

SPI Supplies Division

Structure Probe, Inc.

P.O. Box 656 West Chester, PA 19381-0656 USA

Phone: 1-(610)-436-5400 Fax: 1-(610)-436-5755

spi3spi@2spi.com

<http://www.2spi.com>

Manufacturer's CAGE: 1P573

Safety Data Sheet

Date Effective: June 21, 2017

02549-AB

SPI-Chem™ Bismuth Subnitrate

Section 1.1: Identification

Chemical Name/Synonyms Bismuth Subnitrate; Bismuth Nitrate, basic; Bismuth Oxynitrate

Product or Trade Name SPI-Chem™ Bismuth Subnitrate

CAS #'s 1304-85-4

Chemical Formula..... $\text{Bi}_5\text{O}(\text{OH})_9(\text{NO}_3)_4$

Section 1.2: Relevant Uses/Restrictions

Laboratory chemical for use in staining for Light Microscopy.

Section 1.3: Supplier of the Safety Data Sheet

SPI Supplies Division

Structure Probe, Inc.

P.O. Box 656 West Chester, PA 19381-0656 USA

Phone: 1-(610)-436-5400 Fax: 1-(610)-436-5755

spi3spi@2spi.com

<http://www.2spi.com>

Manufacturer's CAGE: 1P573

Section 1.4: Emergency telephone number

Emergencies

Contacting CHEMTREC:

24 Hour Emergency Use Only #'s...

Worldwide phone: 1-(703)-741-5970

Toll-free phone: 1-(800)-424-9300 USA + Canada only

Section 2: Hazard Identification

2.1 Classification of the substance

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Oxidizing solids (Category 2)

Skin Irritation (Category 2)

Eye Irritation (Category 2A)
Specific Target Organ Toxicity – single exposure (Category 3) Respiratory system

2.2 Label elements

Pictogram



Signal Word: Danger

Hazard statements:

- H272: May intensify fire; oxidizer
- H315: Causes skin irritation
- H319: Causes serious eye irritation
- H335: May cause respiratory irritation

Precautionary statements:

- P210: Keep away from heat.
- P220: Keep/Store away from clothing / combustibles.
- P221: Take any precaution to avoid mixing with combustibles.
- P261: Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
- P264: Wash skin thoroughly after handling.
- P271: Use only outdoors or in a well-ventilated area.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
- P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
- P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Removed contact lenses, if present and easy to do. Continue rinsing.
- P312: Call a POISON CENTER or doctor/ physician if you feel unwell.
- P321: Specific treatment (see supplemental first aid instructions on this label).
- P332 + P313: If skin irritation occurs: Get medical advice/ attention.
- P337 + P313: If eye irritation persists: Get medical advice/ attention.
- P362: Take off contaminated clothing and wash before reuse.
- P370 + P378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
- P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
- P405: Store locked up.
- P501: Dispose of contents/ container to an approved waste disposal plant.

2.3 Other Hazards:

Hazards not otherwise classified (HNOC) or not covered by GHS – none.

Hazardous Material Information System USA

Health 2
Fire Hazard 0
Reactivity 2
Personal Protection E

NFPA Rating (estimated)
Health 2
Flammability..... 0
Reactivity 2
Specific hazard oxy

Section 3: Composition

3.1 Substances:

Bismuth subnitrate CAS# 1304-85-4 EC# 215-136-8 100 %/weight percent

Section 4: First Aid Measures

4.1 Description of first aid measures:

General advice:

**National Capital Poison Center in the United States can provide assistance if you have a poison emergency and need to talk to a poison specialist. Call 1-800-222-1222.

****Inhalation:** Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

****Skin Contact:** In case of skin contact, immediately wash with soap and plenty of water, removing all contaminated clothing and shoes. Get medical attention. If irritation persists, consult a physician.

****Eye Contact:** In case of eye contact, rinse thoroughly with plenty of water for at least 15 minutes. Get medical attention. If symptoms persist, call a physician.

****Ingestion:** Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed:

**Symptoms: Causes serious eye irritation Causes skin irritation. May cause respiratory irritation. Ingestion may cause gastrointestinal irritation, nausea, vomiting, and diarrhea. May cause gingivitis, foul breath, ulcerative stomatitis. May cause anorexia. May cause headache, joint pain. It may affect the kidneys. May affect the liver. Dark line in the gums may also be produced in cases of chronic Bismuth poisoning. Central nervous system effects. Chronic exposure to large amounts of Bismuth and Bismuth salts/compounds may also cause Bismuth encephalopathy which is characterized by mental confusion, ataxia, myoclonus (myoclonic jerks) and dysarthria. Exposure to nitrites/nitrates can cause gastroenteritis, methemoglobinemia, cyanosis, muscle weakness, dizziness, lightheadedness, loss of coordination, fatigue, headache, seizures, convulsions, dyspnea, dysrhythmias, coma, and death. Can affect the liver, metabolism (weight loss), blood (methemoglobinemia), cardiovascular system (bradycardia/ tachycardia, hypotension, vasodilation, irregular heartbeat), and kidneys.

4.3. Indication of any immediate medical attention and special treatment needed:

**Notes to Physician: Treat Symptomatically

**Protection of First-Aid Providers: Avoid exposure to blood or body fluids. Wear gloves and other necessary protective clothing. Dispose of contaminated clothing and equipment as bio-hazardous waste.

Section 5: Fire Fighting Measures

5.1 Extinguishing media

**Suitable Extinguishing Media: Water. CO2 may be of no value in extinguishing fires involving oxidizers and may only provide limited control

**Unsuitable Extinguishing Media: Dry chemical, Halons, Foam.

5.2 Special hazards arising from the substance or mixture

**Oxidizer. Keep away from combustible materials (wood, paper, oil, clothing, etc.) The product is not blamable, but it may cause fire when in contact with other material. Contact with combustible or organic materials may cause fire. Contact with finely divided (powdered) metals may cause ignition (fire) or explosion. Will accelerate burning when involved in a fire. Container explosion may occur under fire conditions or when heated.

Hazardous combustion products: No data available.

5.3 Advice for firefighters

Special protective equipment and precautions for firefighters: ** As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Further information: Use water spray to cool unopened containers. **For large fires, flood fire area with water from a distance. Cool affected containers with flooding quantities of water. DO NOT get water inside containers. DO NOT use combustible materials such as sawdust.

Section 6: Accidental Release Measures

6.1 Personal precautions

**Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Avoid contact with skin, eyes and clothing. Remove all sources of ignition. Keep combustibles (wood, paper, oil, clothing, etc.) away from spilled material.

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

6.2 Environmental precautions

**Prevent further leakage or spillage if safe to do so. Prevent entry into waterways, sewers, basements or confined areas.

Do not let product enter drains.

6.3 Methods and material for containment and cleaning up

**Methods for containment: Stop leak if you can do it without risk. Cover with plastic sheet to prevent spreading.

Methods for cleaning up: Sweep up and shovel. **Use appropriate tools to put the spilled material in a suitable chemical waste disposal container. Do not use combustible materials such as paper towels, sawdust, clothing, etc. to clean up spill. Clean contaminated surface thoroughly.

6.4 Reference to other sections

For disposal see Section 13.

Section 7: Handling and Storage

7.1 Precautions for safe handling

Avoid contact with skin, eyes and clothing.
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
Keep away from sources of ignition.
No smoking.
Normal measures for preventive fire protection.
**Keep away from incompatible materials.
**Use only in well-ventilated areas.
**Do not ingest.
**Do not breathe dust.
**Keep away from combustible material.
**Handle in accordance with good industrial hygiene and safety practice.
For precautions, see Section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

- **Hygroscopic. Protect from moisture.
- **Store at room temperature in the original container.
- **Store away from incompatible materials.
- **Do not store near combustible materials.
- **Store in a segregated and approved area.

**Incompatible Materials:

Reducing agents
Combustible materials
Organic materials
Alkaline bicarbonates, soluble iodides, gallic acid, calomel, salicylic acid, tannin, sulfur

7.3 Specific end uses

Laboratory chemical for use in staining for Light Microscopy.
Not intended for clinical or medical uses.

Section 8: Exposure Controls and Personal Protection

8.1 Control parameter and Personal Protection

Workplace exposure limits

Contains no substances with occupational exposure limit values.

Biological limit values

No further information available.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice.

Wash hands before breaks and at the end of workday.

**Ensure adequate ventilation, especially in confined areas.

**Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

**If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

8.2.2 Individual protection measures

Eye/face protection:

Safety glasses with side-shields conforming to EN 166.

Use equipment for eye protection tested and approved under appropriate government

standards such as NIOSH (US) or EN 166 (EU).

Skin protection:

Handle with gloves.

Gloves must be inspected prior to use.

Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product.

Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.

Wash and dry hands.

Body protection:

**Chemical resistant apron.

**Long sleeved clothing

The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection:

**Effective dust mask or respirator with dust filter.

Where risk assessment shows air-purifying respirators are appropriate, use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

8.2.3 Environmental exposure controls

Do not let product enter drains.

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:

Form: solid

Appearance: white crystalline powder

Odor: Odorless

Odor threshold: no data available

pH: no data available

Melting point/Freezing point: Melting point/range: 260 °C (500 °F) (dec)

Boiling point/Boiling point range: no data available

Flash Point: no data available

Evaporation rate: no data available

Flammability (solid, gas): no data available

Upper/lower flammability or explosive limits: no data available

Vapor Pressure: no data available

Vapor density: no data available

Relative density: 4.93 g/cm³

Solubility: insoluble in water

Partition coefficient (n-octanol/water): no data available

Auto-ignition temperature: no data available

Decomposition temperature: no data available

Viscosity: no data available

Explosive properties: no data available

Oxidizing Properties: The substance is classified as oxidizing with the category 2.

**Formula: $\text{Bi}_5\text{O}(\text{OH})_9(\text{NO}_3)_4$

**Molecular/Formula weight: 1461.99g/mol

9.2 Other information

No further data available.

Section 10: Stability and Reactivity

10.1 Reactivity

No data available.

10.2 Chemical Stability

Stable under recommended storage conditions.

**Hygroscopic. Moisture sensitive.

10.3 Possibility of Hazardous Reactions

**Hazardous polymerization does not occur.

**May release toxic and/or corrosive fumes.

10.4 Conditions to avoid

**Contact with finely divided (powdered) metals.

**Contact with combustible materials (wood, paper, oil, clothing, etc.)

**Exposure to moist air or moisture.

**Heat, flames, sparks, ignition sources.

**Incompatible materials.

**Avoid dust formation.

10.5 Incompatible materials

Alkaline bicarbonates, soluble iodides, gallic acid, calomel, tannins, salicylic acid

10.6 Hazardous decomposition products

**Bismuth Oxides. Nitrogen Oxides (NO_x)

In the event of fire: see Section 5.

Section 11: Toxicological Information

Information on the likely routes of exposure

11.1 Information on toxicological effects

Routes of Entry: Inhalation, Ingestion.

Toxicity to Animals: Not available.

Chronic Effects on Humans: May cause damage to the following organs: kidneys, liver.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Lowest Published Lethal Dose: LDL [Human infant] – Oral; Dose: 1000 mg/kg.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human.

Due to the presence of dark line on gums, chronic bismuth toxicity may complicate diagnosis of chronic lead toxicity.

a. acute toxicity

Ingestion: ******Ingestion of Bismuth salts (bismuth compounds) can cause nausea, vomiting, diarrhea, anorexia, headache, discoloration of the mucous membranes, ulcerative stomatitis, gingivitis, headache, kidney damage and, rarely, affect the liver (mild jaundice). Acute poisoning is seldom from water-insoluble inorganic bismuth salts since they are hardly absorbed by oral administration. The relatively high toxicity is more likely to be caused by reduction of nitrate to nitrite. May cause blurred or foggy vision. Ingestion of large doses of nitrates causes gastrointestinal tract irritation with nausea, vomiting, abdominal cramps, diarrhea (possibly bloody, from gastrointestinal hemorrhage). Under some circumstances, when the nitrate is converted by bacteria in the stomach to nitrite, it may also cause methemoglobinemia, cyanosis (a bluish discoloration of the skin) due to deficient oxygenation of the blood), convulsions and death. Methemoglobinemia is characterized by dizziness, lightheadedness, vertigo, weakness, fatigue, lethargy, convulsions (seizures), drowsiness, headache, mental impairment, shortness of breath, cyanosis, rapid heart rate (tachycardia) or slow heart rate (bradycardia), hypotension, arrhythmias, tingling sensation, flushing, chocolate brown colored blood, unconsciousness.

b. skin corrosion/irritation

May cause skin irritation.

Chronic Potential Health Effects: Chronic or prolonged skin contact may cause dermatitis.

May cause respiratory tract irritation.

c. serious eye damage/irritation

Causes serious eye irritation. May cause temporary foggy vision.

d. respiratory or skin sensitization

No data available.

e. germ cell mutagenicity

No data available.

f. carcinogenicity

IARC: ******IARC group 2A {Monograph 94 [2010]} – Listed under Nitrate or Nitrite (ingested) under conditions that result in endogenous nitrosation.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH>

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP>

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA>

g. reproductive toxicity

No additional data available.

h. STOT-single exposure

Inhalation: May cause respiratory irritation.

i..STOT-repeated exposure

No data available.

j. aspiration hazard

No data available.

Additional Information:

******Target Organs: Liver, Kidneys, Blood, Central Nervous System.

****Delayed and immediate effects as well as chronic effects from short and long-term exposure**

******Chronic Toxicity: Chronic exposures to large amounts of Bismuth or Bismuth salts/ compounds are associated with Bismuth lines (a blue-black line) on the gums, foul breath (halitosis), gastric irritation, diarrhea, gingivitis, ulcerative stomatitis, nausea, decrease or loss of appetite and weight, headache, joint pains (rheumatic pain), and liver and kidney damage. The kidneys are the site of highest concentration with the liver being considerably lower. There may also be mental changes (memory loss, confusion, delirium, disorientation, delusions, psychosis, depression), insomnia, difficulty in concentration, tremor, abnormal coordination, nervousness), blood changes (lymphocytosis, agranulocytosis, aplastic anemia_ and bone marrow depression. It may also cause Bismuth encephalopathy which is characterized by metal confusion, ataxia (disordered gait), myoclonus (myoclonic jerks), and dysarthria. This product is also a nitrate, therefore nitrate poisoning can occur. Prolonged or repeated nitrate ingestion may affect the urinary system (kidneys) and also may affect the blood, resulting in methemoglobin with attendant cyanosis, anorexia, hyperpnea and later dyspnea and chocolate brown colored

blood. The primary toxic effects of nitrates include orthostatic hypotension and methemoglobinemia. Other symptoms include muscular weakness, dizziness, lightheadedness, fatigue, throbbing headache, mental impairment, incoordination, seizures, and convulsions, bradycardia or tachycardia, dysrhythmias, dyspnea. Prolonged or repeated ingestion of large amounts of nitrates may affect the liver and can cause gastroenteritis, nausea, vomiting, abdominal pain, weight loss, possible coma, and death.

Section 12: Ecological Information

- 12.1 Toxicity
No data available.
- 12.2 Persistence and degradability
No data available.
- 12.3 Bio-accumulative potential
No data available.
- 12.4 Mobility in soil
No data available.
- 12.5 Results of PBT and vPvB assessment
No data available.
- 12.6 Other adverse effects
No data available.

Section 13: Disposal Considerations

13.1 Disposal methods

Waste from residues / unused products:

Waste must be disposed of in accordance with federal, state and local environmental control regulations. Contact a licensed professional waste disposal service to dispose of this material.

****Contaminated packaging:**

Empty containers should be taken for local recycling, recovery or waste disposal. Do not re-use empty containers. Dispose of as unused product.

RCRA: Not listed.

Section 14: Transport Information

DOT

UN number: UN 1477
Class: 5.1
Packing Group: II
Proper shipping name: Nitrates, inorganic, n.o.s. (bismuth subnitrate)
Marine pollutant: No
Poison Inhalation Hazard: No

IATA:

UN number: UN 1477
Class: 5.1
Packing Group: II
Proper shipping name: Nitrates, inorganic, n.o.s. (bismuth subnitrate)

IMDG:

UN number: UN 1477
Class: 5.1
Packing Group: II
Proper shipping name: NITRATES, INORGANIC, N.O.S. (bismuth subnitrate)
Marine pollutant: No

Section 15: Regulatory Information

15.1 Safety, health and environmental regulations/ legislation specific for the substance or mixture

US Government Regulations:

RTECS # EB2977000

TSCA Inventory:

Listed

SARA 302 Components:

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 311/312 Hazards:

Reactivity Hazard; Acute Health Hazard

SARA 313 Components:

This material does not contain any chemical components with known CAS numbers that exceed the threshold (de minimis) reporting levels established by SARA Title III, Section 313.

California Prop. 65 Components:

This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

State Right to Know Components:

CAS# 1304-85-4 is listed on the New Jersey and Pennsylvania Right-To-Know lists of components.

****CANADA:**

WHIMIS 2015 – GHS Classification: The WHMIS 2015 classification of this product has not been validated or reviewed yet.

WHIMIS 1988 Hazard Class:

Oxidizing Materials
D2B Toxic Materials

Canada Hazardous Products Regulation:

This product has been classified according to the hazard criteria of the HPR (Hazardous Products Regulation) and the SDS contains all of the information required by the HPR>

Canada Controlled Products Regulation:

This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the SDS contains all of the information required by the CPR>

DSL/NDSL:

CAS# 1304-85-4 is listed on the DSL. CAS# 1304-85-5 is not listed on the NDSL.

CEPA:

CAS# 1304-85-4 is not listed on CEPA Schedule I – Toxic Substances.
CAS# 1304-85-4 is not listed on CEPA-2010 Greenhouse Gases Subject to Mandatory Reporting.

EU regulations

EINECS: 233-792-3

****EU GHS-SV-CLP 172/2008:**

CAS# 1304-85-4: No information.

****EU-CLP (1272/2008)**

R-phrases:

R8 Contact with combustible material may cause fire.
R36/37/38 Irritating to eyes, respiratory system, and skin.

S-phrases:

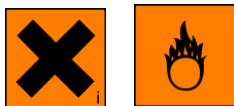
S17 Keep away from combustible material.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S37 Wear suitable gloves.

Bismuth Subnitrate CAS# 1304-85-4 Concentration Limits: No information.

The product is classified in accordance with Annex VI to Directive 67/548/EEc.

****Indication of danger:**

O – Oxidizing
Xi – Irritant



Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006:

Substance is not listed.

REACH pre-registered substances: Substance is listed.

WGK Germany: 3

15.2 Chemical Safety Assessment

Date of Preparation: June 14, 2016.

Revision.1 Date: June 21, 2017.

**Denotes additional information.

Abbreviations and acronyms

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bio-accumulative and Toxicological

vPvB: very Persistent and very Bio-accumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

Section 16: Other Information

Disclaimer of Liability:

Caution! Do not use SPI Supplies products or materials in applications involving implantation within the body; direct or indirect contact with the blood pathway; contact with bone, tissue, tissue fluid, or blood; or prolonged contact with mucous membranes. Products offered by SPI Supplies are not designed or manufactured for use in implantation in the human body or in contact with internal body fluids or tissues. SPI Supplies will not provide to customers making devices for such applications any notice, certification, or information necessary for such medical device use required by US FDA (Food and Drug Administration) regulation or any other statute. SPI Supplies and Structure Probe, Inc. make no representation, promise, express warranty or implied warranty concerning the suitability of these materials for use in implantation in the human body or in contact with internal body tissues of fluids.

The information and recommendations set forth above are taken from sources believed to be accurate as of the date hereof, however SPI Supplies and Structure Probe, Inc. make no warranty with respect to the accuracy of the information or the suitability of the recommendations, and assume no liability to any user thereof. The information contained in this sheet does not constitute a hazard assessment and should not be used in place of the user's own assessment of work place risks as required by other health and safety legislation. Be aware of the Structure Probe, Inc. Copyright Policy. Structure Probe, Inc. grants a nonexclusive license to make unlimited copies of this safety sheet for internal use only. Quite obviously, this information would pertain only to this material when purchased from SPI Supplies as product from other sources, with other ingredients and impurity levels could have substantially different properties.