

LTS RESEARCH LABORATORIES, INC.  
MATERIAL SAFETY DATA SHEET  
ZINC OXIDE TIN

GENERAL

MANUFACTURER/SUPPLIER: LTS RESEARCH LABORATORIES, INC.

COMPANY'S STREET: 37 RAMLAND ROAD  
COMPANY'S CITY: ORANGEBURG  
COMPANY'S STATE: NEW YORK  
COMPANY'S ZIP CODE: 10962  
EMERGENCY CHEMTREC #: 800-262-8200  
COMPANY'S EMERGENCY TEL. #: 800-424-9300 (LOCAL)  
703-527-3887 (INTERNATIONAL)  
COMPANY'S TEL #: 845-494-2940  
DATE MSDS PREPARED: 07/14/11

1. PRODUCT IDENTIFICATION

PRODUCT NAME: ZINC OXIDE TIN  
CHEMICAL NATURE: METAL OXIDE  
FORMULA: ZnO-Sn  
CAS #: 1314-13-2/ 7440-31-5

2. PHYSICAL AND CHEMICAL CHARACTERISTICS

BOILING POINT: N/A  
MELTING POINT: N/A  
VAPOR DENSITY: N/A  
VAPOR PRESSURE: N/A  
DENSITY AT 20°C: N/A  
% VOLATILES: N/A  
SOLUBILITY IN H<sub>2</sub>O: INSOLUBLE  
APPEARANCE AND ODOR: SPUTTERING TARGET, POWDER AND PIECES,  
ODORLESS

3. HAZARD IDENTIFICATION

ZnO  
HAZARDOUS COMPONENTS %  
ZINC OXIDE 0-100%  
OSHA/PEL: 15 mg/m<sup>3</sup>  
ACGIH/TLV 10 mg/m<sup>3</sup>  
OTHER LIMITS 5 mg/m<sup>3</sup>  
SEC. 302 NO  
SEC 304 NO  
EC 313 NO

HAZARD DESCRIPTION: N DANGEROUS FOR THE ENVIRONMENT  
RISK PHRASES: R 50/53 VERY TOXIC TO AQUATIC ORGANISMS, MAY CAUSE  
LONG-TERM ADVERSE EFFECTS IN THE AQUATIC  
ENVIRONMENT

HMIS RATING:  
HEALTH: 1  
FLAMMABILITY: 0  
REACTIVITY: 0

Sn  
HAZARDOUS COMPONENTS %  
TIN 0-100%  
OSHA/PEL: 2 mg/m<sup>3</sup>  
ACGIH/TLV 2 mg/m<sup>3</sup>  
Sec. 302 NO

Sec. 304	NO
Sec. 313	NO
HAZARD DESCRIPTION:	F HIGHLY FLAMMABLE
RISK PHRASES:	R 11 HIGHLY FLAMMABLE
HMIS RATINGS:	
HEALTH:	1
FLAMMABILITY:	2
REACTIVITY:	1

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#### 4. FIRE FIGHTING MEASURES

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FLASH POINT:	N/A
AUTOIGNITION TEMPERATURE (POWDER) (TIN)	630 °C (CLOUD), 430 °C (LAYER)
FLAMMABLE LIMITS:	
UPPER:	N/A
LOWER:	N/A
FLAMMABILITY:	NON-FLAMMABLE SOLID
EXTINGUISHING MEDIA:	USE SUITABLE MEDIA FOR SURROUNDING MATERIALS AND TYPE OF FIRE. DO NOT USE WATER, CO <sub>2</sub> OR HALOGENATED EXTINGUISHERS. USE DRY CHEMICAL EXTINGUISHING AGENTS, GRAPHITE, SODIUM CHLORIDE, DRY SAND OR DRY GROUND DOLOMITE.

#### 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 THE FIRE ARE HAZARDOUS. ISOLATE RUNOFF TO PREVENT ENVIRONMENTAL POLLUTION.

#### UNUSUAL FIRE AND EXPLOSION HAZARDS:

WHEN HEATED TO DECOMPOSITION ZINC OXIDE MAY EMIT TOXIC FUMES OF ZnO. MAY EXPLODE WHEN MIXED WITH CHLORINATED RUBBER. VIOLENT REACTION WITH MAGNESIUM, LINSEED OIL. COMBUSTIBLE IN THE FORM OF DUST WHEN EXPOSED TO HEAT OR BY SPONTANEOUS CHEMICAL REACTION WITH BR<sub>2</sub>, BRF<sub>3</sub>, CL<sub>2</sub>, CLF<sub>3</sub>, CU(NO<sub>3</sub>), K<sub>2</sub>O<sub>2</sub> AND S. POWDER OXIDIZES, ESPECIALLY IN THE PRESENCE OF MOISTURE

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#### 5. HEALTH HAZARD INFORMATION

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#### ZINC OXIDE

#### EFFECTS OF EXPOSURE:

ZINC COMPOUNDS HAVE VARIABLE LOW TOXICITY. ZINC IS NOT INHERENTLY A TOXIC ELEMENT. HOWEVER, WHEN HEATED IT EVOLVES A FUME OF ZINC OXIDE WHICH, WHEN INHALED FRESH CAN CAUSE A DISEASE KNOWN AS "BRASS FOUNDERS" "AGUE", OR BRASS CHILLS". ZINC DUST WHICH IS NOT FRESHLY FORMED IS VIRTUALLY INNOCUOUS. THERE IS NO CUMULATIVE EFFECT FROM THE INHALLATION OF ZINC FUMES. ACUTE CHRONIC EFFECTS:

INHALATION:	MAY CAUSE IRRITATION OF RESPIRATORY TRACT, NASOPHARYNGITIS AND LARYNGITIS.
INGESTION:	MODERATELY TOXIC.
.SKIN:	MAY CAUSE IRRITATION.
EYE:	MAY CAUSE IRRITATION
CHRONIC AFFECTS:	
INHALATION:	MAY CAUSE HUMAN SYSTEMIC EFFECTS.
INGESTION:	NO CHRONIC EFFECTS RECORDED.
.SKIN:	NO CHRONIC EFFECTS RECORDED..

EYE:	NO CHRONIC EFFECTS RECORDED.
ROUTES OF EXPOSURE:	INHALATION, INGESTION, SKIN, EYE.
TARGET ORGAN:	NO TARGET ORGANS RECORDED.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:	PREEXISTING RESPIRATORY DISORDERS
CARCINOGENICITY:	
NTP: NO	
IARC: NO	
OSHA: NO	
EFFECTS OF EXPOSURE:	TIN COMPOUNDS HAVE VARIABLE TOXICITY. ELEMENTAL TIN AND INORGANIC TIN COMPOUNDS HAVE TOXICITY AND ARE POORLY ABSORBED WHEN INGESTED. SOME INORGANIC TIN SALTS ARE IRRITATING OR CAN LIBERATE TOXIC FUMES ON DECOMPOSITION. THE LATTER IS PARTICULARLY TRUE OF TIN HALOGENS. (SAX, DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, EIGHTH EDITION.)
ACUTE EFFECTS:	
INHALATION:	MAY CAUSE IRRITATION OF THE UPPER RESPIRATORY SYSTEM, METAL FUME FEVER, THIRST, METALLIC TASTE, COUGHING, FEVER, CHILLS, MUSCULAR PAIN, HEADACHE, NAUSEA, VOMITING, PROFUSE SWEATING, EXCESSIVE URINATION AND DIARRHEA
INGESTION:	POOR ABSORPTION MAKES IT RELATIVELY NON-TOXIC.
SKIN: MAY CAUSE IRRITATION.	
EYE: MAY CAUSE IRRITATION	
CHRONIC AFFECTS:	
INHALATION:	MAY CAUSE PNEUMONOCONIOSIS AND TIN POISONING. REPEATED OR HIGH LEVELS MAY CAUSE ABDOMINAL PAIN, NAUSEA, CONSTIPATION OR DIARRHEA, GASTRIC IRRITATION AND LOSS OF WEIGHT.
INGESTION:	
SKIN:	MAY CAUSE DERMATITIS.
EYE:	MAY CAUSE CONJUNCTIVITIS
ROUTES OF EXPOSURE:	INGESTION, INHALATION, SKIN AND EYE CONTACT.
TARGET ORGAN:	MAY AFFECT THE RESPIRATORY SYSTEM, SKIN AND EYES

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## 6. STABILITY

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STABILITY:	STABLE
CONDITION TO AVOID:	NONE
INCOMPATIBILITY (MATERIAL TO AVOID):	ALUMINUM, HEXACHLOROETHANE, CHLORINATED RUBBER, LINSEED OIL, MAGNESIUM. ACIDS, HALOGENS, BASES, CARBON TETRACHLORIDE + WATER, DISULFUR DICHLORIDE, BROMIDE, BROMINE TRIFLUORIDE, CHLORINE TRIFLUORIDE, CHLORINE, IODINE BROMIDE, COPPER (II) NITRATE, FLUORINE, IODINE HEPTAFLUORIDE, AMMONIUM NITRATE, POTASSIUM DIOXIDE, SODIUM PEROXIDE, SULFUR, TELLURIUM, MOLTEN TIN + WATER. CONCENTRATED ACIDS, OXIDANTS. FIRES AND EXPLOSIONS CAN OCCUR WHEN METALLIC TIN IS IN CONTACT WITH TURPENTINE
HAZARDOUS DECOMPOSITION PRODUCTS:	ZINC OXIDE. TIN OXIDES. METAL OXIDE FUME
HAZARDOUS POLYMERIZATION:	WILL NOT OCCUR.

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## 7. EMERGENCY AND FIRST AID PROCEDURES:

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INHALATION:	REMOVE TO FRESH AIR; KEEP WARM AND QUIET; GIVE OXYGEN IF BREATHING IS DIFFICULT AND SEEK MEDICAL ATTENTION..
INGESTION:	PROVIDE 1-2 GLASS OF MILK OR WATER AND INDUCE VOMITING IF CONSCIOUS, SEEK IMMEDIATE MEDICAL ATTENTION.
SKIN:	REMOVE CONTAMINATED CLOTHING, BRUSH MATERIAL OFF SKIN, WASH AFFECTED AREA WITH MILD SOAP AND WATER, MEDICAL HELP WILL BE NEEDED IF SYMPTOM PERSIST.
EYE:	RINSE EYE FOR SEVERAL MINUTES UNDER RUNNING WATER. THEN CONSULT A DOCTOR IF SYMPTOMS PERSISTS.

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8. HANDLING AND STORAGE

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HANDLING AND STORAGE	KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA, BUT KEEP POWDERED ZINC DRY AND AWAY FROM STRONG OXIDIZING MATERIALS AND OTHER INCOMPATIBILITIES.
OTHER PRECAUTIONS:	NORMAL LAB COAT. TIN POWDER OXIDIZES IN MOISTURE. HANDLE AND STORE IN A DRY, CONTROLLED ATMOSPHERE. DO NOT STORE TOGETHER WITH ACIDS, ALKALIES.

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9. SPILL OR LEAK PROCEDURES

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STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:		WEAR APPROPRIATE RESPIRATORY AND PROTECTIVE EQUIPMENT. ISOLATE SPILLED AREA AND PROVIDE VENTILATION. VACUUM UP SPILL AREA WITH HIGH EFFICIENCY PARTICULATE ABSOLUTE AIR FILTER AND PROVIDE VENTILATION TAKE CARE NOT RAISE DUST.
WASTE DISPOSAL METHOD:		IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
SPECIAL PROTECTION INFORMATION:		
RESPIRATORY PROTECTION:		NIOSH/MSHA APPROVED DUSR RESPIRATOR.
VENTILATION:		LOCAL EXHAUST VENTILATION MAY BE NECESSARY TO CONTROL ANY AIR CONTAMINANTS TO WITHIN THEIR PELS OR TLVs DURING THE USE OF THIS PRODUCT. GOOD GENERAL EXHAUST IS RECOMMENDED.
PROTECTIVE GLOVES:		RUBBER GLOVES
EYE PROTECTION:		SAFETY GLASSES
OTHER PROTECTIVE EQUIPMENT OR CLOTHING:		PROECTIVE GEAR SUITABLE TO PREVENT CONTAMINATION. BARRIER CREAM MAY HELP PREVENT IRRITATION IN HYPERSENSATIVE ONE.

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10. TOXICITY DATA

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ZINC OXIDE TOXICITY:	
ACUTE TOXICITY ORAL (LD50):	7950 MG/KG FOR MOUSE >5000 MG/KG RAT
(LDLO) :	500 MG/KG HUMAN
INHALATIVE (LC50):	2500 MG/M <sup>3</sup> MOUSE
IRRITATION OF SKIN (MILD):	500 MG/24H RABBIT
IRRITATION OF EYES (MILD):	500 MG/24H RABBIT

CHRONIC EFFECTS ON HUMAN:	NOT AVAILABLE
ACUTE EFFECTS ON HUMAN:	HAZARDOUS IN CASE EYE CONTACT. INFLAMMATION OF THE EYE IS CHARACTERIZED BY REDNESS, WATERING AND ITCHING. IRRITATION, SCALING, REDDENING LEADING TO BISTER FORMATION TO SKIN. INHALATION CAUSES LUNG IRRITATION.
SENSITIZATION:	N/A
TERATOCITY:	N/A
TIN	METALLIC TIN IS RELATIVELY NON-TOXIC. EXPOSURE TO DUST OR FUMES OF INORGANIC TIN SALTS IS KNOWN TO CAUSE BENIGN INFLAMMATION OF THE LUNG TISSUE, A CONDITION IN WHICH THERE IS NO DISTINCTIVE FIBROSIS, NO SIGN OF DISABILITY, NO COMPLICATING FACTORS.
CARCINOGENICITY:	NO CLASSIFICATION DATA ON CARCINOGENIC PROPERTIES OF THIS MATERIAL IS AVAILABLE FROM THE EPA, IARC, NTP.
ADDITIONAL INFORMATION:	TO THE BEST OF OUR KNOWLEDGE THE ACUTE AND CHRONIC TOXICITY OF THIS SUBSTANCE IS NOT FULLY KNOWN

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#### 11. TRANSPORTATION DATA

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##### D.O.T REGULATOR FOR POWDERS ONLY

PROPER SHIPPING NAME:	METAL POWDER, FLAMMABLE, N.O.S.
UN NUMBER:	UN3089
HAZARD CLASS:	4.1
PG	III
ADR//RID CLASS:	4.1 (F3) FLAMMABLE SOLIDS, SELF-REACTIVE SUBSTANCES AND SOLID DESENSITISED EXPLOSIVES.
IMDG CLASS:	4.1
ICAO/IATA CLASS:	4.1

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#### 12. OTHER INFORMATION

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THIS SAFETY DATA SHEET SHOULD BE USED IN CONJUNCTION WITH TECHNICAL SHEETS. IT DOES NOT REPLACE THEM. THE INFORMATION GIVEN IS BASED ON OUR KNOWLEDGE OF THIS PRODUCT, AT THE TIME OF PUBLICATION. IT IS GIVEN IN GOOD FAITH. THE ATTENTION OF THE USER IS DRAWN TO THE POSSIBLE RISKS INCURRED BY USING THE PRODUCT FOR ANY OTHER PURPOSE OTHER THAN THAT FOR WHICH IT WAS INTENDED. THIS DOES NOT IN ANY WAY EXCUSE THE USER FROM KNOWING AND APPLYING ALL THE REGULATIONS GOVERNING HIS ACTIVITY. IT IS THE SOLE RESPONSIBILITY OF THE USER TO TAKE ALL PRECAUTIONS REQUIRED IN HANDLING THE PRODUCT. THE AIM OF THE MANDATORY REGULATIONS MENTIONED IS TO HELP THE USER TO FULFILL HIS OBLIGATIONS REGARDING THE USE OF HAZARDOUS PRODUCTS.