

TIN

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TIN
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MATERIAL SAFETY DATA SHEET

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TIN
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SUBSTANCE IDENTIFICATION

SUBSTANCE: **TIN** CAS-NUMBER 7440-31-5
TRADE NAMES/SYNONYMS:
METALLIC TIN, SILVER WATT POWDER, TIN FLAKE, TIN POWDER, WANG, TIN ELEMENT,
STANNUM, CI, 77860, CI, PIGMENT METAL 5, T-121, T-122, T-123, T-124,
T-127, T-128, T-129, T-131, ACC23480

CHEMICAL FAMILY:
Metal

MOLECULAR FORMULA: SN
MOLECULAR WEIGHT: 118.69

CERCLA RATINGS (SCALE 0-3): HEALTH-3 FIRE-1 REACTIVITY-0 PERSISTENCE-3
NFPA RATINGS (SCALE 0-4): HEALTH-U FIRE-1 REACTIVITY-0

COMPONENTS AND CONTAMINANTS

COMPONENT: TIN PERCENT: 100
CAS# 7440-31-5

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

TIN AND INORGANIC TIN COMPOUNDS (as Sn):
2 mg/m³ OSHA TWA
2 mg/m³ ACGIH TWA
2 mg/m³ NIOSH recommended 10 hour TWA
4 mg/m³ DFG MAK 30 minute peak, average value, 4 times/shift
Measurement method: Particulate filter; acid; atomic absorption spectrometry; (NIOSH II(3) # S183).

PHYSICAL DATA

DESCRIPTION: An odorless, silver-white, lustrous, soft, very malleable and ductile powder or solid metal. BOILING POINT: 4100 F (2260 C)
MELTING POINT: 449 F (232 C) SPECIFIC GRAVITY: 7.28

VAPOR PRESSURE: 1 mmHg @ 1610 C SOLUBILITY IN WATER: Insoluble
SOLVENT SOLUBILITY: Soluble in hydrochloric acid, sulfuric acid, aqua regia, alkali, hot potassium hydroxide, hot sodium hydroxide; slightly soluble in dilute nitric acid

HARDNESS (BRINNEL): 20
AUTOIGNITION TEMPERATURE: 806 F (430 C) (dust layer); 1117 F (630 C) (cloud)

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
Negligible fire hazard in bulk form; however, dust, powder, or fumes are flammable or explosive when exposed to heat or flames.

LOWER EXPLOSIVE LIMIT: 0.19 oz/lit AUTOIGNITION TEMP.: 806 F (430 C)

FIREFIGHTING MEDIA:

Use dry sand, dry chemical, graphite, sodium chloride, soda ash, or appropriate metal extinguishing agents. Do not apply water to burning material (NFPA Fire Protection Handbook, 16th Edition).

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FIREFIGHTING:
Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn (1993 Emergency Response Guidebook, HSPA P 5800.8, Guide Page 32).

Extinguish using agent for type of fire. Avoid breathing fumes from burning material.

TRANSPORTATION DATA

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
Metal powders, flammable, n.o.s. (tin)-UN 3089

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
4.1 - Flammable solid

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101:
U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101:
Flammable solid

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
EXCEPTIONS: 49 CFR 173.151
NON-BULK PACKAGING: 49 CFR 173.212
BULK PACKAGING: 49 CFR 173.240

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 15 kg
CARGO AIRCRAFT ONLY: 50 kg

TOXICITY

TIN:
TOXICITY DATA: Tumorigenic data (RTECS).
CARCINOGEN STATUS: None known.
ACUTE TOXICITY LEVEL: No data available.
TARGET EFFECTS: No data available.

HEALTH EFFECTS AND FIRST AID

INHALATION:

TIN:
100 mg/m³ Immediately Dangerous to Life or Health.
ACUTE EXPOSURE- 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, in addition to severe general feeling of malaise, fever, chills, 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.
CHRONIC EXPOSURE- Repeated or prolonged exposure to dust or fumes may cause a benign pneumoconiosis without fibrosis.

FIRST AID- Remove from exposure area to fresh air immediately. Perform artificial respiration if necessary. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention immediately.

SKIN CONTACT:

TIN:
ACUTE EXPOSURE- No reported effects in humans from tin dust. Inorganic tin compounds may cause irritation.
CHRONIC EXPOSURE- Repeated or prolonged contact with inorganic tin compounds may cause dermatitis.

FIRST AID- Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

EYE CONTACT:

TIN:
ACUTE EXPOSURE- Powder may cause moderate irritation.
CHRONIC EXPOSURE- Repeated or prolonged exposure to inorganic tin compounds may cause conjunctivitis.

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FIRST AID- Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

INGESTION:

TIN:

ACUTE EXPOSURE- Relatively non-toxic because of poor absorption. At very high levels, abdominal pain, nausea, vomiting, gastric irritation, and high levels of acid in the stomach. Repeated or prolonged ingestion of small quantities may cause abdominal pain, nausea, constipation, and loss of weight.

FIRST AID- Chemical should be removed by emesis. Do not induce vomiting in an unconscious person. Treatment should be performed by qualified medical personnel. Get medical attention. (Dreisbach Handbook of Poisoning 11 Ed.)

ANTIDOTE:

No specific antidote. Treat symptomatically and supportively.

REACTIVITY

REACTIVITY:

Stable under normal temperatures and pressures.

INCOMPATIBILITIES:

TIN:

ACIDS (STRONG): Can produce toxic organic or inorganic tin compounds.

AMMONIUM NITRATE: Forms shock-sensitive mixture.

BICARBONATE POWDER: Violent reaction.

BROMINE (EXCEPT IN HALOCARBON SOLUTION): Violent reaction.

BROMINE TRIFLUORIDE: Violent reaction.

CARBON DIOXIDE: Violent reaction.

CARBON TETRACHLORIDE + WATER: Violent reaction.

CHLORINE (LIQUID): Ignites @ -34 C.

CHLORINE TRIFLUORIDE: Violent reaction and possible ignition.

CHLORINE TRIFLUORIDE + WATER: Violent reaction.

DISULFUR DICHLORIDE: Violent reaction.

FLUORINE: Ignites @ 100 C.

IODINE BROMIDE: Violent reaction.

IODINE HEPTAFLUORIDE: Vigorous exothermic reaction when heated.

PEROXIDE: Oxidation with incandescence may occur.

POTASSIUM PEROXIDE: Incandescent reaction.

POTASSIUM PEROXIDE: 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.

DECOMPOSITION:

Thermal decomposition may release stannic oxide.

POLYMERIZATION:

Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

STORAGE AND DISPOSAL

Observe all federal, state and local regulations when storing or disposing of this substance.

Storage

Store in a cool, dry place.

Store away from incompatible substances.

Disposal

Disposal must be in accordance with standards applicable to generators of hazardous waste, 40 CFR 262, EPA Hazardous Waste Number D001, 100 pound CERCLA Section 103 Reportable Quantity.

CONDITIONS TO AVOID

Avoid dispersion of dust in air. Finely divided particles, dust, or fumes may be a slight fire hazard. Keep away from sparks or ignition sources.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:

For large spills, sweep up with a minimum of dusting and place into suitable clean, dry containers for reclamation or later disposal.

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Residue should be cleaned up using a high-efficiency particulate filter vacuum.

PROTECTIVE EQUIPMENT

VENTILATION:

Provide local exhaust ventilation to meet published exposure limits. Ventilation equipment should be explosion-proof if explosive concentrations of dust, vapor or fume are present.

RESPIRATOR:

The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH Pocket Guide to Chemical Hazards: NIOSH criteria documents or by the U.S. Department of Labor, 29 CFR 1910 Subpart Z.

The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).

TIN, INORGANIC COMPOUNDS EXCEPT OXIDES (AS SN):

For dust or mist:

10 mg/m3- Any dust and mist respirator except single-use respirators.

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

50 mg/m3- Any powered air-purifying respirator with a dust and mist filter.

For dust, mist, or fume:

20 mg/m3- Any supplied-air respirator.

Any self-contained breathing apparatus.

50 mg/m3- Any supplied-air respirator operated in a continuous flow mode.

100 mg/m3- Any air-purifying full facepiece respirator with a high-efficiency particulate filter.

Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.

400 mg/m3- Any supplied-air respirator with a full facepiece and operated in a pressure-demand or other positive pressure mode.

Escape- Any air-purifying full facepiece respirator with a high-efficiency particulate filter.

Any appropriate escape-type self-contained breathing apparatus.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

CLOTHING:

Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.

GLOVES:

Employee must wear appropriate protective gloves to prevent contact with this substance.

EYE PROTECTION:

Employee must wear splash-proof or dust-resistant safety goggles to prevent eye contact with this substance.

Emergency eye wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.

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