

LTS (CHEMICAL) INC.  
MATERIAL SAFETY DATA SHEET  
ZINC VANADIUM

GENERAL

MANUFACTURER/SUPPLIER: LTS RESEARCH LABORATORIES, INC.

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COMPANY'S CITY: ORANGEBURG  
COMPANY'S STATE: NEW YORK  
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DATE MSDS PREPARED: 07/08/11

1. PRODUCT IDENTIFICATION

PRODUCT NAME: ZINC VANADIUM ALLOY  
FORMULA: Zn-V  
CAS #: 7440-66-6/ 7440-62-2  
MOLECULAR WEIGHT: 116.36 g/mol

2. PHYSICAL AND CHEMICAL CHARACTERISTICS

BOILING POINT: N/A  
MELTING POINT: N/A  
MOLECULAR WEIGHT: 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, ODORLESS

3. HAZARD IDENTIFICATION

Zn  
HAZARDOUS COMPONENTS %  
ZINC 0-100%  
OSHA/PEL: 0  
ACGIH/TLV N/A  
OTHER LIMITS N/A  
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: 0  
FLAMMABILITY: 2  
REACTIVITY: 2

VANADIUM  
HAZARD DESCRIPTION: Xi IRRITANT  
F HIGHLY FLAMMABLE  
RISK PHRASES: R 11 HIGHLY FLAMMABLE  
R 36/37/38 IRRITATING TO EYES, RESPIRATORY SYSTEM,  
AND SKIN

SAFETY PHRASES: 7 KEEP CONTAINER TIGHTLY CLOSED  
 26 IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE  
 33 TAKE RPECAUTIONARY MEASURES AGAINST STATIC CHARGES  
 37 WEAR SUITABLE GLOVES  
 43 IN CASE OF FIRE, USE SAND, CARBON DIOXIDE, OR POWDERED EXTINGUISHING POWDER. NEVER USE WATER.  
 60 THIS MATERIAL AND ITS CONTAINER MUST BE DISPOSED OF AS HAZARDOUS WASTE.

HAZARDOUS COMPONENTS %  
 VANADIUM 0-100%  
 OSHA/PEL: N/E  
 ACGIH/TLV N/E  
 SEC.302: NO  
 SEC.304: NO  
 SEC.313: YES

HMIS RATINGS:  
 HEALTH: 1  
 FLAMMABILITY: 3  
 REACTIVITY: 2

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#### 4. FIRE FIGHTING MEASURES

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FLASH POINT: N/A  
 AUTOIGNITION TEMPERATURE: N/A  
 FLAMMABLE LIMITS:  
 UPPER: N/A  
 LOWER: N/A  
 FLAMMABILITY: NON-FLAMMABLE SOLID  
 EXTINGUISHING MEDIA: USE SUITABLE MEDIA FOR SURROUNDING MATERIALS 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 THE FIRE ARE HAZARDOUS. ISOLATE RUNOFF TO PREVENT ENVIRONMENTAL POLLUTION.  
 UNUSUAL FIRE AND EXPLOSION HAZARDS: WHEN HEATED TO DECOMPOSITION ZINC MAY EMIT TOXIC FUMES OF ZnO. MAY EXPLODE WHEN MIXED WITH CHLORINATED RUBBER. VIOLENT REACTION WITH MAGNESIUM, LINSEED OIL.

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#### 5. HEALTH HAZARD INFORMATION

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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  
VANADIUM

VANADIUM COMPOUNDS ARE CONSIDERED TO HAVE VARIABLE TOXICITY. VANADIUM COMPOUNDS ACT CHIEFLY AS AN IRRITANT TO THE CONJUNCTIVA AND RESPIRATORY TRACT. ACUTE AND CHRONIC EXPOSURE CAN GIVE RISE TO CONJUNCTIVITIS, RHINITIS, REVERSIBLE IRRITANT OF THE RESPIRATORY TRACT. EXPOSURE MAY LEAD TO BRONCHITIS, BRONCHOSPASMS, AND ASTHMA-LIKE DISEASES IN MORE SEVERE CASES. MAY CAUSE POLYCYTHEMIA, RED BLOOD CELL DESTRUCTION AND ANEMIA, ALBUMINURIA AND HEMATURIA, GASTROINTESTINAL DISORDERS, NERVOUS COMPLAINTS, AND SEVERE COUGH. INDUSTRIAL EXPOSURE IS MOSTLY ACUTE, SELDOM CHRONIC. HUMAN VANADIUM POISONING SYMPTOMS ARE FOR THE MOST PART RESTRICTED TO THE CONJUNCTIVA AND RESPIRATORY SYSTEM. ACUTE POISONING IN ANIMALS BY INGESTION OF VANADIUM COMPOUNDS CAUSES NERVOUS DISTURBANCES, PARALYSIS OF LEGS, RESPIRATORY FAILURE, CONVULSIONS, BLOODY DIARRHEA AND DEATH. POISONING BY INHALATION CAUSES BLEEDING OF THE NOSE AND ACUTE BRONCHITIS (SAX, DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, EIGHTH EDITION).

ZINC: ZINC IS GENERALLY HAS LOW TOXICITY. HEATED METAL MAY EVOLVE ZINC FUME AND OXIDE CAUSING " ZINC SHAKES". ZINC FUMES MAY CAUSE METAL FUMES FEVER. EFFECTS INCLUDE DRY THRIAT, METALLIC TASTE, CHEST PAIN, DYSPNEA, RALES AND DRY COUGH. SEVERAL HOURS LATER, CHILLS MAY OCCUR WITH LASTITUDE, MALAISE, FATIGUE, HEADACHE, BACK PAIN, MUSCLE CRAMPS, BLURRED VISION, NAUSEA, FEVER, PERSPIRATION, VOMIING, AND LEUKOCYTOSIS.

ACUTE EFFECTS OF VANADIUM:  
INHALATION:

MAY CAUSE IRRITATION OF THE RESPIRATORY TRACT. VANADIUM COMPOUNDS MAY CAUSE BLEEDING AND ACUTE BRONCHITIS. MAY CAUSE VANADIUM TOXICITY. NO ACUTE HEALTH EFFECTS RECORDED.  
IRRITANT TO SKIN AND MUCOUS MEMBRANES  
IRRITATING EFFECT.

INGESTION:  
SKIN:  
EYES:

CHRONIC AFFECTS:  
INHALATION:

VANADIUM COMPOUNDS MAY CAUSE PNEUMONIA AND OTHER PATHOLOGIC SYMPTOMS (CHRONIC SYMPTOMS OF VANADIUM TOXICITY.)

INGESTION:  
SKIN:  
EYE:  
ROUTES OF EXPOSURE:  
TARGET ORGAN:

NO CHRONIC HEALTH EFFECTS RECORDED.  
MAY CAUSE DERMATITIS.  
MAY CAUSE CONJUNCTIVITIS  
INHALATION, INGESTION, SKIN, EYE.  
MAY AFFECT THE KIDNEYS, RESPIRATORY SYSTEM, SKIN AND EYES

ACUTE AND CHRONIC EFFECTS  
OF ZINC:

INHALATION: IRRITATION OF UPPER RESPIRATORY TRACT, HEADACHE, NAUSEA, VOMITING, DIARRHEA, CHILLS, FEVER, ACHING MUSCLES.

INGESTION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL IRRITATION.

SKIN: PROLONGED CONTACT MAY CAUSE DERMATITIS.

EYE: POWDER IS IRRITATING TO EYES.

TARGET ORGANS: RESPIRATORY SYSTEM, LUNGS, SKIN CONTACT, EYE CONTACT.

GENERALLY AGGRAVATED  
BY EXPOSURE:  
CARCINOGENICITY:

PREEXISTING RESPIRATORY DISORDERS

NTP: NO  
IARC: NO  
OSHA: NO

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#### 6. STABILITY

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STABILITY: STABLE

CONDITION TO AVOID: NONE

NCOMPATIBILITY  
(MATERIAL TO AVOID): ALUMINUM, HEXACHLOROETHANE, CHLORINATED RUBBER, LINSEED OIL, MAGNESIUM, ACIDS, OXIDIZING AGENTS, ALKALI METALS, HALOGENS, INTERHALOGENS

HAZARDOUS  
DECOMPOSITION PRODUCTS: ZINC, VANADIUM OXIDE

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.

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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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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

CARCINOGENICITY: NO

TERATOCITY: N/A

VANADIUM ANIMALS: NUTRITIONAL AND GROSS METABOLIC – WEIGHT LOSS OR DECREASED WEIGHT GAIN  
TUMORIGENIC – EQUIVOCAL TUMORIGENIC AGENT  
TUMORIGENIC – TUMORS AT SITE OF APPLICATION

CARCINOGENICITY: NO CLASSIFICATION DATA ON CARCINOGENIC PROPERTIES OF THIS MATERIAL IS AVAILABLE FROM THE EPA, IARC, NTP, OSHA, OR ACGIH.

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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Zn, POWDER IS D.O.T. REGULATED

HAZARD CLASS: 4.3+4.2

ADR/RID CLASS: 1436 ZINC POWDER, ENVIRONMENTALLY HAZARDOUS

IMDG CLASS: 9

AIR TRAN. ICAO/IATA CLASS: 9

UN NUMBER: 3077

PROPER SHIPPING NAME: ZINC POWDER

VANADIUM

HAZARD CLASS: 4.1

UN NUMBER: 3089

ADR//RID CLASS:	4.1 (F3) FLAMMABLE SOLIDS, SELF-REACTIVE SUBSTANCES AND SOLID DESNSITIZED EXPLOSIVES
IMDG CLASS:	4.1
ICAO/IATA CLASS:	4.1
PACKING GROUP:	II
PROPER SHIPPING NAME:	METAL POWDER, FLAMMABLE, N.O.S.

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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.

