Date of Issue:
19 May 2015

# SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

**Product Identifier**

**SRM Number:** 127b
**SRM Name:** Solder (40Sn – 60Pb)
**Other Means of Identification:** Not applicable.

**Recommended Use of This Material and Restrictions of Use**

This Standard Reference Material (SRM) is intended primarily for application in optical emission and x ray spectroscopic methods of analysis. A unit of SRM 127b consists of 150 g of lead solder that was atomized to powder and sized between 100 and 325 mesh sieves (0.15 mm and 0.045 mm).

**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
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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 |
| | Carcinogenicity | Category 1B |
| | Reproductive Toxicity | Category 1A |
| | STOT, Repeated Exposure | Category 2 |

**Label Elements**

**Symbol:**



**Signal Word:** DANGER

**Hazard Statement(s):**

| | |
|---|---|
| H302 | Harmful if swallowed. |
| H332 | Harmful if inhaled. |
| H350 | May cause cancer. |
| H360 | May damage fertility or the unborn child. |
| H373 | May causes damage to organs through prolonged or repeated exposure. |

**Precautionary Statement(s):**

| | |
|---|---|
| P201 | Obtain special instructions before use. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P260 | Do not breathe 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. |
| P280 | Wear eye protection, protective gloves and clothing. |

| | |
|---|---|
| P301 + P312 | If swallowed: Call a doctor if you feel unwell. |
| P330 | Rinse mouth. |
| P304 + P340 | If inhaled: Remove person to fresh air and keep comfortable for breathing. |
| P308 + P313 | If exposed of concerned: Get medical attention. |
| P405 | Store locked up. |
| 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:** Powdered solder, 60 % Pb/ 40 % Sn

**Other Designations:** Solder

**NOTE:** Components are listed in compliance with OSHA's 29 CFR 1910.1200. For actual values, see the NIST Certificate of Analysis.

| Hazardous Component(s) | CAS Number | EC Number (EINECS) | Nominal Mass Concentration (%) |
|---|---|---|---|
| Lead | 7439-92-1 | 231-100-4 | 60 |
| Tin | 7440-31-5 | 231-141-8 | 40 |

## 4. FIRST AID MEASURES

**Description of 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. If necessary, seek medical attention.

**Eye Contact:** Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

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

**Most Important Symptoms/Effects, Acute and Delayed:** Nausea, vomiting, metallic taste, thirst, a burning sensation in the mouth and throat, salivation, abdominal pain with severe colic. Delayed effects include cancer, birth defects, and reproductive effects.

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

## 5. FIRE FIGHTING MEASURES

**Fire and Explosion Hazards:** Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. See Section 9, "Physical and Chemical Properties" for flammability properties.

**Extinguishing Media:**

Suitable: Dolomite, dry powder for metal fires, dry sand, graphite, soda ash, sodium chloride.
Unsuitable: Do not get water directly on material.

**Specific Hazards Arising from the Chemical:** None listed.

**Special Protective Equipment and Precautions for Fire-Fighters:** Avoid inhalation of material or combustion byproducts. 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 = 1 Fire = 0 Reactivity = 0

## 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions, Protective Equipment and Emergency Procedures:** Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

**Methods and Materials for Containment and Clean up:** Notify safety personnel of spills. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

## 7. HANDLING AND STORAGE

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

**Storage:** Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances (see Section 10, "Stability and Reactivity").

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

**Exposure Limits:**

**Component:** Lead

NIOSH (REL): 0.050 $mg/m^3$ (TWA)
100 $mg/m^3$ (IDLH)

ACGIH (TLV): 0.05 $mg/m^3$ (TWA)

OSHA (PEL): 50 $\mu g/m^3$ (TWA)
30 $\mu g/m^3$ (Action Level, See 29 CFR 1910.1025)

**Component:** Tin

NIOSH (REL): 2 $mg/m^3$ (TWA)
100 $mg/m^3$ (IDLH)

ACGIH (TLV): 2 $mg/m^3$ (TWA)

OSHA (PEL): No occupational exposure limits established.

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

**Personal Protection:** 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/Face Protection:** Wear chemical resistant safety goggles. An eyewash station should be readily available near areas of use.

**Skin and Body Protection:** Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| Descriptive Properties | Lead (60 % of this SRM) | Tin (40 % of this SRM) |
|---|---|---|
| **Appearance (physical state, color, etc.)** | white to grey powder | lustrous white powder |
| **Molecular Formula** | Pb | Sn |
| **Molar Mass (g/mol)** | 207.20 | 118.69 |
| **Odor** | not available | odorless |
| **Odor Threshold** | not available | not available |
| **pH** | not available | not available |
| **Evaporation Rate** | not available | not available |
| **Melting Point/Freezing Point** | 328 ºC (622 ºF) | 232 ºC (450 ºF) |
| **Relative Density** as specific gravity (water = 1) | 11.3 | 7.28 |
| **Vapor Pressure** | 1.3 mmHg at 970 °C | 1 mmHg at 1610 °C |
| **Vapor Density (air = 1)** | not available | not available |
| **Viscosity** | not available | not available |
| **Solubility(ies)** | almost insoluble in water; soluble in nitric acid and hot concentrated sulfuric acid | insoluble in water; soluble in hydrochloric acid, sulfuric acid, aqua regia, hot potassium hydroxide solutions, and alkali. |
| **Partition Coefficient (n-octanol/water)** | not available | not available |
| **Particle Size** | 45 µm to 75 µm | 45 µm to 75 µm |
| **Thermal Stability Properties** | | |
| **Autoignition Temperature** | not applicable | not applicable |
| **Thermal Decomposition** | not applicable | not applicable |
| **Initial Boiling Point and Boiling Range** | 1740 ºC (3164 ºF) | 2260 ºC (4100 ºF) |
| **Explosive Limits, LEL** | not applicable | 0.19 g/L |
| **Explosive Limits, UEL** | not applicable | not applicable |
| **Flash Point** | not applicable | not applicable |
| **Flammability (solid, gas)** | not applicable | not applicable |

## 10. STABILITY AND REACTIVITY

**Reactivity:** Stable at normal temperatures and pressure.

**Stability:** X Stable _____ Unstable

**Possible Hazardous Reactions:** No data available.

**Conditions to Avoid:** None reported.

**Incompatible Materials:** Oxidizing materials, halogens, combustible materials, peroxides, metals, metal carbide, and acids.

**Fire/Explosion Information:** See Section 5, “Fire Fighting Measures”.

**Hazardous Decomposition:** Oxides of lead.

**Hazardous Polymerization:** _____ Will Occur X Will Not Occur

## 11. TOXICOLOGICAL INFORMATION

**Route of Exposure:** X Inhalation _____ Skin X Ingestion

**Symptoms Related to the Physical, Chemical and Toxicological Characteristics:** Fatigue, weakness, anorexia, anemia, jaundice, encephalopathy.

**Potential Health Effects (Acute, Chronic and Delayed):**

**Inhalation:** Short term inhalation of lead may cause irritation, nausea, vomiting, kidney damage, liver damage. Prolonged exposure to lead may result in an accumulation in body tissues and exert adverse effects on the blood, nervous system, heart, endocrine and immune systems, kidneys, and reproduction.

**Skin Contact:** Prolonged or repeated exposure may cause irritation and dermatitis.

**Eye Contact:** Contact with may cause eye irritation.

**Ingestion:** Ingestion may cause kidney damage or liver damage; chronic ingestion may result in accumulation in body tissues and may also cause cancer.

**Numerical Measures of Toxicity:**

**Acute Toxicity:** Category 4, oral and inhalation.

**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:** Category 1B

**Listed as a Carcinogen/Potential Carcinogen** X Yes _____ No
Lead is listed as reasonably anticipated to be a human carcinogen per NTP.
IARC lists inorganic lead in Group 2A (probably carcinogenic to humans).

**Reproductive Toxicity:** Category 1A; lead crosses the placenta and may affect the fetus causing birth defects, mental retardation, behavioral disorders, and death during the first year of childhood.

**Specific Target Organ Toxicity, Single Exposure:** Not classified; no data available.

**Specific Target Organ Toxicity, Repeated Exposure:** Category 2; lead can accumulate in body tissues.

**Aspiration Hazard:** Not applicable.

## 12. ECOLOGICAL INFORMATION

**Ecotoxicity Data:**

**Component:** Tin
No ecotoxicity data available.

**Component:** Lead
Carp (*Cyprinus carpio*), LC50: 0.44 mg/L (96 h, semi-static)
Trout (*Oncorhynchus mykiss*), LC50: 1.17 mg/L (96 h, flow-through)

**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 of waste in accordance with all applicable federal, state, and local regulations. Lead Hazardous Waste Number(s): D008. Lead subject to U.S. EPA 40 CFR 262 for concentrations at or above the regulatory level of 5.0 mg/L.

## 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): Lead: 10 lbs (4.54 kg) final RQ – no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 μm.

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): Lead: 0.1 % Supplier notification limit; 0.1 % de minimis concentration (when contained in stainless steel, brass, or bronze).

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:

WARNING! This product contains chemicals (lead) known to the state of California to cause cancer and reproductive/developmental effects.

**U.S. TSCA Inventory:** Tin and lead are listed.

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

**Canadian Regulations:**

WHMIS Information: Not provided for this material.

## 16. OTHER INFORMATION

**Issue Date:** 19 May 2015

**Sources:** ChemAdvisor, Inc., SDS *Lead*, 20 March 2015.

ChemAdvisor, Inc., SDS *Tin*, 20 March 2015.

**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 | STEL | Short Term Exposure Limit |
| LD50 | Median Lethal Dose or Lethal Dose, 50 % | STOT | Specific Target Organ Toxicity |
| 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 certified 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.