

## SAFETY DATA SHEET

### 1. SUBSTANCE AND SOURCE IDENTIFICATION

**Product Identifier**

**SRM Number:** 54d  
**SRM Name:** Tin-Base Bearing Metal  
**Other Means of Identification:** Not applicable.

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

This Standard Reference Material (SRM) is intended for use as a composition standard. A unit of SRM 54d consists of approximately 75 g of atomized alloy (small spheres).

**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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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  
 Carcinogenicity – Category 1B  
 Reproductive Toxicity – Category 1A

**Symbol:**



**Signal Word:**

DANGER

**Hazard Statement(s):**

H302 Harmful if swallowed.  
 H350 May cause cancer.  
 H360 May damage fertility or the unborn child.

**Precautionary Statement(s):**

P201 Obtain special instructions before use.  
 P202 Do not handle until all safety precautions have been read and understood.  
 P264 Wash hands thoroughly after handling.  
 P270 Do not eat, drink or smoke when using this product.  
 P280 Wear protective gloves, protective clothing, and eye protection.  
 P301 + P312 If swallowed: Call a doctor if you feel unwell.  
 P330 Rinse mouth.  
 P308 + P313 If exposed or concerned: Get medical attention.  
 P405 Store locked up.  
 P501 Dispose of contents and container in accordance with local regulations.

**Hazards Not Otherwise Classified:** Not applicable.

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

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### 3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

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**Substance:** Tin Alloy

**Other Designations:** Babbitt metal, white metal.

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the NIST Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Tin Alloy	not available	not available	100
<i>Individual Components of SRM 54d Alloy</i>			
Tin	7440-31-5	231-141-8	88.5
Antimony	7440-36-0	231-146-5	7.1
Lead	7439-92-1	231-100-4	0.6
Arsenic	7440-38-2	231-148-6	0.1

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### 4. FIRST AID MEASURES

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**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. Cancer, birth defects, 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.

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### 5. FIRE FIGHTING MEASURES

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

**Extinguishing Media:**

Suitable: Use extinguishing media appropriate for the surrounding area.

Unsuitable: None listed.

**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

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### 6. ACCIDENTAL RELEASE MEASURES

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**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.

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## 7. HANDLING AND STORAGE

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

**Storage:** Store and handling in accordance with all current regulations and standards.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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### Exposure Limits:

**Component:** Tin

NIOSH REL (TWA): 2 mg/m<sup>3</sup>  
NIOSH REL (IDLH): 100 mg/m<sup>3</sup>  
ACGIH TLV (TWA): 2 mg/m<sup>3</sup>

**Component:** Antimony

NIOSH REL (TWA): 0.5 mg/m<sup>3</sup>  
NIOSH REL (IDLH): 50 mg/m<sup>3</sup>  
ACGIH TLV (TWA): 0.5 mg/m<sup>3</sup>  
OSHA PEL (TWA): 0.5 mg/m<sup>3</sup>

**Component:** Lead

NIOSH REL (TWA): 0.05 mg/m<sup>3</sup>  
NIOSH REL (IDLH): 100 mg/m<sup>3</sup>  
ACGIH TLV (TWA): 0.05 mg/m<sup>3</sup>  
OSHA PEL (TWA): 50 µg/m<sup>3</sup>  
OSHA PEL (Action Level): 30 µg/m<sup>3</sup> (See 29 CFR 1910.1025)

**Component:** Arsenic

NIOSH REL (Ceiling, 15 min): 0.002 mg/m<sup>3</sup>  
NIOSH REL (IDLH): 5 mg/m<sup>3</sup>  
ACGIH TLV (TWA): 0.01 mg/m<sup>3</sup>  
OSHA PEL (TWA): 10 µg/m<sup>3</sup> (See 29 CFR 1910.1018, except Arsine)  
OSHA PEL (Action Level): 5 µg/m<sup>3</sup> (See 29 CFR 1910.1018, except Arsine)

**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.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**Note:** The physical and chemical data provided is for tin and antimony, the main components of this SRM. No physical or chemical data are available for this material. The actual behavior may differ from the individual components.

<b>Descriptive Properties:</b>	<b>Tin 88.5 % of this SRM</b>	<b>Antimony 7.1 % of this SRM</b>
<b>Appearance (physical state, color, etc.):</b>	white solid	lustrous white solid
<b>Molecular Formula:</b>	Sn	Sb
<b>Molar Mass (g/mol):</b>	118.69	121.75
<b>Odor:</b>	odorless	odorless
<b>Odor threshold:</b>	not available	not available
<b>pH:</b>	not available	not available
<b>Evaporation rate:</b>	not applicable	not applicable
<b>Melting point/freezing point (°C):</b>	232 (450 °F)	630 (1166 °F)
<b>Relative Density (g/L):</b>	7.28 (relative to water)	6.684 (relative to water)
<b>Vapor Pressure (mmHg):</b>	1 at 1610 °C	1 at 886 °C
<b>Vapor Density (air = 1):</b>	not applicable	not applicable
<b>Viscosity (cP):</b>	not applicable	not applicable
<b>Solubility(ies):</b>	insoluble in water and soluble in hydrochloric acid, sulfuric acid, aqua regia, alkali.	insoluble in water and soluble in ammonium sulfide solutions and hot sulfuric acid.
<b>Partition coefficient (n-octanol/water):</b>	not available	not available
<b>Particle Size:</b>	not available	not available
<b>Thermal Stability Properties:</b>		
<b>Autoignition Temperature (°C):</b>	not available	not available
<b>Thermal Decomposition (°C):</b>	not available	not available
<b>Initial boiling point and boiling range (°C):</b>	2260 (4100 °F)	1750 (3182 °F)
<b>Explosive Limits, LEL (Volume %):</b>	0.19 g/L	0.42 g/L
<b>Explosive Limits, UEL (Volume %):</b>	not available	not available
<b>Flash Point (°C):</b>	not available	not available
<b>Flammability (solid, gas):</b>	not available	not available

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## 10. STABILITY AND REACTIVITY

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

**Stability:**  Stable  Unstable

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

**Conditions to Avoid:** Avoid generating dust.

**Incompatible Materials:** Acids, oxidizing materials, halogens, metal salts, peroxides, bases, metal oxides, metals, combustible materials.

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

**Hazardous Decomposition:** Oxides of Tin, lead, antimony and arsenic.

**Hazardous Polymerization:**  Will Occur  Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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**Route of Exposure:**  Inhalation  Skin  Ingestion

**Symptoms Related to the Physical, Chemical and Toxicological Characteristics:** Nausea, abdominal pain, constipation or diarrhea.

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

**Inhalation:** Short term inhalation of inorganic tin compounds may cause respiratory irritation. Inhalation of lead may cause irritation, nausea, vomiting, kidney damage, liver damage. Prolonged exposure to tin dust or fumes may cause a benign pneumoconiosis without fibrosis. Chronic lead inhalation 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. Inhalation of antimony may cause irritation of the respiratory tract; chronic exposure may cause stomatitis, dry throat, metallic taste, laryngitis, nausea bronchitis. Inhalation of arsenic may cause severe irritation of the nasal mucosa, larynx and bronchi, pain in the chest and possibly pulmonary edema; chronic inhalation may cause a catarrhal state of the mucous membranes, mild tracheobronchitis and perforation of the nasal septum.

**Skin Contact:** Prolonged or repeated exposure to lead and tin may cause irritation; exposure to lead powder may cause dermatitis. Direct contact with antimony dusts or its compounds may cause irritation with itching; chronic dermal exposure may cause papules and pustules. Arsenic irritates the skin with erythema; chronic exposure may cause eczematous erythema, swelling and papules.

**Eye Contact:** Contact with lead and tin may cause eye irritation. Direct contact with antimony dusts may cause irritation and inflammation of the cornea; repeated exposure may cause conjunctivitis. Arsenic dust may cause irritation characterized by itching, burning and watering of the eyes; repeated exposure may cause conjunctivitis.

**Ingestion:** Ingestion of this material is unlikely under normal conditions of use. Ingestion of tin may cause abdominal pain, nausea, vomiting, gastric irritation or diarrhea may occur. Ingestion of lead may cause kidney damage or liver damage; chronic ingestion may result in accumulation in body tissues and may also cause cancer. Ingestion of antimony may cause violent irritation of the nose, throat, stomach and intestines, vomiting, severe diarrhea and low blood pressure. Chronic ingestion of antimony may cause sores in the mouth, and degenerative liver and kidney damage. Ingestion of large doses of arsenic may cause systemic poisoning; chronic ingestion may cause damage to the nervous system.

**Numerical Measures of Toxicity:**

**Acute Toxicity:** Category 4 oral.

Tin, Rat, Oral LD50: 700 mg/kg.

Antimony, Rat, Oral LD50: 100 mg/m<sup>3</sup>.

Lead: as a pure component, lead is classified as Category 4 oral and Category 4 inhalation.

Arsenic, Rat, Oral LD50: 763 mg/m<sup>3</sup>.

**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**  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). Lead is not listed by OSHA as a carcinogen.

Arsenic is listed as known human carcinogen per NTP. IARC lists arsenic in Group 1 (carcinogenic to humans). OSHA lists inorganic arsenic (Designated Carcinogenic).

**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:** Not classified.

**Aspiration Hazard:** Not applicable.

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## 12. ECOLOGICAL INFORMATION

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### Ecotoxicity Data:

Lead Fish Toxicity:

Carp (*Cyprinus carpio*), LC50: 0.44 mg/L (96 hours, semi-static)

Trout (*Oncorhynchus mykiss*), LC50: 1.17 mg/L (96 hours, 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.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Dispose of waste in accordance with all applicable federal, state, and local regulations. Lead Hazardous Waste Number(s): D001 (tin) and D008 (lead). Lead is subject to U.S. EPA 40 CFR 262 for concentrations at or above the regulatory level of 5.0 mg/L.

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** Not regulated by DOT or IATA.

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## 15. REGULATORY INFORMATION

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### U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4):

**Note:** No reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm.

Lead: 10 lbs (4.54 kg) final RQ

Antimony: 5000 lbs (2270 kg) final RQ

Arsenic: 1 lb (0.454 kg) final RQ

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).

Antimony: 1 % de minimis concentration.

Arsenic: 0.1 % de minimis concentration.

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

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 known to the state of California to cause cancer (lead and arsenic) and reproductive/developmental effects (lead).

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

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

### Canadian Regulations:

WHMIS Information: Not provided for this material.

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## 16. OTHER INFORMATION

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**Issue Date:** 01 May 2015

**Sources:** ChemAdvisor, Inc., SDS *Lead*, 20 March 2015.  
ChemAdvisor, Inc., SDS *Arsenic*, 20 March 2015.  
ChemAdvisor, Inc., SDS *Antimony*, 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](mailto:srmmsds@nist.gov); or via the Internet at <http://www.nist.gov/srm>.