

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
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Gaithersburg, Maryland 20899-2300

SRM Number: 1877
MSDS Number: 1877
SRM Name: Beryllium Oxide Powder

Date of Issue: 08 June 2012

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Description: This Standard Reference Material (SRM) is intended for use in laboratory analysis and health research for the development and validation of analytical methods and instruments used to determine beryllium, as well as for proficiency testing of laboratories involved in beryllium determinations. A unit of SRM 1877 consists of one bottle containing 20 g of beryllium oxide powder.

Substance: Beryllium Oxide

Other Designations: Beryllium monoxide; bromellite; thermoalox

2. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 2 Fire = 0 Reactivity = 0

Major Health Hazards: Respiratory tract irritation, cancer in humans.

Physical Hazards: There are no known physical hazards associated with this material.

Potential Health Effects (Acute and Chronic)

Inhalation: Exposure to dust may result in irritation and acute pneumonitis. Exposure to particles, fumes, or solutions of beryllium-containing materials may cause chronic beryllium disease (CBD), a potentially disabling or even fatal respiratory disease with symptoms that may include cough, weight loss, weakness, and dyspnea.

Skin Contact: Exposure to intact skin may be irritating to the skin. Absorption through a wound or abrasion may result in the production of a skin granulomata with necrosis spreading to other parts of the body.

Eye Contact: Contact with beryllium oxide may cause eye irritation.

Ingestion: Ingestion may cause digestive tract irritation.

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	X ^(a)	
In the International Agency for Research on Cancer (IARC) Monographs	X ^(b)	
By the Occupational Safety and Health Administration (OSHA)		X

^(a)NTP lists beryllium and beryllium compounds as a *known human carcinogen*.

^(b)IARC lists beryllium oxide in Group 1 (*carcinogenic to humans*).

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Beryllium Oxide	1304-56-9	215-133-1	100

EC Classification: T+, Xi, Carc. Cat. 2

EC Risk (R No.): 25, 26, 36/37/38, 43, 48/23, 49

EC Safety (S No.): 45, 53

EC Classification Risk/Safety Phrases: Refer to Section 15, "Regulatory Information".

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eye Contact: Flush eyes with plenty of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard.

Extinguishing Media: Regular dry chemical, carbon dioxide, water, regular foam.

Fire Fighting: Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point: Not applicable.

Autoignition Temp.: Not applicable.

Flammability Limits in Air

UPPER (Volume %): Not applicable.

LOWER (Volume %): Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Collect spilled material in appropriate container for disposal. Keep of water supplies and sewers.

Disposal: Refer to Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Store in a cool, dry place.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: (As Be, related to beryllium compounds, n.o.s.)

ACGIH (TWA):	0.05 $\mu\text{g}/\text{m}^3$ (inhalable fraction)
	Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA (TWA):	2 $\mu\text{g}/\text{m}^3$
OSHA (Ceiling):	5 $\mu\text{g}/\text{m}^3$; 0.005 mg/m^3 (30 min) with a maximum peak of 0.025 mg/m^3
NIOSH (TWA):	0.5 $\mu\text{g}/\text{m}^3$
NIOSH (IDLH):	4 mg/m^3

Ventilation: Use local exhaust ventilation system. Ensure compliance with applicable exposure limits. Refer to the ACGIH document, *Industrial Ventilation, a Manual of Recommended Practices*.

Respirator: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29 CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye Protection: Wear chemical safety goggles. An eyewash station should be readily available near areas of use.

Personal Protection: Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: White amorphous powder; no odor information available.
Molecular Formula: BeO
Molar Mass (g/mol): 25.01
Water Solubility: 2 ppm @ 30 °C
Boiling Point: 3900 °C (7052 °F)
Density (g/m³): 3.01
Specific Gravity (water = 1): 3

10. STABILITY AND REACTIVITY

Stability: Stable Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid heat, flames, sparks and other sources of ignition. Avoid generating dust. Keep out of water supplies and sewers.

Incompatible Materials: Acids, magnesium.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Oxides of beryllium.

Hazardous Polymerization: Will Occur Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: Inhalation Skin Ingestion

Toxicity Data: Mouse, Oral LD₅₀: 2062 mg/kg

Health Effects (Acute and Chronic): See Section 2, "Hazards Identification" for potential health effects.

Target Organ(s): Eyes, skin, respiratory system.

Medical Conditions Aggravated by Exposure: No data available.

Mutagen/Teratogen:

This material has been reviewed and the Registry of Toxic Effects of Chemical Substance (RTECS) publishes the following endpoints:

Tumorigenic effects: Rat, Inhalation TCLo: 28 mg/m³ (17 week)

Reproductive effects: Rat, Intratracheal TDLo: 139 mg/kg (pregnant 3 d)

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: No ecotoxicity data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Beryllium compound, n.o.s. (beryllium oxide), UN1566, Hazard Class 6.1, Packing Group II.

15. REGULATORY INFORMATION

U.S. Regulations

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): 0.1 % de minimis concentration (Chemical Category N050, related to beryllium compounds, n.o.s.).

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	Yes
CHRONIC:	Yes
FIRE:	No
REACTIVE:	No
PRESSURE:	No

State Regulations

California Proposition 65: Warning! This product contains beryllium oxide which is known to the state of California to cause cancer.

Canadian Regulations

WHMIS Information: Not provided for this material.

European Regulations

EC Classification (assigned):

T+ - Very Toxic; Carcinogen Category 2

Xi - Irritant

EC Risk Phrases:

R25 - Toxic if swallowed.

R26 - Very toxic by inhalation.

R35/37/38 - Irritating to eyes, respiratory system and skin.

R43 - May cause sensitization by skin contact.

R48/23 - Toxic: danger of serious damage to health by prolonged exposure through inhalation.

R49 - May cause cancer by inhalation.

EC Safety Phrases:

S45 - In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).

S53 - Avoid exposure – obtain special instructions before use.

National Inventory Status

U.S. Inventory (TSCA): Listed.

TSCA 12(b)

Export Notification: Not listed.

16. OTHER INFORMATION

Sources: ChemAdvisor, Inc., MSDS *Beryllium Oxide*, 20 December 2011.

EC; European Chemical Substance Information System (ESIS), *Beryllium Oxide*, Cas No. 1304-56-9; available at <http://esis.jrc.ec.europa.eu/index.php?PGM=cla> (accessed June 2012).

CDC; NIOSH; *NIOSH Pocket Guide to Chemical Hazards*; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; *Beryllium & beryllium compounds (as Be)*, CAS# 7440-41-7, 4 April 2011; available at <http://www.cdc.gov/niosh/npg/npgd0054.html> (accessed June 2012).

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.