

Tin



Safety Data Sheet

Section 1: Identification

1.1 Product Identifier

Product Name: Tin
 Product Form: Solid
 Chemical Family: Metal
 CAS Number: 7440-31-5
 Molecular Formula: Sn
 Molecular Weight: 118.69

1.2 Other Means of Identification

Synonyms: Metallic Tin; Wang; Tin Element; Stannum; C.I. 77860; C.I. Pigment Metal 5; T-121; T-122; T-123; T-124; T-127; T-128; T-129; T-130; Sn; DLA23482; RTECS XP7320000

1.3 Recommended Uses

Recommended Use: Variety of laboratory, mechanical, and industrial applications.

1.4 Manufacturer, Importer, or Responsible Party

Responsible Party: Defense Logistics Agency Strategic Materials
 8725 John J. Kingman Road
 Fort Belvoir, Virginia 22060-6223
 (703) 767-5525

1.5 Emergency Phone Number

Emergency Phone Number: (800) 424-9300 (CHEMTREC)
 (703) 527-3887 (CHEMTREC INTERNATIONAL)

Section 2: Hazard(s) Identification

2.1 Classification of Chemical per OSHA CFR 1910.1200

Skin Irritation: Category 2
 Eye Irritation: Category 2A
 Respiratory Sensitization: Category 1B
 Target Organ Toxicity – Prolonged: Category 2 (Lungs)

2.2 Label Elements

Signal Word: DANGER

Symbol(s):



Hazard Statements:	Causes skin and serious eye irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause damage to lungs through prolonged or repeated exposure via inhalation.
Precautionary Statements:	<p>Prevention: Wear protective gloves and eye/face protection. Wash hands thoroughly after handling. Avoid breathing dust. In case of inadequate ventilation, wear respiratory protection.</p> <p>Response: If on skin, wash with plenty of water. If in eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If skin or eye irritation occurs or persists, get medical advice and/or attention. Take off contaminated clothing and wash it before reuse. If inhaled and breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms or feeling unwell, get medical attention and/or advice or call a poison control center and/or doctor.</p> <p>Storage: No specific storage requirements.</p> <p>Disposal: Dispose of contents and container in accordance with all local, state, and federal regulations.</p>

2.3 Other Hazards

Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.

2.4 Unknown Acute Toxicity

Does not apply to this product.

Section 3: Composition / Information on Ingredients

3.1 Chemical Name

Chemical Name:	Tin
Composition:	100%

3.2 Common Names/Synonyms

Synonyms: See **Section 1.2** for common names and synonyms.

3.3 CAS Number/Unique Identifiers

CAS Number:	7440-31-5
EC Number (EINECS):	231-141-8

3.4 Impurities/Stabilizing Additives

No data available.

Section 4: First-Aid Measures

4.1 Description of First-Aid Measures

Inhalation:	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.
Skin Contact:	Remove contaminated clothing and shoes. Wash skin with soap and water for at least 15 minutes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.
Eye Contact:	Flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.
Ingestion:	Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. Give water, milk, or activated charcoal slurry. Allow vomiting to occur. When vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

4.2 Most Important Symptoms/Effects, Acute and Delayed

Inhalation (Short-Term):	Irritation, metallic taste, nausea, vomiting, diarrhea, and headache.
Inhalation (Chronic):	Lung damage.
Skin Contact (Acute):	Irritation.
Skin Contact (Chronic):	Irritation.
Eye Contact (Acute):	Irritation.
Eye Contact (Chronic):	Irritation.
Ingestion (Acute):	Nausea, vomiting, diarrhea, and stomach pain.
Ingestion (Chronic):	Nausea, vomiting, diarrhea, and stomach pain.

4.3 Indication of Immediate Medical Attention/Special Treatment

For ingestion, consider gastric lavage.

Section 5: Fire-Fighting Measures

5.1 Suitable Extinguishing Media

Dolomite, dry powder for metal fires, dry sand, graphite, soda ash, or sodium chloride are recommended. Do not get water directly on metal.

5.2 Specific Hazards

Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.

5.3 Special Protective Equipment and Precautions

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area, and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion byproducts.

Section 6: Accidental Release Measures

6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

Keep all unauthorized people away, isolate hazard area, and deny entry. Personal protective equipment is discussed in **Section 8.3**.

6.2 Methods and Materials for Containment and Cleaning Up

If spilled or leaked, the following steps should be taken:

1. Ventilate area of spill or leak.
2. Collect spilled or leaked material in the most convenient and safe manner for reclamation or for disposal. Liquid containing inorganic tin compounds should be absorbed in vermiculite, dry sand, earth, or a similar material.

Section 7: Handling and Storage

7.1 Precautions for Safe Handling

Handle in accordance with all current regulations and standards. Utilize personal protective equipment to avoid contact with skin. Personal protective equipment is discussed in **Section 8.3**.

7.2 Conditions for Safe Storage

Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Keep separated from incompatible substances. Incompatible materials are identified in **Section 10.5**.

Section 8: Exposure Controls / Personal Protection

8.1 Exposure Limits

OSHA PEL TWA:	2 mg/m ³
IDLH:	100 mg/m ³
ACGIH TWA:	2 mg/m ³
NIOSH REL TWA (10 hours):	2 mg/m ³
EC OEL:	2 mg/m ³
UK WEL TWA:	2 mg/m ³
UK WEL STEL:	4 mg/m ³

ACGIH TLV-TWA additional information:

Excursion Limit Recommendation: Excursions in worker exposure levels may exceed 3 times the TLV-TWA for no more than a total of 30 minutes during a work day, and under no circumstances should they exceed 5 times the TLV-TWA, provided that the TLV-TWA is not exceeded.

8.2 Appropriate Engineering Controls

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

8.3 Individual Protection Measures

Eye Protection: Eye protection not required under normal conditions.

Clothing: Protective clothing not required under normal conditions.

Gloves: Protective gloves are not required under normal conditions.

Respirator: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

10 mg/m³ 1. Any dust and mist respirator.

20 mg/m³ 1. Any dust and mist respirator except single-use and quarter-mask respirators.
2. Any supplied-air respirator.

50 mg/m³ 1. Any supplied-air respirator operated in a continuous-flow mode.
2. Any powered, air-purifying respirator with a dust and mist filter.

100 mg/m³ 1. Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
2. Any self-contained breathing apparatus with a full facepiece.
3. Any supplied-air respirator with a full facepiece.

Unknown Concentrations/IDLH: 1. Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
2. Any self-contained breathing apparatus with a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Escape: 1. Any air-purifying respirator with a full facepiece and a high-efficiency particulate filter.
2. Any appropriate escape-type, self-contained breathing apparatus.

Section 9: Physical and Chemical Properties

9.1 Appearance

Physical State: Solid

Physical Description:	Gray to almost silver-white, ductile, malleable lustrous solid in pig, ingot or tub form.
9.2 Odor	Odorless.
9.3 Odor Threshold	Not applicable.
9.4 pH	Not applicable.
9.5 Melting / Freezing Points	
Melting Point:	450°F (232°C)
Freezing Point:	No data available.
9.6 Initial Boiling Point and Boiling Range	
Boiling Point:	4,100°F (2,260°C)
9.7 Flash Point	No data available.
9.8 Evaporation Rate	Not applicable.
9.9 Flammability	
Lower:	0.19 oz/ft ³
9.10 Upper/Lower Explosive Limits	No data available.
9.11 Vapor Pressure	
Vapor Pressure:	1 mmHg at 2,930°F (1,610°C)
9.12 Vapor Density	Not applicable.
9.13 Relative Density	
Water = 1:	7.28
9.14 Solubility(ies)	
Insoluble:	Water
Soluble:	Hydrochloric Acid, Sulfuric Acid, Aqua Regia, Hot Potassium Hydroxide Solutions, Alkali
Slightly Soluble:	Dilute Nitric Acid, Acetic Acid
9.15 Partition Coefficient	No data available.
9.16 Auto-Ignition Temperature	
Cloud:	1,166°F (630°C)
Layer:	806°F (430°C)
9.17 Decomposition Temperature	No data available.
9.18 Viscosity	
Viscosity:	1.85 mPa-s (=cP) @ 240°C (MP)

Section 10: Stability and Reactivity

10.1 Reactivity

Stable at normal temperatures and pressures. Stable in air, but when in powder form it oxidizes, especially in the presence of moisture.

10.2 Chemical Stability

Stable at normal temperatures and pressures. Stabilizes at < 64°F (18°C).

10.3 Possibility of Hazardous Reactions

Acids (Strong):	Can produce toxic organic or inorganic tin compounds.
Ammonium Nitrate:	Forms shock-sensitive mixture.
Bicarbonate Powder:	Violent reaction.
Bromine (Except halocarbon solution):	Violent reaction.
Bromine Trifluoride:	Violent reaction.
Carbon Dioxide:	Violent reaction.
Carbon Tetrachloride + water:	Violent reaction.
Chlorine (Liquid):	Ignites @ -29°F (-34°C).
Chlorine Trifluoride:	Violent reaction and possible ignition.
Cupric Nitrate:	Possible ignition.
Disulfur Dichloride:	Violent reaction.
Fluorine:	Ignites @ 212°F (100°C).
Iodine Bromide:	Violent reaction.
Iodine Heptafluoride:	Vigorous exothermic reaction when heated.
Peroxide:	Oxidation with incandescence may occur.
Potassium Peroxide:	Incandescent reaction.
Potassium Oxide:	Oxidation with incandescence may occur.
Sodium Peroxide:	Incandescent reaction.
Sodium Peroxide + Carbon Dioxide:	Explodes.
Sulfur:	Ignition reaction.
Tellurium:	Vigorous exothermic reaction.
Turpentine:	Fire and explosion hazard.

10.4 Conditions to Avoid

None reported.

10.5 Incompatible Materials

Acids, alkalis, oxidizing materials, halogens, metal salts, peroxides, bases, metal oxides, metals, and combustible materials.

Safe storage of the material is discussed in **Section 7.2**.

10.6 Hazardous Decomposition Products

Thermal decomposition products: Oxides of tin.

Section 11: Toxicological Information

11.1 Likely Routes of Exposure

Routes of entry include inhalation, skin contact, eye contact, and ingestion.

11.2 Symptoms

See **Section 4.2** for symptoms related to the chemical and toxicological characteristics.

11.3 Short and Long Term Effects

Inhalation (Acute): Inhalation of inorganic tin compounds may cause respiratory irritation. Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually

between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea, and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

Inhalation (Chronic):

Repeated or prolonged exposure to dust or fumes may cause a benign pneumoconiosis without fibrosis.

Skin Contact (Acute):

No reported effects in humans from tin dust. Inorganic tin compounds may cause irritation.

Skin Contact (Chronic):

Repeated or prolonged contact with inorganic tin compounds may cause dermatitis.

Eye Contact (Acute):

Powder may cause moderate irritation.

Eye Contact (Chronic):

Repeated or prolonged exposure to inorganic tin compounds may cause conjunctivitis.

Ingestion (Acute):

Relatively non-toxic because of poor absorption. At very high levels, abdominal pain, nausea, vomiting, gastric irritation, and diarrhea may occur.

Ingestion (Chronic):

Repeated or prolonged ingestion of small quantities may cause abdominal pain, nausea, constipation, and loss of weight.

11.4 Numerical Measures of Toxicity

TDL ₀ (Human):	250 mg/kg (unreported)
TDL ₀ (Rat):	395 gm/kg (implant)
TDL ₀ (Mouse):	840 gm/kg (implant)

11.5 Carcinogen Status

OSHA:	Not identified as carcinogenic
NTP:	Not identified as carcinogenic
IARC:	Not identified as carcinogenic

Section 12: Ecological Information

12.1 Ecotoxicity

Algal Toxicity: 5,000 µg/L 13 day(s) (Biochemical) Green algae (*Enteromorpha sp.*)

12.2 Persistence and Degradability

No data available.

12.3 Bioaccumulative Potential

Bioconcentration: 5,000-6,000 µg/L 51 hour(s) BCFD (Residue) Common bay mussel, blue mussel (*Mytilus edulis*) 0.04 µg/L

12.4 Mobility in Soil

No data available.

12.5 Other Adverse Effects

No data available.

Section 13: Disposal Considerations

Dispose in accordance with all applicable regulations.

Section 14: Transport Information

14.1 UN Number

No classification assigned.

14.2 UN Proper Shipping Name

No classification assigned.

14.3 Transport Hazard Class(es)

U.S. Department of Transportation:	No classification assigned.
CA Transportation/Dangerous Goods:	No classification assigned.
Land Transport ADR:	No classification assigned.
Land Transport RID:	No classification assigned.
Air Transport IATA:	No classification assigned.
Air Transport ICAO:	No classification assigned.
Maritime Transport IMDG:	No classification assigned.

14.4 Packing Group

No classification assigned.

14.5 Environmental Hazards

No data available.

14.6 Transport in Bulk

No data available.

14.7 Special Precautions

No data available.

Section 15: Regulatory Information

US Regulations

CERCLA 102A/103 (40 CFR 302.4): Not regulated.

SARA Title III

Section 302 (40 CFR 355.30): Not regulated.

Section 304 (40 CFR 355.40): Not regulated.

Sections 311/312 (40 CFR 370.21): Not regulated.

Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety: Not regulated.

State Regulations

California Proposition 65: Not regulated.

National Inventory Status

US Inventory (TSCA): Listed on inventory.

TSCA 12(b) Export Notification: Not listed.

Section 16: Other Information

The information in this Safety Data Sheet meets the requirements of the United States Department of Labor OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION and regulations promulgated thereunder (29 CFR 1910.1200 et. seq.). This document is intended only as a guide to the appropriate precautionary material handling by a person trained in, or supervised by a person trained in, chemical handling. Exposure to this chemical may have serious adverse health effects. This chemical may interact with other substances. Since the potential uses are so varied, all of the potential hazards

of use or interaction with other chemicals or materials cannot be identified on this Safety Data Sheet. The user should recognize that this chemical can cause injury, especially if improperly handled, precautionary measures are not followed, and personal protective equipment not worn. Read and understand all precautionary information prior to use. The Defense Logistics Agency (DLA) shall not be held liable for any damage resulting from handling or from contact with the above chemical.

References:

ChemADVISOR®, Inc. *Material Safety Data Sheet, Chromium*. September 4, 2008. (as provided by the Defense Logistics Agency)

American Conference of Governmental Industrial Hygienists. *2013 TLVs® and BEIs®*, ACGIH® Publication #0113. 2013.

US Department of Transportation. *Emergency Response Guidebook*. 2012

Centers for Disease Control and Prevention. *NIOSH Pocket Guide to Chemical Hazards*, <http://www.cdc.gov/niosh/npg/>.

National Institute of Health, Toxicology Data Network. <http://toxnet.nlm.nih.gov/>

NOTE: No data available: no data for this topic found using references listed.

Date of Preparation of Updated SDS: April 24, 2015