Barium oxide

sc-210860

Material Safety Data Sheet

Hazard Alert Code Key: 

<table>
<thead>
<tr>
<th>EXTREME</th>
<th>HIGH</th>
<th>MODERATE</th>
<th>LOW</th>
</tr>
</thead>
</table>

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Barium oxide

STATEMENT OF HAZARDOUS NATURE

NFPA

<table>
<thead>
<tr>
<th>FLAMMABILITY</th>
<th>HEALTH HAZARD</th>
<th>INSTABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY:
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9673 3112

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability:</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Toxicity:</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Body Contact:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Reactivity:</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Chronic:</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW
RISK
Causes burns.
Risk of serious damage to eyes.
Harmful by inhalation and if swallowed.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
- The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
- Accidental ingestion of the material may be damaging to the health of the individual.

EYE
- The material can produce chemical burns to the eye following direct contact. Vapors or mists may be extremely irritating.
- If applied to the eyes, this material causes severe eye damage.

SKIN
- The material can produce chemical burns following direct contact with the skin.
- Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
- Barium fumes are primary skin irritants and may aggravate any pre-existing skin conditions.

INHALED
- If inhaled, this material can irritate the throat and lungs of some persons.
- Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
- Barium fumes are respiratory irritants. Over-exposure to barium dusts and fume may result in rhinitis, frontal headache, wheezing, laryngeal spasm, salivation and anorexia. Long term effects include nervous disorders and adverse effects on the heart, circulatory system and musculature. Heavy exposures may result in a benign pneumoconiosis.

CHRONIC HEALTH EFFECTS
- Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.
- Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
- Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
- Barium compounds may cause high blood pressure, airway irritation and damage the liver, spleen and bone marrow. Prolonged exposure may cause a lung inflammation and scarring.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>barium oxide</td>
<td>1304-28-5</td>
<td>&gt;96</td>
</tr>
</tbody>
</table>

Section 4 - FIRST AID MEASURES

SWALLOWED
- For advice, contact a Poisons Information Center or a doctor at once. • Urgent hospital treatment is likely to be needed.

EYE
- If this product comes in contact with the eyes: • Immediately hold eyelids apart and flush the eye continuously with running water. • Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
- If skin or hair contact occurs: • Immediately flush body and clothes with large amounts of water, using safety shower if available. • Quickly remove all contaminated clothing, including footwear.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area. • Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN
- Treat symptomatically.
- for poisons (where specific treatment regime is absent):

--- BASIC TREATMENT ---
• Establish a patent airway with suction where necessary.
• Watch for signs of respiratory insufficiency and assist ventilation as necessary.
Section 5 - FIRE FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapour Pressure (mmHG)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>5.7</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.

FIRE FIGHTING

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Non combustible.
- Not considered to be a significant fire risk, however containers may burn.
- Decomposition may produce toxic fumes of: metal oxides.
- May emit poisonous fumes.

FIRE INCOMPATIBILITY

- None known.

PERSONAL PROTECTION

Glasses:
- Full face- shield.

Gloves:

Respirator:
- Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Not applicable.

MAJOR SPILLS

- Not applicable.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Not applicable.

RECOMMENDED STORAGE METHODS

- Not applicable.

STORAGE REQUIREMENTS

- Not applicable.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Source</th>
<th>Material</th>
<th>TWA ppm</th>
<th>TWA mg/m³</th>
<th>STEL ppm</th>
<th>STEL mg/m³</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Canada - Ontario Occupational Exposure Limits</td>
<td>barium oxide (Barium carbonate, chloride, nitrate, or oxide (as barium))</td>
<td>0.5</td>
<td></td>
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<tr>
<td>Canada - British Columbia Occupational Exposure Limits</td>
<td>barium oxide (Barium and soluble compounds, as Ba)</td>
<td>0.5</td>
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<tr>
<td>US - Minnesota Permissible Exposure Limits (PELs)</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
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<tr>
<td>Location</td>
<td>Standard/Regulation</td>
<td>Substance</td>
<td>Limit(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
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<tr>
<td>US OSHA Permissible Exposure Levels (PELs) - Table Z1</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
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<tr>
<td>Canada - Alberta Occupational Exposure Limits</td>
<td>barium oxide (Barium and soluble compounds, as Ba)</td>
<td>0.5</td>
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<tr>
<td>US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
<td></td>
<td></td>
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<tr>
<td>US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
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<tr>
<td>US - Idaho - Limits for Air Contaminants</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
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<tr>
<td>US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants</td>
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<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
<td>barium oxide (Barium and soluble compounds, (as Ba))</td>
<td>0.5, 1.5</td>
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<td></td>
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<tr>
<td>US - Hawaii Air Contaminant Limits</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
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<tr>
<td>Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances</td>
<td>barium oxide (Barium (soluble compounds))</td>
<td>0.5, -, 0.5</td>
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<tr>
<td>US - Washington Permissible exposure limits of air contaminants</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5, 1.5</td>
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<tr>
<td>Canada - Northwest Territories Occupational Exposure Limits (English)</td>
<td>barium oxide (Barium (soluble compounds))</td>
<td>0.5, 1.5</td>
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<td>Canada - Nova Scotia Occupational Exposure Limits</td>
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<tr>
<td>US - Alaska Limits for Air Contaminants</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
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<tr>
<td>US - Michigan Exposure Limits for Air Contaminants</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
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</tr>
<tr>
<td>Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)</td>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
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<tr>
<td>US ACGIH Threshold Limit Values (TLV)</td>
<td>barium oxide (Barium - Soluble compounds (as Ba))</td>
<td>0.5</td>
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<tr>
<td>US - California Permissible Exposure Limits for Chemical Contaminants</td>
<td>barium oxide (Barium, soluble compounds, as Ba)</td>
<td>0.5</td>
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<tr>
<td>US - Oregon Permissible Exposure Limits (Z-1)</td>
<td>barium oxide (Barium (soluble compounds))</td>
<td>0.5</td>
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</tr>
</tbody>
</table>
Canada - Prince Edward Island Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Compounds</th>
<th>Limit (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>barium oxide (Barium - Soluble compounds (as Ba))</td>
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</table>

US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants

<table>
<thead>
<tr>
<th>Compounds</th>
<th>Limit (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>barium oxide (Barium, soluble compounds (as Ba))</td>
<td>0.5</td>
</tr>
</tbody>
</table>

PERSONAL PROTECTION

RESPIRATOR
Particulate
Consult your EHS staff for recommendations

EYE
- Chemical goggles.
- Full face shield.

HANDS/FEET
- Wear chemical protective gloves, eg. PVC.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
  - frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and
dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER
- Overalls.
- Eyewash unit.

ENGINEERING CONTROLS
- Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES
Solid.
Mixes with water.

<table>
<thead>
<tr>
<th>State</th>
<th>Molecular Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divided solid</td>
<td>153.34</td>
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</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>3488</td>
</tr>
<tr>
<td>Boiling Range (°F)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flash Point (°F)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition Temp (°F)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Autoignition Temp (°F)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>Nil.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Solubility in water (g/L)</td>
<td>Miscible</td>
</tr>
<tr>
<td>pH (1% solution)</td>
<td>Alkaline &gt; 7</td>
</tr>
<tr>
<td>pH (as supplied)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapour Pressure (mmHG)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>5.7</td>
</tr>
<tr>
<td>Relative Vapor Density (air=1)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Section 10 - CHEMICAL STABILITY
CONDITIONS CONTRIBUTING TO INSTABILITY
- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY
- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
- These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels -
- The state of subdivision may affect the results.
  Barium oxide
- is an oxidiser
- reacts with water or steam, producing heat and corrosive barium hydroxide; may cause spontaneous combustion
- reacts violently or explosively with reducing agents, alcohols, ethers, fluorine, glycols, glycol ethers, hydrazine, hydrogen sulfide, hydrogen trisulfide, hydroxylamine
- is incompatible with ammonium nitrate, diboron tetrafluoride, hydrazinium nitrate, hydrogen sulfide, nitroalkanes, red phosphorus, sulfur trioxide, rubidium acetylide, selenium oxychlordide
- forms heat-sensitive explosive material with anilinium perchlorate
- increase the explosive or thermal sensitivity of nitromethane, nitroethane, 1-nitropropane, silver azide
- increase explosive sensitivity of hydrazinium perchlorate
- reacts with carbon dioxide, nickel monoxide, nitrogen tetroxide
- is strongly basic in aqueous solution.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

BARIUM OXIDE

TOXICITY AND IRRITATION
- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
- Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which may occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

No significant acute toxicological data identified in literature search.

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions
A. General Product Information
Toxicity characteristic: use EPA hazardous waste number D005 (waste code E) if this substance, in a solid waste, produces an extract containing greater than 100 mg/L of barium.

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 6.1
Identification Numbers: UN1884 PG: III
Label Codes: 6.1 Special provisions: IB8, IP3, T1, TP33
Packaging: Exceptions: 153 Quantity limitations: 100 kg
Passenger aircraft/rail:
Quantity Limitations: Cargo 200 kg Vessel stowage: Location: A
aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Barium oxide

**Air Transport IATA:**
ICAO/IATA Class: 6.1 ICAO/IATA Subrisk: None
UN/ID Number: 1884 Packing Group: III
Special provisions: None
Cargo Only
Packing Instructions: 619 Maximum Qty/Pack: 200 kg
Passenger and Cargo Passenger and Cargo
Packing Instructions: 619 Maximum Qty/Pack: 100 kg
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Y619 Maximum Qty/Pack: 10 kg
Shipping Name: BARIUM OXIDE

**Maritime Transport IMDG:**
IMDG Class: 6.1 IMDG Subrisk: None
UN Number: 1884 Packing Group: III
EMS Number: F-A , S-A Special provisions: None
Limited Quantities: 5 kg
Shipping Name: BARIUM OXIDE

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**Section 15 - REGULATORY INFORMATION**

**REGULATIONS**

barium oxide (CAS: 1304-28-5) is found on the following regulatory lists;
"Canada - Ontario Occupational Exposure Limits","Canada Domestic Substances List (DSL)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","US - New Jersey Right to Know Hazardous Substances","US DOE Temporary Emergency Exposure Limits (TEELs)","US Toxic Substances Control Act (TSCA) - Inventory"

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**Section 16 - OTHER INFORMATION**

**LIMITED EVIDENCE**
- Skin contact may produce health damage*.
- Cumulative effects may result following exposure*.
  * (limited evidence).

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- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
- A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.
- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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7 of 7