

## 7. HANDLING AND STORAGE

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| *Handling* | Operate in a well-ventilated area. Keep away from reactive products. |
| *Storage* | Store in a dry area away from food, keeping product in original closed packaging. |

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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| *Authorized Limit Values* | **TLV® ACGIH® USA (2002)**: 0.5 mg/m³ as Ba, in soluble compounds of Ba<br>**OSHA PELL**: 0.5 mg/m³ as Ba, in soluble compounds of Ba |
| *Ventilation*: | Maintain exposures to levels below the applicable exposure limits. |

**Personal Protective Equipment**

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| *Respiratory Protection* | Use only respiratory protection that conforms to international/ national standards (NIOSH/MSHA approved respiratory protection). Full face supplied air respirator for high or unknown exposures. Cartridge respirators in known concentrations above exposure limits. Comply with OSHA respiratory protection requirements. |
| *Hand Protection* | Chemical protective gloves. Recommended materials: PVC, neoprene or rubber. |
| *Eye Protection* | Wear protective goggles for all industrial operations. |
| *Skin Protection* | Wear boots, apron, long sleeves and other protective clothing suitable for use conditions to prevent contact with the skin. |

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| *Hygiene Measures* | Chemical protective clothing in dusty areas. An eyewash and safety shower should be nearby and ready for use. Use good hygiene practices when handling this product including changing work clothes after use. Do not eat, drink or smoke in areas where this material is handled. |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

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| Form | Powder |
| Color | White |
| Odor | Odorless |

### Safety Data

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| pH | 7 to 8 @ 20 °C (68 °F) in saturated solution. |
| Melting Point | 811 ºC |
| Boiling Point | 1300 ºC |
| Decomposition Temperature | > 1400 °C (2552 °F) |
| Flash Point | Not applicable |
| Oxidizing Properties | Oxidizer, see Section 4 |
| Vapor Pressure | Not Applicable |
| Relative Density: Specific Gravity ($H_2O$=1) | 4.3 |
| Solubility in Water | 0.02 g/l @ 20 °C (68 °F) |
| Partition Coefficient | P (n-octanol/water): Not listed |
| Viscosity | Not applicable |
| Vapor Density (Air=1) | Not applicable |
| Evaporation Rate | Not applicable |



## 10. STABILITY AND REACTIVITY

| | |
|---|---|
| *Stability* | Stable under normal conditions of use |
| *Conditions to Avoid* | Heat |
| *Materials and Substances to Avoid* | Contact with acids liberates $CO_2$, sometimes violently |
| *Hazardous Decomposition Products* | Carbon dioxide and soluble barium salts (Barium oxide) |
| *Hazardous Polymerization* | Not applicable |

## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

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| *Oral LD50* | Rat, 418 800 mg/kg |

### Chronic toxicity

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|---|---|
| *Inhalation* | After repeated exposure, rat, Target Organ cardiovascular/hematology respiratory system liver: 5.2 mg/m³, observed effect |
| *Oral* | After repeated exposure, rat/mouse, target organ cardiovascular/ hematology renal system/adrenal glands, observed effect |
| *Carcinogenic Designation* | Oral (water), after prolonged exposure, rat/mouse, no carcinogenic effect |

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| *Comments* | Harmful effect by oral route. The toxicity is mainly linked to the barium ion (nervous, cardiovascular, respiratory and gastrointestinal troubles). Risk of effect on liver, cardiovascular and hematological system and adrenals. Irritant effect for the skin and eyes. |

## 12. ECOLOGICAL INFORMATION

**Acute Ecotoxicity**

Fishes, *Gambusia affinis*, LC 50, 96 hour(s), > 10 g/l. Result: Toxicity threshold above hydro solubility

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| **Chronic Ecotoxicity** | No data |
| **Mobility** | Mobility as solid aerosols |
| **Degradation** | |
| *Abiotic* | Slow ionization and cation precipitation in presence of sulfates or carbonates |
| *Biotic* | Not applicable (inorganic compound) |
| *Potential for Bioaccumulation* | Bioconcentration result: potential accumulation of the cation |
| *Other Adverse Effects/ Comments* | Product is not significantly hazardous for the environment. Persistent product mainly as inert form. |

## 13. DISPOSAL CONSIDERATIONS

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| Waste Disposal Methods | Use a solution of sodium/magnesium sulfate or a dilute solution of sulfuric acid to form a precipitate of sulfate. Spilled product should be disposed of in an EPA-approved disposal facility in accordance with applicable national, state and local environmental laws and regulations. |
| Packaging treatment | Containers that cannot be cleaned must be treated as waste and disposed of in an approved industrial incineration facility. |
| RCRA Hazardous Waste | May exhibit characteristic of hazardous waste (D005). Results of toxicant extraction test must show waste to contain at least 100 mg/l barium to be considered hazardous waste. |

## 14. TRANSPORT INFORMATION

Not a hazardous material for transportation.

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| **DOT Regulations:** | Not regulated |
| **Air Transport ICAO-TI and IATA:** | Not regulated |

## 15. REGULATORY INFORMATION

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| **US National Regulations** | TSCA Inventory 8(b) / Yes |
| **SARA Title III Sec. 302/303** | *Extremely Hazardous Substances /* No (40 CFR355) |
| **SARA Title III Sec. 311/312 (40 CFR 370)** | |
| *Hazard Category* | Acute health hazard; chronic health hazard. Threshold planning quantity - 10,000 lbs. |

**SARA Title III Sec. 313 Toxic Chemical Emissions Reporting (40 CFR 372):** No

**CERCLA Hazardous Substance (40CFR Part 302):** No

**Canadian DSL Registration:** Yes

**WHMIS Classification**: D-1 Material causing immediate and serious toxic effects

**Labeling according to Directive 1999/45/EC:**

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| *Phrases:* | *R 22* | Harmful if swallowed |
| | S 2 | Keep out of reach of children |
| | 24/25 | Avoid contact with skin and eyes |

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## 16. OTHER INFORMATION

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| Prepared By | ISOFLEX USA<br>PO Box 472615<br>San Francisco CA 94147<br>United States |
| Issuing Date | September 17, 2014 |
| Revision Date | April 5, 2024 |
| Revision Number | 5 |
| Revision Note | Update supplier address |

**ISOFLEX USA's Commonly Used Abbreviations and Acronyms***

| | |
|---|---|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| ADR | European Agreement Concerning the International Carriage of Dangerous Goods by Road |
| ALARA | As Low As Is Reasonably Achievable |
| AMU | Atomic Mass Unit |
| ANSI | American National Standards Institute |
| BLS | Basic Life Support |
| CAM | Continuous Air Monitor |
| CAS | Chemical Abstracts Service (division of the American Chemical Society) |
| CEN | European Committee for Standardization |
| CERCLA | Comprehensive Environmental Response Compensation and Liability Act |
| CLP | Classification, Labelling and Packaging (European Union) |
| CPR | Controlled Products Regulations (Canada) |
| CWA | Clean Water Act (USA) |
| DAC | Derived Air Concentration (USA) |
| DOE | United States Department of Energy (USA) |
| DOT | United States Department of Transportation (USA) |
| DSL | Domestic Substances List (Canada) |
| EC50 | Half Maximal Effective Concentration |
| EINECS | European Inventory of Existing Commercial Chemical Substances |
| EHS | Environmentally Hazardous Substance |
| ELINCS | European List of Notified Chemical Substances |
| EMS | Emergency Response Procedures for Ships Carrying Dangerous Goods |
| EPA | Environmental Protection Agency (USA) |
| EPCRA | Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 |
| GHS | Globally Harmonized System |
| HMIS | Hazardous Materials Identification System (USA) |
| IARC | International Agency for Research on Cancer |

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|---|---|
| IATA | International Air Transport Association |
| IBC | Intermediate Bulk Containers |
| ICAO | International Civil Aviation Organization |
| IDLH | Immediately Dangerous to Life or Health |
| IMDG | International Maritime Code for Dangerous Goods |
| LC50 | Lethal concentration, 50 percent |
| LD50 | Lethal dose, 50 percent |
| LDLO | Lethal Dose Low |
| LOEC | Lowest-Observed-Effective Concentration |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| MSHA | Mine Safety and Health Administration (USA) |
| NCRP | National Council on Radiation Protection & Measurements (USA) |
| NDSL | Non-Domestic Substances List (Canada) |
| NFPA | National Fire Protection Association (USA) |
| NIOSH | National Institute for Occupational Safety and Health (USA) |
| NOEC | No Observed Effect Concentration |
| N.O.S. | Not Otherwise Specified |
| NRC | Nuclear Regulatory Commission (USA) |
| NTP | National Toxicology Program (USA) |
| OSHA | Occupational Safety and Health Administration (USA) |
| PBT | Persistent Bioaccumulative and Toxic Chemical |
| PEL | Permissible Exposure Limit |
| PIH | Poisonous by Inhalation Hazard |
| RCRA | Resource Conservation and Recovery Act (USA) |
| RCT | Radiation Control Technician |
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals (Europe) |
| RID | Regulations Concerning the International Transport of Dangerous Goods by Rail |
| RTECS | Registry of Toxic Effects of Chemical Substances |
| SARA | Superfund Amendments and Reauthorization Act (USA) |
| TDG | Transportation of Dangerous Goods (Canada) |
| TIH | Toxic by Inhalation Hazard |
| TLV | Threshold Limit Value |
| TPQ | Threshold Planning Quantity |
| TSCA | Toxic Substances Control Act |
| TWA | Time Weighted Average |
| UN | United Nations (Number) |
| VOC | Volatile Organic Compound |
| vPvB | Very Persistent Very Bioaccumulative Chemical |
| WGK | Wassergefährdungsklassen (Germany: Water Hazard Classes) |
| WHMIS | Workplace Hazardous Materials Information System |

*One or more of the above-listed items may not appear in this document.

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