SAFETY DATA SHEET – BISMUTH

Creation Date 22-April-2019 **Latest Revision 30-April-2019**

SECTION 1. INDENTIFICATION

Product Name: Bismuth
Formula: Bi
CAS Number: 7440-69-9

Recommended use: Laboratory chemicals and scientific research.
Uses advised against: Not for food,

SECTION 2. HAZARDS IDENTIFICATION

Classification:

Health			Physical	Environmental
Acute Toxicity (Oral, Inhalation)	–	Does not meet criteria	Does not meet criteria for any Physical Hazard	**Aquatic Toxicity – Long Term (Chronic) Category 3**
Skin Corrosion/Irritation	–	Does not meet criteria		
Eye Damage/Eye Irritation	–	Does not meet criteria		
Respiratory or Skin Sensitization	–	Does not meet criteria		
Mutagenicity	–	Does not meet criteria		
Carcinogenicity	**–**	**Category 2**		
Reproductive Toxicity	**–**	**Category 1**		
Specific Target Organ Toxicity				
Acute Exposure	–	Does not meet criteria		
Chronic Exposure	**–**	**Category 1**		

Label:

Symbols:

Signal Word:

DANGER

Hazard Overviews:	Precautionary Overviews:
DANGER! Causes damage to kidneys, blood-forming systems, central nervous system and digestive tract through prolonged orrepeated inhalation of dust or fumes. May damage the unborn child. May cause harm to breast-fed children. Suspected of damaging fertility. Suspected of causing cancer. Harmful to the aquatic environment with long-lasting effects.	Obtain special instructions before use. Do not handle until all safety precautions have been read andunderstood. Wear protective gloves/protective clothing/eye protection. Do not breathe dust or fumes. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. If exposed or concerned or you fell unwell: Get medical advice/attention. Avoid release to the environment.

GHS Classification: H228: Flammable solids (CFR 1910. 1200) Category 1
RTECS: EB2600000
TSCA: Yes
Packaging group: Ⅲ (Low degree of hazard)
Risk phrases: R8: Contact with combustible material may cause fire.
R11: Highly flammable.
R37: Irritating to the respiratory system.
R38: Irritating to the skin.

Safety phrases: S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice .
S36: Wear suitable protective clothing.
S37: Wear suitable gloves.
S39: Wear eye/face protection.
S45: In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).

Precautionary Statements: P210: Keep away from heat/sparks/flames. No smoking.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ventilating.
P370+P378: In case of fire: Use CO_2 powder for extinciton.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization: Metal
Ingredient: Bismuth
Weight%: 100%
CAS number: 7440-69-9
EC number: 231-177-4

SECTION 4. FIRST AID MEASURES

General Measures: Under normal handling and use, exposure to solid forms of this material present few health hazards. Subsequent operations such as grinding, melting or welding may produce dust or fumes.
Special Treatment: None.
Important Symptoms: None.

Eye contact: *Symptoms:* Eye irritation, redness. Rinse immediately with water, also under the eyelids, for at least 15 minutes. Get medical aid.
Skin contact: *Symptoms:* Skin soiling, mild irritation. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.
Inhalation: *Symptoms:* Respiratory irritation. Remove from exposure, lie down. Move to fresh air. If not breathing, give artificial respiration. Get medical attention if cough or other symptoms appear.
Ingestion: *Symptoms:* Stomach upset. Clean mouth with water. Do not induce vomiting. Seek aid.

Most important symptoms and effects: No information available.
Notes to Physician: Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Emergency Overview: A bluish-white to silvery-grey heavy, soft metal that does not burn in bulk. Finely-divided dust clouds are a moderate fire hazard and moderate explosion hazard, however. When heated to fuming in air metal oxide fumes are generated which will contain significant levels of lead oxides. Inhalation or ingestion may produce both acute and chronic health effects. Possible cancer and reproductive hazard due to the lead content. SCBA and full protective clothing are required for fire emergency response personnel.

Suitable Extinguishing Media: Water spray. Carbon dioxide. Dry chemical**.** Chemical foam.
Unsuitable Extinguishing Media: No information available.
Autoignition Temperature: Not applicable.
Flash Point: Not applicable.
Explosion Limits:
Lower: 4 vol%
Upper: Not available.
Sensitivity to mechanical impact: Not available.
Sensitivity to static discharge: Not available.

Specific Hazards Arising from the Chemical:
Flammable. Combustive material.
Hazardous Combustion Products:
None known.

Protective Equipment and Precautions for Firefighters:
As in general fire-fighting, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA Rating:

Health	Flammability	Instability	Physical hazards
0	2	1	N/A

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean up:

Avoid dust formation. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

Environmental Precautions: This product, a metal alloy, has low bioavailability and is therefore unlikely to pose any immediate ecological risks; however, compounds of the constituent metals, particularly lead and zinc, can pose risks, particularly in aquatic environments. Releases of the product to water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Overview:

No special packaging materials are required. Store in a DRY, covered area away from incompatible materials, strong acids andfood or foodstuffs. Solid metal that is suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. Bullion, in contact with wood or other surfaces, may leave traces of lead particulate that can accumulate over time. Cleaning or disposal of thesesurfaces requires review to ensure that any effluent or solid waste disposal meets the requirements of regulations in the applicable jurisdiction.

Handling:

Use only in a well-ventilated area.
Minimize dust generation and accumulation.
Use spark-proof tools and explosion proof equipment.
Avoid contact with eyes, skin, and clothing.
Take precautionary measures against static discharges.
Keep away from heat, sparks and flame.
Do not ingest or inhale.

Storage:

Keep in a dry, cool and well-ventilated place.
Keep container tightly closed.
Keep away from heat and sources of ignition.
Flammables area.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical name	ACGIH - TLV	NIOSH - REL	OSHA - PEL
Bismuth	None listed	None listed	None listed

Exposure Guidelines: This product does not contain any hazardous materials with occupational

exposure limits established by the region specific regulatory bodies.

Engineering Measures Use explosion-proof electrical/ventilating/lighting/equipment.

Personal Protective Equipment:

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection: No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Crystal
Appearance	Silvery-grey (Colorful surface due to its oxidize compounds)
Odor	Odorless
pH	No information available
Relative density (Water = 1)	Approx. 10 - 11
Melting Point/Range	271 °C / 519.8 °F
Boiling Point/Range	1500 °C / 2732 °F
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	.00%
Lower	4.00%
Vapor Pressure	1 hPa @ 840 °C
Vapor Density	Not applicable
Volatility	Not applicable
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	Bi
Molecular Weight	208.98

SECTION 10. STABILITY AND REACTIVITY

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Avoid dust formation. Keep away from open flames, hot surfaces. Incompatible products.

Incompatible Material Acids, Strong oxidizing agents, Halogens

Hazardous Decomposition Products	None under normal use conditions
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

SECTION 11. TOXICOLOGICAL INFORMATION

Oral exposure:

A) MANAGEMENT OF MILD TOXICITY: Treat nausea and vomiting with antiemetics and fluids.

B) MANAGEMENT OF SEVERE TOXICITY: Severe toxicity is rare after acute ingestion.

C) PITFALLS:

Making the diagnosis of bismuth toxicity can be difficult without a clear history of exposure.

D) PHARMACOKINETICS

Only approximately 0.2% of orally administered bismuth is absorbed systemically from the gastrointestinal tract. The time to peak concentration is typically within one hour. The volume of distribution is unknown. The distribution half-life is approximately 1 to 4 hours, and the elimination half-life is 5 to 11 days. Urinary bismuth is detectable 3 months after the last dose.

Range of Toxicity:

A) TOXICITY:

Blood levels less than 5 mcg/dL are rarely associated with symptoms.

PEDIATRIC:

Acute toxic symptoms have occurred with as little as 5.2 mg IM over 26 hours in a 21-month-old to 30 g over 8 days in a 7.5-year-old. A 17-year-old developed acute renal failure but recovered after ingesting 7.5 g bismuth subcitrate.

B) THERAPEUTIC DOSE:

BISMUTH SUBSALICYLATE: 12 yrs and older: 524 mg orally every 0.5 to 1 hour, up to a maximum of 8 doses/day (4192 mg/day).

Acute:

Skin/Eye: Contact with dust or fume may cause local irritation but would not cause tissue damage. This material is not absorbed through the skin.

Inhalation: Inhalation of dust or fume may irritate the upper respiratory tract. Symptoms may include coughing, sneezing and/orshortness of breath. Intense exposure to dust or fume may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in legs, arms, and joints.

Ingestion: Symptoms due to ingestion of lead dust or fume would be similar to those from inhalation including nausea, vomiting, weakness, diarrhea, ulcerative stomatitis, pyorrhea, swelling of the buccal membranes, and increased salivation. Other healtheffects such as metallic taste in the mouth and constipation or bloody diarrhea might also be expected to occur.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity	Do not empty into drains. .
Persistence and Degradability	Insoluble in water
Bioaccumulation/ Accumulation	No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

SECTION 14. TRANSPORT INFORMATION

DOT
UN-No UN3089
Proper Shipping Name Metal powder, flammable, n.o.s
Hazard Class 4.1
Packing Group II

TDG
UN-No UN3089
Proper Shipping Name METAL POWDER, FLAMMABLE, N.O.S.
Hazard Class 4.1
Packing Group II

IATA
UN-No UN3089
Proper Shipping Name METAL POWDER, FLAMMABLE, N.O.S.
Hazard Class 4.1
Packing Group II

IMDG/IMO
UN-No UN3089
Proper Shipping Name METAL POWDER, FLAMMABLE, N.O.S.
Hazard Class 4.1
Packing Group II

SECTION 15. REGULATORY INFORMATION

International inventories: (X indicates listed; else indicates no information available)

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Bismuth powder	X	X	-	231-177-	-		X	-	X	X	X

Relevant regulations of supervising the material:

GB/T 16483-2008: Material Safety Data Sheet – Contents and the order of sections.

67/548/EEC: European REACH (The classification and identification of chemical hazards.)

Chemical safety assessment
For this product, a chemical safety assessment was not carried out.

SECTION 16. OTHER INFORMATION

The information in this Safety Data Sheet is based on the following references:

- Chemical Book. https://www.chemicalbook.com/. Accessed on May 20th, 2019.
- TOXNET, U.S. National Liabiray of Medicine. Accessed on May 20th, 2019.
- National Institution of Standards and Technology. https://www.nist.gov/. Accessed on May 20th, 2019.
- CCOHS, RTECS. http://ccinfoweb.ccohs.ca/rtecs/search.html. Accessed on May 20th, 2019.
- ChemSafetyPRO. https://www.chemsafetypro.com/Topics/GHS/GHS_hazard_class.html. Accessed onMay 20th, 2019.
- U.S. Department of Labor. https://web.archive.org/web/20070702005153/http://www.osha.gov/dsg/hazcom/ghs.html#3.0. Accessed on May 20th, 2019.
- CDH FineChemical. http://cdhfinechemical.lookchem.com/. Accessed on May 20th, 2019.
- Angstrom Sciences, Inc. 40 South Linden Street, Duquesne, PA 15110. *Safety Data Sheet of Bismuth.* (2015)
- ESPI Metals. 1050 Benson Way, Ashland, OR 97520. *Safety Data Sheet of Bismuth.* (2015)
- ThermoFisher SCIENTIFIC. Fair Lawn, NJ 07410. *Safety Data Sheet of Bismuth.* (2008)
- ThermoFisher SCIENTIFIC. Fair Lawn, NJ 07410. http://www.finarchemicals.com/msds/. *Index of msds.* Accessed on May 20th, 2019.
- Acros Organics BVBA, Janssen Pharmaceuticalaan 3a, 2440 Geel, Belgium. *MSDS#96777.* (2009)
- Teck Metals Ltd. Suite 3300-550 Burrard Street, Vancouver, British Columbia. *Safety Data Sheet of Bismuth.* (2015)

Notice to Readers

The information contained in this document is based on the state of our knowledge at the time of publication and is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. All the data and information provided in this Safety Data Sheet represents a compilation of data drawn directly from various sources available to us. Our group makes no representation or guarantee as to the suitability of this information to a particular application of a substance covered in the Safety Data Sheet.

GLOSSARY:

CAS - Chemical Abstracts Service

HMIS - Hazardous Material Information System

RTECS - Registry of Toxic Effects of Chemical Substances

TSCA - Toxic Substances Control Act

NFPA - National Fire Protection Association

SCBA - Self-contained breathing apparatus

OSHA - Occupational Safety and Health Administration

PEL – Permissible Exposure Limit

NIOSH - National Institute for Occupational Safety and Health

REL – Recommended Exposure Limit

ACGIH - American Conference of Governmental Industrial Hygienists

TLV – Threshold Limit Value

DOT - US Department of Transportation

TDG – Dangerous Goods

IATA - The International Air Transport Association

IMDG/IMO - International Maritime Dangerous Goods

GHS - Globally Harmonized System of Classification and Labeling of Chemicals

CLP – Guidance on Labeling and Packaging in accordance with Regulations (EC)

EC - European INventory of Existing commercial Chemical Substances