Date of Issue:
30 July 2015

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 1051b
SRM Name: Barium Cyclohexanebutyrate
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is primarily intended for use in preparing standard oil solutions containing barium. SRM 1051b is a material that is essentially free from other metals and has suitable solubility, compatibility, and uniformity, for use with most lubricating oils or petroleum products. A unit of SRM 1051b contains 5 grams of material.

Company Information

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

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. Hazards Identification

Classification

Physical Hazard:	Not classified.	
Health Hazard:	Acute Toxicity, Oral	Category 4
	Acute Toxicity, Inhalation	Category 4

Label Elements

Symbol

Signal Word
WARNING

Hazard Statement(s):

H302	Harmful is swallowed.
H332	Harmful if inhaled.

Precautionary Statement(s):

P261	Avoid breathing dust.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink, or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P301 + P312 + P330	If swallowed: Call a doctor if you feel unwell. Rinse mouth.
P304 + P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P312	Call a doctor if you feel unwell.
P501	Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Barium cyclohexanebutyrate

Other Designations: Cyclohexanebutanoic acid, barium salt; barium 4-cyclohexylbutanoate; $C_{20}H_{34}BaO_4$.

Components are listed in compliance with OSHA's 29 CFR 1910.1200.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Barium Cyclohexanebutyrate	62669-65-2	263-685-7	100

4. FIRST AID MEASURES

Description of First Aid Measures

Inhalation: If adverse effects occur, remove to well-ventilated (uncontaminated) area. If not breathing, qualified personnel should give artificial respiration. Seek immediate medical attention.

Skin Contact: Rinse affected skin with water for at least 15 minutes, then wash thoroughly with soap or mild detergent and water. If skin irritation persists, seek medical aid and bring the container or label.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes.

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

Most Important Symptoms/Effects, Acute and Delayed: Gastroenteritis, muscle twitching, numbness and tingling around the mouth and neck, hemoglobin in the urine, cardiac arrest.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Slight fire hazard. Dust/air mixtures may ignite or explode. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media

Suitable: Regular dry chemical, carbon dioxide, water.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Not applicable.

Special Protective Equipment and Precautions for Fire-Fighters: Move container from fire area if it can be done without personal risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

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

Health = 2 Fire = 1 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection". Keep out of waters supplies and sewers.

Methods and Materials for Containment and Clean up: Collect in appropriate container for disposal.

7. HANDLING AND STORAGE

Safe Handling Precautions: Avoid dust formation. Avoid breathing dust. See Section 8, "Exposure Controls and Personal Protection".

Storage and Incompatible Materials: Store in a well-ventilated area. Keep separated from incompatible substances (see Section 10, "Stability and Reactivity").

8. Exposure Controls and Personal Protection

Exposure Limits

OSHA (PEL): 0.5 mg/m^3 TWA – as Barium, soluble compounds (as Br)

NIOSH (REL): 0.5 mg/m^3 TWA – as Barium, soluble compounds (as Br)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection Measures: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

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

Eye Protection: Splash resistant safety goggles and emergency eyewash are recommended.

Skin and Body Protection: Chemical resistant clothing and gloves are recommended.

9. Physical and Chemical Properties

Properties	
Molar Mass (g/mol)	475.80
Molecular Formula	$C_{20}H_{34}BaO_4$
Appearance (physical state, color, etc.)	odorless white powder
Odor	not available
Odor threshold	not available
pH	not available
Evaporation rate	not applicable
Melting point/freezing point	225 °C (437 °F)
Relative Density (water = 1)	not available
Density	not available
Vapor Pressure	negligible
Vapor Density (air = 1)	16.4
Viscosity	not available
Solubilities	solubility in water: negligible; other solubilities: no information available.
Partition coefficient (n-octanol/water)	not available
Particle size	not available
Thermal Stability Properties	
Autoignition Temperature	not available
Thermal Decomposition	not available
Initial boiling point and boiling range	not available
Explosive Limits, LEL (Volume %)	not available
Explosive Limits, UEL (Volume %)	not available
Flash Point (Closed Cup)	not available
Flammability (solid, gas)	not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: Not applicable.

Conditions to Avoid: Avoid generating dust. Avoid heat, flames, sparks and other sources of ignition.

Incompatible Materials: Strong oxidizers.

Hazardous Decomposition: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Gastroenteritis, muscle twitching, numbness and tingling around the mouth and neck, hemoglobin in the urine, cardiac arrest.

Potential Health Effects (Acute, Chronic, and Delayed)

Inhalation: There is no data listed for acute exposure. Long term (chronic) or repeated exposure to insoluble barium compounds has resulted in baritosis, a benign form of pneumoconiosis.

Skin Contact: Contact with powder may cause mechanical irritation.

Eye Contact: Contact with powder may cause mechanical irritation.

Ingestion: Ingestion of this material is unlikely under normal conditions of use. The toxicity of barium compounds is dependent on their solubility. Insoluble barium compounds are generally nontoxic. Ingestion of soluble barium compounds may result in acute gastroenteritis, disturbances in cardiac action, muscle twitching, central nervous system stimulation and depression, kidney damage, and death. Ingestion of 1 g of barium ion (Ba^{+2}) from soluble barium compounds may be fatal. No data is listed for chronic exposure.

Numerical Measures of Toxicity

Acute Toxicity:
Oral, Category 4.
Inhalation, Category 4

Skin Corrosion/Irritation: Not classified; no data available.

Serious Eye Damage/Eye Irritation: Not classified; no data available.

Respiratory Sensitization: Not classified; no data available.

Skin Sensitization: Not classified; no data available.

Germ Cell Mutagenicity: Not classified; no data available.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen X Yes _____ No
Barium compounds are not listed by IARC, NTP, or OSHA as a carcinogen.

Reproductive Toxicity: Not classified; no data available.

STOT, Single Exposure: Not classified; no data available.

STOT, Repeated Exposure: Not classified; no data available.

Aspiration Hazard: Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: Barium

Fish Toxicity: Sheepshead minnow (*Cyprinodon variegatus*) LC50: >500 mg/L (96 h)
Invertebrate: Water flea (*Daphnia magna*) LC50: >530 mg/L (24 h)

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No 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: Not regulated by DOT or IATA.

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): 1 % de minimis concentration barium compounds (except barium sulfate).

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

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

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

State Regulations

California Proposition 65: Not regulated.

U.S. TSCA Inventory: Listed.

T**SCA 12(b), Export Notification:** Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 30 July 2015

Sources: Hazardous Substances Data Bank (HSDB), National Library of Medicine's TOXNET system, *Barium compounds*, available at http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/f?./temp/~yFbUR5:1 (accessed Jul 2015).

European Chemical Agency (ECHA), Registered substances, *Barium Cyclohexanebutyrate, CAS No.62669-65-2,* available at http://echa.europa.eu/information-on-chemicals (accessed Jul 2015).

National Center for Biotechnology Information, U.S. National Library of Medicine, PubChem, *Barium Cyclohexanebutyrate,* available at http://pubchem.ncbi.nlm.nih.gov/compound/112911#section=Information-Sources, (accessed Jul 2015).

Vendor MSDS, Eastman Kodak Company, MSDS *Barium Cyclohexanebutyrate*, 03 February 1981.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration	STOT	Specific Target Organ Toxicity
LD50	Median Lethal Dose or Lethal Dose, 50 %	STEL	Short Term Exposure Limit
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
n.o.s.	Not Otherwise Specified	WHMIS	Workplace Hazardous Materials Information System

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

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at http://www.nist.gov/srm.