



## Material Safety Data Sheet

Identity: Germanium

Formula: Ge

### SECTION I - GENERAL INFORMATION

Manufacturer: [Stanford Advanced Materials](#) (SAM)

The information below is believed to be accurate and represents the best information available to SAM. However, SAM makes no warranty, expressed or implied with respect to such information and assumes no liability resulting from its use.

### SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Molecular weight: 72.61

CAS #	OSHA PEL	ACGIH TLV	%
7440-56-4	N/A	N/A	100%

### SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Physical State: Solid

Boiling Point: 2830°C  
Melting Point: 937.2 °C  
Solubility in water: None  
Rate: NA

Specific Gravity (water=1): 5.32 g/cm<sup>3</sup>  
Vapor Pressure: 1.1 x 10<sup>-9</sup> atm  
Vapor Density: NA Evaporation

*Appearance and odor:* Grayish-white metal, Odorless

### Section IV - Fire and Explosion Hazard Data:

Flash Point: N/A Method Used: Explosive Limits: LEL: N/A UEL: N/A

*Extinguishing Media:*

Use suitable extinguishing agent for surrounding material and type of fire

*Special Fire Fighting Procedures:*

Firefighters must wear full face, self-contained breathing apparatus with full protective clothing to prevent contact with skin and eyes. Fumes from fire are hazardous. Isolate runoff to prevent environmental pollution.

*Unusual Fire and Explosion Hazards:*

Massive metal is not considered a fire or explosion hazard. Germanium metal dust or powder may be flammable or explosive when dispersed in the air at high concentrations. When finely divided, germanium burns in chlorine and bromine.

### SECTION V - REACTIVITY DATA



*Stability:* Stable

*Conditions to Avoid (stability):* Powder reacts violently with concentrated nitric acid. Mixtures with potassium chlorate or potassium nitrate explode when heated.

*Incompatibility:* Strong oxidizing agents, fused alkalis and halogens. May ignite in bromine, chlorine, fluorine or oxygen

*Hazardous Decomposition or Byproducts:* Irritating and noxious fumes may be generated by thermal decomposition or combustion. Contact with hydrochloric acid emits volatile germanium tetrachloride, which is corrosive and irritation

*Hazardous Polymerization:* Will not occur

*Conditions to avoid (hazardous polymerization):* Contact with hydrochloric acid

## SECTION VI - HEALTH HAZARD DATA

*Routes of entry:* Relatively non-toxic to humans by all routes of exposure.

### Health Hazards (Acute and Chronic):

*Inhalation:* Irritation to the respiratory system

*Ingestion:* Kidney dysfunction, anemia and liver dysfunction

*Skin:* Direct contact may cause mechanical irritation, redness and itching

*Eye:* May cause redness, itching, watering and/or swelling

*Carcinogenicity:* NTP? No

IARC Monographs? No

OSHA Regulated? No

### Emergency and First Aid Procedures:

*Inhalation:* Remove victim to fresh air, keep warm and quiet, and give oxygen if breathing is difficult; seek medical attention

*Ingestion:* Give 1-2 glasses of milk or water and induce vomiting, seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person

*Skin:* Remove contaminated clothing, brush material off skin, wash affected area with mild soap and water, and seek medical attention if symptoms persist

*Eye:* Flush eyes with lukewarm water, lifting upper and lower eyelids for at least 15 minutes and seek medical attention

## SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

### *Steps to be taken in case material is released or spilled:*

Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area, provide ventilation and extinguish sources of ignition. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust.

### *Waste disposal method:*

Dispose of in accordance with state, local, and federal regulations.

### *Hazard Label Information:*

Solid suspected of containing moisture should be thoroughly dried before added to molten bath. Store in cool, dry area and in tightly sealed container. Wash thoroughly after handling.



SECTION VIII - CONTROL MEASURES
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*Protective Equipment Summary (Hazard Label Information):*

NIOSH approved respirator, impervious gloves, safety glasses, clothes to prevent contact.

*Ventilation:*

Local Exhaust: To maintain concentration at low exposure levels.

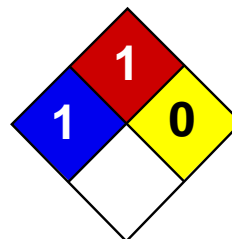
Mechanical (General): Recommended.

*Work/Hygienic/Maintenance Practices:*

Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

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Please be advised that N/A can either mean Not Applicable or No Data Has Been Established



Health	1
Fire	1
Reactivity	0
Personal Protection	B

## Material Safety Data Sheet Tin MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Tin

**Catalog Codes:** SLT3304, SLT1291, SLT2584, SLT3880

**CAS#:** 7440-31-5

**RTECS:** XP7320000

**TSCA:** TSCA 8(b) inventory: Tin

**CI#:** Not available.

**Synonym:**

**Chemical Name:** Tin

**Chemical Formula:** Sn

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Tin	7440-31-5	100

**Toxicological Data on Ingredients:** Not applicable.

### Section 3: Hazards Identification

**Potential Acute Health Effects:** Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:**

Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:**

When heated in Chlorine, Tin reacts, producing light and much heat. In the presence of water, cupric nitrate and tin foil, on prolonged intimate contact, will produce flaming and sparking. Sodium peroxide and Potassium peroxide, potassium dioxide, oxidize tin with incandescence. The reaction between tin and tellurium attains incandescence.

**Special Remarks on Explosion Hazards:**

Tin reacts violently or explosively with fused ammonium nitrate below 200 deg. C. Contact of metallic tin with turpentine may cause fires and explosions.

## Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

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.

**Personal Protection:** Safety glasses. Lab coat. Gloves (impervious).

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 2 (mg/m<sup>3</sup>) from OSHA (PEL) [United States] TWA: 2 (mg/m<sup>3</sup>) from ACGIH (TLV) [United States] TWA: 2 (mg/m<sup>3</sup>) from NIOSH TWA: 2 STEL: 4 (mg/m<sup>3</sup>) [Canada] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid.

**Odor:** Odorless.

**Taste:** Not available.

**Molecular Weight:** 118.71 g/mole

**Color:** Silver-white Grey.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 2507°C (4544.6°F)

**Melting Point:** 231.9°C (449.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 7.31 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water, hot water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Excess heat, incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents, acids, alkalis.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Incompatible with bromine, bromine trifluoride, Chlorine, Chlorine trifluoride + Carbon, water + Cupric Nitrate, Sodium peroxide, water vapor + Carbon Tetrachloride, Disulfur Dichloride, fused Ammonium Nitrate, Potassium dioxide, Tellurium, Turpentine, Acids (Nitric acid, Sulfuric Acid, Hydrochloric Acid, Acetic Acid), caustic Alkali, Iodine Bromide. In the presence of water vapor, the interaction between tin and carbon tetrachloride is violent. The interaction between tin and disulfur dichloride is violent. Tin reacts violently with Iodine Bromide

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

### Section 11: Toxicological Information

**Routes of Entry:** Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:** Not available.

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

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: Skin: May cause skin irritation. Eyes: May cause eye irritation to due mechanical action.  
Inhalation: Inhalation of tin dust may cause respiratory tract and mucous membrane tract irritation due to mechanical action  
Ingestion: It is poorly absorbed from the digestive tract. It can cause gastrointestinal tract disturbances which may be from irritant or astringent action on the stomach.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

### Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:**

Transportation information for Tin Metal Powder: Metal Powder, Flammable, n.o.s. (Tin Metal, Powder), Class 4.1, Flammable Solid, UN3089, PGIII

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

Rhode Island RTK hazardous substances: Tin Pennsylvania RTK: Tin Massachusetts RTK: Tin New Jersey: Tin California Director's List of Hazardous Substances: Tin TSCA 8(b) inventory: Tin

**Other Regulations:** EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):**

This product is not classified according to the EU regulations. Not applicable.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** B

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves (impervious). Lab coat. Not applicable. Safety glasses.

### Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 12:05 AM

**Last Updated:** 05/21/2013 12:00 PM

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