# **Barium oxide**



### STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.



### SUPPLIER

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### Section 2 - HAZARDS IDENTIFICATION

#### **CHEMWATCH HAZARD RATINGS** Min Max Flammability: 0 2 Toxicity: Min/Nil=0 Body Contact: 3 Low=1 Moderate=2 Reactivity: 0 High=3 Chronic: 2 Extreme=4

### 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 contactwith 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 andlungs 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.

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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.

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### Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
barium oxide	1304-28-5	>96

### **Section 4 - FIRST AID MEASURES**

#### **SWALLOWED**

 $\cdot$  For advice, contact a Poisons Information Center or a doctor at once.  $\cdot$  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**

Vapour Pressure (mmHG):	Not applicable.
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	5.7
Lower Explosive Limit (%):	Not applicable

### **EXTINGUISHING MEDIA**

 $\cdot$  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

#### **EXPOSURE CONTROLS**

Source	Material	TWA ppm	TWA mg/m <sup>3</sup>	STEL ppm	STEL mg/m <sup>3</sup>	Notes
Canada - Ontario Occupational Exposure Limits	barium oxide (Barium carbonate, chloride, nitrate, or oxide (as barium))		0.5			
Canada - British Columbia Occupational Exposure Limits	barium oxide (Barium and soluble compounds, as Ba)		0.5			
US - Minnesota Permissible Exposure Limits (PELs)	barium oxide (Barium, soluble compounds (as Ba))		0.5			

US OSHA Permissible Exposure Levels (PELs) - Table Z1	barium oxide (Barium, soluble compounds (as Ba))	0.5		
Canada - Alberta Occupational Exposure Limits	barium oxide (Barium and soluble compounds, as Ba)	0.5		
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	barium oxide (Barium, soluble compounds (as Ba))	0.5		
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	barium oxide (Barium, soluble compounds (as Ba))	0.5		
US - Idaho - Limits for Air Contaminants	barium oxide (Barium, soluble compounds (as Ba))	0.5		
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	barium oxide (Barium, soluble compounds (as Ba))	0.5		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	barium oxide (Barium and soluble compounds, (as Ba))	0.5	1.5	
US - Hawaii Air Contaminant Limits	barium oxide (Barium, soluble compounds (as Ba))	0.5		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	barium oxide (Barium (soluble compounds) - (as Ba))	0.5 -	0.5	
US - Washington Permissible exposure limits of air contaminants	barium oxide (Barium, soluble compounds (as Ba))	0.5	1.5	
Canada - Northwest Territories Occupational Exposure Limits (English)	barium oxide (Barium (soluble compounds) (as Ba))	0.5	1.5	
Canada - Nova Scotia Occupational Exposure Limits	barium oxide (Barium - Soluble compounds (as Ba))	0.5		TLV Basis: eye, skin & gastrointestinal irritation; muscular stimulation
US - Alaska Limits for Air Contaminants	barium oxide (Barium, soluble compounds (as Ba))	0.5		
US - Michigan Exposure Limits for Air Contaminants	barium oxide (Barium, soluble compounds (as Ba))	0.5		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	barium oxide (Barium, soluble compounds (as Ba))	0.5		
US ACGIH Threshold Limit Values (TLV)	barium oxide (Barium - Soluble compounds (as Ba))	0.5		TLV Basis: eye, skin & gastrointestinal irritation; muscular stimulation
US - California Permissible Exposure Limits for Chemical Contaminants	barium oxide (Barium, soluble compounds, as Ba)	0.5		
US - Oregon Permissible Exposure Limits (Z-1)	barium oxide (Barium (soluble compounds))	0.5		

Canada - Prince Edward barium oxide (Barium Island Occupational **Exposure Limits** 

- Soluble compounds (as Ba))

0.5

TLV Basis: eye, skin & gastrointestinal irritation; muscular stimulation

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

barium oxide (Barium, soluble compounds (as Ba))

0.5

## 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: such as:

- · 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. <\p>.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### PHYSICAL PROPERTIES

Solid. Mixes with water.			
State	Divided solid	Molecular Weight	153.34
Melting Range (°F)	3488	Viscosity	Not Applicable
Boiling Range (°F)	Not applicable.	Solubility in water (g/L)	Miscible
Flash Point (°F)	Not applicable	pH (1% solution)	Alkaline > 7
Decomposition Temp (°F)	Not Applicable	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not applicable	Vapour Pressure (mmHG)	Not applicable.
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	5.7
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	Not applicable.
Volatile Component (%vol)	Nil.	Evaporation Rate	Not applicable

### Section 10 - CHEMICAL STABILITY

### CONDITIONS CONTRIBUTING TO INSTABILITY

 $\cdot$  Presence of incompatible materials.

· Product is considered stable.

### STORAGE INCOMPATIBILITY

 $\cdot$  Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.

These trifluorides are hypergolic oxidisers. They ignites on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.

• The state of subdivision may affect the results.

Barium oxide

 $\cdot$  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 oxychloride

- · 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-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can 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 (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. Not applicable.

### 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 Packaging: Non- bulk: 213 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: Nove 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

### 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"

### 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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