Beryllium oxide

sc-234014

Material Safety Data Sheet

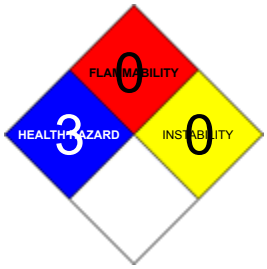
Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Beryllium oxide

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



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 9573 3112

SYNONYMS
Be-O, "beryllium monoxide", Beryllia, Thermalox, Bromelite, Bromellete

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	0		
Toxicity	4		
Body Contact	2		
Reactivity	0		
Chronic	4		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Toxic if swallowed.
Very toxic by inhalation.
May cause CANCER by inhalation.
May cause SENSITISATION by skin contact.
Toxic danger of serious damage to health by prolonged exposure through inhalation.
Irritating to eyes, respiratory system and skin.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
■ Exposure to even extremely small amounts of beryllium can result in the inhibition of a number of metabolic pathways.
■ Beryllium even in its most highly soluble forms is poorly absorbed fromthe gastrointestinal tract.

EYE

■ This material can cause eye irritation and damage in some persons.

SKIN

■ This material can cause inflammation of the skin oncontact in some persons.
■ The material may accentuate any pre-existing dermatitis condition.
■ Beryllium causes the sensitivity of skin to increase.
It is an irritant and causes inflammation on contact, nodules and ulcers.
■ 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.

INHALED

■ Inhalation of dusts, generated by the material, during the course of normal handling, may produce toxic effects.
■ The material can cause respiratory irritation in some persons.
The body's response to such irritation can cause further lung damage.
■ 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.
If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.
■ Inhaled beryllium is not absorbed rapidly.
It accumulates in the bones, kidney and liver.

CHRONIC HEALTH EFFECTS

■ Toxic danger of serious damage to health by prolonged exposure through inhalation.
This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. This has been demonstrated via both short- and long-term experimentation.
Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.
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. Prime symptom is breathlessness; lung

shadows show on X-ray.
Chronic exposure to beryllium dusts and fumes may cause progressive lung damage and systemic disease including lung inflammation, joint pain, skin lesions, chills, fever, damage to the liver, kidney, spleen, lymph nodes and heart. The onset may be marked by weakness, fatigue, weight loss without cough or shortness of breath. High levels or repeated exposures can result in kidney stones. Granular tissue often occurs in the lungs, lymph nodes, spleen, liver and bone marrow. The disease is chronic in nature and relapsing-remitting. When chills and fever develop as complications, the prognosis is bad. There is some evidence that beryllium causes lung and bone cancer in humans.
Any dramatic, unexplained weight loss should be considered as possible first indication of beryllium disease.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
beryllium oxide	1304-56-9	> 98

Section 4 - FIRST AID MEASURES

SWALLOWED

- Give a slurry of activated charcoal in water to drink. NEVER GIVE AN UNCONSCIOUS PATIENT WATER TO DRINK.
- At least 3 tablespoons in a glass of water should be given.
- Although induction of vomiting may be recommended (IN CONSCIOUS PERSONS ONLY), such a first aid measure is dissuaded due to the risk of aspiration of stomach contents. (i) It is better to take the patient to a doctor who can decide on the necessity and method of emptying the stomach. (ii) Special circumstances may however exist; these include non- availability of charcoal and the ready availability of the doctor.

NOTE If vomiting is induced, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

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.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.

SKIN

If skin contact occurs

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.

NOTES TO PHYSICIAN

■ Acute berylliosis produces interstitial fibrotic disease rather than the simple focal nodular lesions seen in simple pneumoconiosis. Fibrotic lesions appear out of proportion to dust-laden macrophages.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG)	Not applicable.
Upper Explosive Limit (%)	Not Available
Specific Gravity (water=1)	3.00
Lower Explosive Limit (%)	Not Available

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.

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 a significant fire risk, however containers may burn.

Decomposition may produce toxic fumes of metal oxides.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

None known.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Clean up all spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Wet residue with water to prevent dusting

Do not dry sweep.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by all means available, spillage from entering drains or water courses.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.

RECOMMENDED STORAGE METHODS

- Glass container is suitable for laboratory quantities

- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

<. All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
US - Michigan Exposure Limits for Air Contaminants	beryllium oxide (Silicates (less than 1% crystalline silica) Talc (containing asbestos); use asbestos limit)							0.1	R 325.51311 et seq, Asbestos for General Industry
US - Michigan Exposure Limits for Air Contaminants	beryllium oxide (Sillicates (less than 1% crystalline silica) Soapstone, total dust)		6						
US - Michigan Exposure Limits for Air Contaminants	beryllium oxide (Sillicates (less than 1% crystalline silica) Talc (containing no asbestos), respirable dust)		2						
US - Michigan Exposure Limits for Air Contaminants	beryllium oxide (Sillicates (less than 1% crystalline silica) Soapstone, respirable dust)		3						
US - Hawaii Air Contaminant Limits	beryllium oxide (Silicates (less than 1% crystalline silica) - Mica (respirable dust))		3						
US - Washington Permissible exposure limits of air contaminants	beryllium oxide (Silicates (less than 1% crystalline silica) Mica -		3		6				

	Respirable fraction)					
US - Hawaii Air Contaminant Limits	beryllium oxide (Silicates (less than 1% crystalline silica) - Soapstone, total dust)		6			
US OSHA Permissible Exposure Levels (PELs) - Table Z3	beryllium oxide (Silicates (less than 1% crystalline silica) Tremolite, asbestiforms (see 29 CFR 1910.1001))				0.1	
US - Idaho - Limits for Air Contaminants	beryllium oxide (Silicates (less than 1% crystalline silic))		[3]			
US OSHA Permissible Exposure Levels (PELs) - Table Z1	beryllium oxide (Silicates (less than 1% crystalline silica) - Talc (containing asbestos); use asbestos limit; see 29 CFR 1910.1001)		0.1			See Table Z-3; (STEL (Excursion limit)(as averaged over a sampling period of 30 minutes))
US OSHA Permissible Exposure Levels (PELs) - Table Z1	beryllium oxide (Silicates (less than 1% crystalline silica) - Tremolite, asbestiform; see 1910.1001)		0.1			(STEL (Excursion limit)(as averaged over a sampling period of 30 minutes))
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	beryllium oxide (Beryllium and beryllium Compounds (as Be) (STEL - 30 minutes))		0.002	0.005	0.025	
US - Idaho - Acceptable Maximum Peak Concentrations	beryllium oxide (Beryllium and beryllium compounds (Z37.29-1970))		2 ug/M3		5ug/M3	
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	beryllium oxide (Beryllium and beryllium compounds (as Be))	0.002		0.005 (30 min)	0.025	
US - Vermont Permissible Exposure Limits Table Z-1-A	beryllium oxide (Beryllium and beryllium compounds (as	See Table	Z-2			

Transitional Limits for Air Contaminants	Be))				
Canada - Prince Edward Island Occupational Exposure Limits	beryllium oxide (Beryllium and compounds, as Be)	0.00005			TLV® Basis Beryllium sens; chronic beryllium disease (berylliosis)
Canada - Nova Scotia Occupational Exposure Limits	beryllium oxide (Beryllium and compounds, as Be)	0.00005	0.01		TLV Basis beryllium sensitization; chronic beryllium disease (berylliosis)
US - Oregon Permissible Exposure Limits (Z-2)	beryllium oxide (Beryllium, and beryllium compounds (Z37.29-1970))	0.002	0.005		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	beryllium oxide (Beryllium, metal and compounds (as Be))	0.00015			
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift	beryllium oxide (Beryllium and beryllium compounds (Z37.29-1970))	0.002		0.005	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	beryllium oxide (Beryllium and compounds, (as Be))	0.002	0.01		T20
US - Washington Permissible exposure limits of air contaminants	beryllium oxide (Beryllium and beryllium compounds (as Be))	0.002	0.005	0.025	(STEL (30 minutes))
US - Michigan Exposure Limits for Air Contaminants	beryllium oxide (Beryllium and beryllium compounds (as Be))	0.002		0.005	See Table G-2

US - Alaska Limits for Air Contaminants	beryllium oxide (Beryllium and beryllium compounds (as Be))		0.002	0.005	0.025	
US - Hawaii Air Contaminant Limits	beryllium oxide (Beryllium and beryllium compounds (as Be))	0.002		0.005	0.025	see Table 202-2
US - Minnesota Permissible Exposure Limits (PELs)	beryllium oxide (Beryllium and beryllium compounds (as Be))		0.002	0.005 (30 min)	0.025	
Canada - Ontario Occupational Exposure Limits	beryllium oxide (Beryllium and its compounds, as Be / Béryllium et ses composés, en Be)		0.002	0.01		
US - Idaho - Limits for Air Contaminants	beryllium oxide (Beryllium compounds (as Be))		[2]			
US - California Permissible Exposure Limits for Chemical Contaminants	beryllium oxide (Beryllium, and beryllium compounds as Be)		0.0002		0.025	
Canada - British Columbia Occupational Exposure Limits	beryllium oxide (Beryllium and compounds, as Be Revised 2009; 2010)		0.002	0.01		Skin; S, A1, 1
US OSHA Permissible Exposure Levels (PELs) - Table Z2	beryllium oxide (Beryllium and beryllium compounds (Z37.29–1970))		0.002		0.005	
US OSHA Permissible Exposure Levels (PELs) - Table Z1	beryllium oxide (Zirconium compounds (as Zr))		5			
Canada - Alberta Occupational Exposure Limits	beryllium oxide (Beryllium and compounds, as Be)		0.002	0.01		
US NIOSH Recommended Exposure Limits (RELs)	beryllium oxide (Beryllium & beryllium compounds (as Be))		0.0005			See Appendix A; Ca

US ACGIH Threshold Limit Values (TLV)	beryllium oxide (Beryllium and compounds, as Be)	0.00005	TLV® Basis Beryllium sens; chronic beryllium disease (berylliosis)

PERSONAL PROTECTION

RESPIRATOR

•Particulate. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber

NOTE

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

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

OTHER

- Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood.
- Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
- Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 65292006 or national equivalent]
- Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent]

- Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.

ENGINEERING CONTROLS

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Provide adequate local exhaust ventilation for all shaping operations such as machining, grinding, laser trimming, sand blasting, chemical etching etc. where respirable dusts, mists or fumes may be generated.
Note
The machining of beryllia under a liquid lubricant/coolant can potentially generate an elevated airborne concentration of beryllia.
The recycling of liquid coolant can also generate an elevated airborne concentration.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Does not mix with water.
Sinks in water.

State	Divided solid	Molecular Weight	25.01
Melting Range (°F)	4586	Viscosity	Not Applicable
Boiling Range (°F)	Not available.	Solubility in water (g/L)	Immiscible
Flash Point (°F)	Not applicable	pH (1% solution)	Not applicable.
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not Available	Vapour Pressure (mmHG)	Not applicable.
Upper Explosive Limit (%)	Not Available	Specific Gravity (water=1)	3.00
Lower Explosive Limit (%)	Not Available	Relative Vapour Density (air=1)	Not applicable.
Volatile Component (%vol)	Not applicable.	Evaporation Rate	Not applicable

APPEARANCE

Odorless, powder. Very sparingly soluble in water, slowly soluble in concentrated acids and alkalis. Volatile BeOH can be formed when firing solid parts at >1200 deg. C. in moist atmospheres [SDR 037]

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

STORAGE INCOMPATIBILITY

- 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.
- Avoid strong bases.

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

Section 11 - TOXICOLOGICAL INFORMATION

beryllium oxide

TOXICITY AND IRRITATION
BERYLLIUM OXIDE
unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.
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.
No significant acute toxicological data identified in literature search.
WARNING This substance has been classified by the IARC as Group 1 CARCINOGENIC TO HUMANS.
Tenth Annual Report on Carcinogens Substance anticipated to be Carcinogen
[National Toxicology Program U.S. Dep.

CARCINOGEN

Beryllium and beryllium compounds	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Beryllium and compounds	US EPA Carcinogens Listing	Carcinogenicity	B1
Beryllium and compounds (Inhalation Route)*	US EPA Carcinogens Listing	Carcinogenicity	K/L
Beryllium and compounds (Oral Route)*	US EPA Carcinogens Listing	Carcinogenicity	CBD
beryllium oxide	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	B1
beryllium oxide	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	K/L
beryllium oxide	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	CBD
Beryllium and compounds, as Be	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A1
BERYLLIUM OXIDE	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65-MC
BERYLLIUM COMPOUNDS	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
BERYLLIUM OXIDE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
BERYLLIUM COMPOUNDS	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65

Beryllium and its Compounds (as Be)	US NIOSH Recommended Exposure Limits (RELs) - Carcinogens	Carcinogen	Ca
beryllium oxide	US - Maine Chemicals of High Concern List	Carcinogen	B1
beryllium oxide	US - Maine Chemicals of High Concern List	Carcinogen	K/L
beryllium oxide	US - Maine Chemicals of High Concern List	Carcinogen	CBD
CAS~	US - Maine Chemicals of High Concern List	Carcinogen	A1
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; IRIS; NTP 11th ROC
CAS~	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV® Basis Beryllium sens; chronic beryllium disease (berylliosis)
CAS~	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV Basis beryllium sensitization; chronic beryllium disease (berylliosis)

SKIN

beryllium oxide	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes
beryllium oxide	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	TLV® Basis Beryllium sens; chronic beryllium disease (berylliosis)
beryllium oxide	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	Yes
beryllium oxide	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin; S, A1, 1
beryllium oxide	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	Yes
beryllium oxide	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	Yes

Section 12 - ECOLOGICAL INFORMATION

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This material and its container must be disposed of as hazardous waste.
Avoid release to the environment.
Refer to special instructions/ safety data sheets.

Section 13 - DISPOSAL CONSIDERATIONS

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

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. In most instances the supplier of the material should be consulted.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.

For scrap beryllium oxide or beryllium contaminated material:-
Place in a polyethylene bag, seal and place inside a metal container clearly marked
BERYLLIA - HIGHLY TOXIC - CANCER HAZARD
Seek specialist advice on disposal. [SDR 037].

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	6.1
Identification Numbers:	UN1566	PG:	II
Label Codes:	6.1	Special provisions:	IB8, IP2, IP4, T3, TP33
Packaging: Exceptions:	153	Packaging: Non-bulk:	212
Packaging: Exceptions:	153	Quantity limitations: Passenger aircraft/rail:	25 kg
Quantity Limitations: Cargo aircraft only:	100 kg	Vessel stowage: Location:	A
Vessel stowage: Other:	None		

Hazardous materials descriptions and proper shipping names:
Beryllium compounds, n.o.s.
Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	1566	Packing Group:	II
Special provisions:	A3		
Cargo Only			
Packing Instructions:	676	Maximum Qty/Pack:	100 kg

Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	669	Maximum Qty/Pack:	25 kg
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y644	Maximum Qty/Pack:	1 kg

Shipping Name: BERYLLIUM COMPOUND, N.O.S. *(CONTAINS BERYLLIUM OXIDE)

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	1566	Packing Group:	II
EMS Number:	F-A,S-A	Special provisions:	274
Limited Quantities:	500 g	Marine Pollutant:	Yes

Shipping Name: BERYLLIUM COMPOUND, N.O.S.(contains beryllium oxide)

Section 15 - REGULATORY INFORMATION

bberyllium oxide (CAS: 1304-56-9) is found on the following regulatory lists;
"Canada Ingredient Disclosure List (SOR/88-64)","Canada Non-Domestic Substances List (NDSL)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Chemical Secretariat (ChemSec) SIN List (*Substitute It Now!)","US - California Proposition 65 - Carcinogens","US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens","US - Connecticut Hazardous Air Pollutants","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US DOE Temporary Emergency Exposure Limits (TEELs)","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE
■ Cumulative effects may result following exposure*.
■ Danger of very serious irreversible effects*.
■ Possible respiratory sensitiser*.
* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ 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.

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