

SAFETY DATA SHEET



CROWN ALLOYS COMPANY

Section 1 – PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Tin-Zinc-Lead Alloy for Cast Iron
PRODUCT IDENTIFICATION: ROYAL 108
RECOMMENDED USE: TS (Torch Soldering)
SPECIFICATION: N/A
SUPPLIER: Crown Alloys Company
30105 Stephenson Hwy.
Madison Heights, MI. 48071
TELEPHONE NUMBER: (248) 588-3790
EMERGENCY NUMBER: Call CHEMTREC Day or Night 1-800-424-9300 / +1 703-527-3887
WEBSITE: www.crownalloys.com

Section 2 – HAZARDS IDENTIFICATION

2.1 Classification of the mixture

This product is placed on the market in solid form

2.1.1 Classification in accordance with GHS-US

Acute Tox. 4 (Oral)	H302	Carc. 1B	H350
Skin Sens. 1	H317	Carc. 2	H351
Resp. Sens. 1B	H334	Repr. Tox. 2	H361
Muta. 1	H340	STOT RE 2	H373
Muta. 2	H341	Aquatic Chronic 4	H413

2.2 Label elements

GHS-US labelling

Hazard Pictograms (GHS-US):



GHS07



GHS08



GHS09

Signal word (GHS-US): Danger
Hazard-determining components of labeling: LEAD (Pb)

Hazard statements (GHS-US):

- H302 – Harmful if swallowed
- H317 – May cause an allergic skin reaction
- H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H340 – May cause genetic defects
- H341 – Suspected of causing genetic defects
- H350 – May cause cancer
- H351 – Suspected of causing cancer
- H361 – Suspected of damaging fertility or the unborn child
- H373 – May cause damage to organs through prolonged or repeated exposure
- H413 – May cause long lasting harmful effects to aquatic life

Precautionary statements (GHS-US):

- P202 – Do not handle until all safety precautions have been read and understood
- P260 – Do not breathe dust/fume/gas/mist/vapors/spray
- P263 – Avoid contact during pregnancy/while nursing
- P264 – Wash thoroughly after handling
- P270 – Do not eat, drink or smoke when using this product
- P271 – Use only outdoors or in a well-ventilated area
- P272 – Contaminated work clothing should not be allowed out of the workplace
- P273 – Avoid release to the environment
- P280 – Wear protective gloves/protective clothing/eye protection/face protection
- P302+P352 – IF ON SKIN: Wash thoroughly with soap and water to remove any Residue. If a rash develops, call a physician.
- P304+P340 – IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call physician; advise of chemical composition (section 3)
- P305+P351+P338 – IF IN EYES: Flush with water for at least 15 minutes to remove irritant. Remove contact lenses, if present and easy to do. Continue rinsing. Consult a physician.
- P312 – Call a POISON CENTER or physician if you feel unwell
- P314 – Get medical advice and attention if you feel unwell
- P391 – Collect spillage
- P403+P233 – Store in a well-ventilated place. Keep container tightly closed
- P501- Dispose of contents/container in accordance with local / regional / national / international regulations
- P405 – Store locked up

2.3 Other hazards

No additional information available

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2.4 Unknown acute toxicity (GHS-US)

No data available

Other hazards which do not result in GHS classification:

Heat rays (infrared radiation) from flame or hot metal can injure eyes.
 Overexposure to brazing fumes and gases can be hazardous.
 Read and understand the manufacturer's instructions, Safety Data Sheets and the precautionary labels before using these alloys. Refer to Section 8.

Section 3 – COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Not applicable

Full text of H-phrases: See section 16

3.2 Mixture

Reportable Hazardous Ingredients

Chemical Identity	CAS-No.	Weight Percent (%)	GHS-US Classification
Lead (Pb)*	7439-92-1	40.0 – 60.0	Acute Tox. 4; Carc. 2; Repr. 2; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H351, H361, H373, H410
Tin (Sn)	7440-31-5	20.0 – 40.0	Not classified
Zinc (Zn)	7440-66-6	10.0 – 30.0	Not classified

*The OSHA standard limit for occupational exposure to lead as referenced in CFR Title 29, Part 1910.1025 is 50.0 µg/m³ (micrograms/cubic meter) based on an eight hour time-weighted average. This standard states that, when the air of work-rooms contains regularly not more than 50.0 µg (micrograms) of inorganic lead and its inorganic compounds per cubic meter of air, as measured by prescribed methods, cases of lead intoxication will not occur.

No other hazardous material is present in concentrations greater than 1% (0.1% for carcinogens)

CAUTION!! ROYAL 108 contains lead and is by law prohibited for usage on private or public water systems.

Composition Comments: The term "Hazardous Ingredients" should be interpreted as a term defined in Hazard Communication standards and does not necessarily imply the existence of a welding hazard. These alloys may contain additional non-hazardous ingredients or may form additional compounds under the condition of use. Refer to Sections 2 & 8 for more information.

Section 4 – FIRST AID MEASURES

4.1 Description of first aid measures

- Ingestion:** Unlikely due to the form of the product. Avoid hand, clothing, food, and drink contact with metal fume or powder which can cause ingestion of particulate during hand to mouth activities such as drinking, eating, smoking, etc. If ingested, do not induce vomiting. Contact a poison control center. Unless the poison control center advises otherwise, wash out mouth thoroughly with water. If symptoms develop, seek medical attention at once. Advise of chemical composition (Section 3).
- Inhalation:** Move to fresh air if breathing is difficult. If not breathing, perform artificial respiration. Seek medical assistance immediately. Advise of chemical composition (Section 3).
- Skin Contact:** Flush with soap and water for at least 15 minutes. For reddened or blistered skin, or thermal burns, obtain medical assistance.
- Eye Contact:** Flush with clean, tepid water for at least 15 minutes to remove irritant. Remove contact lenses, if present and easy to do. Continue rinsing. Consult a physician.

4.2 Most important symptoms/effects, acute and delayed

- Special brazing hazards:** Brazing/soldering hazards are complex and may include physical and health hazards such as but not limited to infrared radiation from flame or hot metal, physical strains, thermal burns due to hot metal or spatter and potential health effects of overexposure to brazing fume or dust. Refer to Section 11 for more information.
- Symptoms/injuries after inhalation:** Short-term (acute) overexposure to the gases, fumes, and dusts may include irritation of the eyes, lungs, nose, and throat. Some toxic gases associated with welding (usually not brazing/soldering) may cause pulmonary edema, asphyxiation, and death.
 Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty in breathing, frequent coughing, or chest pain.
- Symptoms/injuries after skin contact:** Dusts may cause irritation.
- Symptoms/injuries after eye contact:** Causes eye irritation.
- Symptoms/injuries after ingestion:** Not an anticipated route of exposure during normal product handling. May be harmful if ingested.

4.3 Indication of immediate medical attention and special treatment needed

No additional information available

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Section 5 – FIRE-FIGHTING MEASURES

General Fire Hazards: *As shipped*, this product is nonflammable. However, infrared radiation from flame or hot metal can ignite combustibles and flammable products. Read and understand American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" and National Fire Protection Association NFPA 51B, "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" before using this product.

5.1 Extinguishing media

Suitable extinguishing media: CO₂ or dry chemical extinguisher.

Unsuitable extinguishing media: Do NOT use water on molten metal: Large fires may be flooded with water from a distance.

5.2 Special hazards arising from the substance

Fire/explosion hazard:

- Lead and its decomposition products are hazardous to health. Fire-fighters should not enter an area in which a fire involves these products without wearing specialized protective equipment suitable for potential Lead exposure. Normal fire-fighter bunker gear is not adequate to protect against exposure to Lead and its decomposition products. A full-body, encapsulating chemical resistant suit with positive-pressure Self-Contained Breathing Apparatus may be necessary. If possible, prevent run-off water from entering storm drains, bodies of water or other environmentally sensitive areas.
- NOTE: When overheated, lead fumes are toxic. Never exceed 500°C.
- Never drop water or liquids onto molten solder.
- Do not plunge damp or wet solder bars/pieces into molten solder.
- Flame will trace fine zinc dust. Product of combustion is ZnO.
- Finely divided dust may form explosive mixture with air.

5.3 Special protective equipment and precautions for firefighters

Special firefighting procedures: Use NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing if involved in a fire.

Special protective equipment for firefighters: Firefighters should wear full protective gear.

Section 6 – ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If airborne dust and/or fume is present, use adequate engineering controls and, if needed, personal protection to prevent overexposure. Refer to recommendations in Section 8.

6.2 Environmental precautions

Avoid release to the environment

6.3 Methods and material for containment and cleaning up

Clean up spills immediately, observing precautions in the personal protective equipment in Section 8. Avoid generating dust. Vacuuming is recommended for accumulated metal dust from saw/grind operations. Prevent product from entering any drains, sewers or water sources. Refer to Section 13 for proper disposal. Solder is solid/recyclable. Attempt to reclaim the product if possible.

Section 7 – HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhaling brazing/soldering fumes. Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Read and understand the manufacturer's instruction and the precautionary label on the product. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, <http://pubs.aws.org> and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, www.gpo.gov.

Do not eat, drink or smoke when using the product. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Cosmetics should not be applied in areas where exposures exist! Routinely wash work clothing and protective equipment to remove contaminants.

Wet or moist solder bar(s) will present an explosion hazard when submerged in molten solder. Always preheat bar/ingot before charging into furnace.

7.2 Conditions for safe storage, including any incompatibilities

Store in closed original container in a dry place at ambient temperature. Store away from incompatible materials. Store in accordance with local/regional/national regulations.

7.3 Specific end use(s)

For welding/brazing/soldering consumables and related products

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Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Chemical Identity (CAS-No.)	ACGIH TLV (TWA)	OSHA PEL (TWA)	NIOSH REL	NIOSH STEL
Lead (7439-92-1)	0.05 mg/m ³	50 µg/m ³	N/A	N/A
Tin (7440-31-5)	2.0 mg/m ³	2.0 mg/m ³	2.0 mg/m ³	N/A
Zinc (7440-66-6)	2.0 mg/m ³ (respirable oxide dust)	5.0 mg/m ³ (oxide fume) 15.0 mg/m ³ (total oxide dust) 5.0 mg/m ³ (respirable oxide dust)	N/A	10.0 mg/m ³

8.2 Exposure controls

Appropriate Engineering Controls:

Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone & the general area. Maintain exposures below acceptable exposure levels (see Section 8.1). Use industrial hygiene air monitoring to ensure that your use of these products does not create exposures that exceed the recommended exposure limits. Always use exhaust ventilation in user operations such as high temperature cutting, grinding, welding and brazing. Train the welder to keep his head out of the fume plume. Confined spaces require adequate ventilation and/or air supplied respirators. Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, Safety in Welding, Cutting, and Allied Processes, published by the American Welding Society, 8669 Doral Blvd. Suite 130, Doral, FL 33166 and OSHA Publication 2206 (29CFR1910), US Government Printing Office, Washington, D.C. 20402 for more details on many of the following.

General information:

Exposure Guidelines: Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) are values published by the American Conference of Government Industrial Hygienists (ACGIH). ACGIH Statement of Positions Regarding the TLVs® and BEIs® states that the TLV-TWA should be used as a guide in the control of health hazards and should not be used to indicate a fine line between safe and dangerous exposures. See Section 10 for information on potential fume constituents of health interest. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists.

Eye/face protection:

Wear helmet or use face shield with filter lens of appropriate shade number. Shield others by providing screens and flash goggles.

Skin/Hand Protection:

Wear protective gloves. Suitable gloves can be recommended by the glove supplier.

Protective Clothing:

Wear hand, head, and body protection which help to prevent injury from radiation, sparks, flame and electrical shock. See Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Wear dry gloves free of holes or split seams. Train the welder not to permit electrically live parts or electrodes to contact skin . . . or clothing or gloves if they are wet. Insulate yourself from the work piece and ground using dry plywood, rubber mats or other dry insulation.

Respiratory Protection:

Keep your head out of fumes. Use enough ventilation and local exhaust to keep fumes and gases from your breathing zone and the general area. An approved respirator should be used unless exposure assessments are below applicable exposure limits. Use respirable fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV's (see Section 8.1). Use only NIOSH approved respirators in accordance with 29 CFR 1910.134 – Respiratory Protection. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

Hygiene measures:

Do not eat, drink or smoke when using the product. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Cosmetics should not be applied in areas where exposures exist! Routinely wash work clothing and protective equipment to remove contaminants.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, www.aws.org.

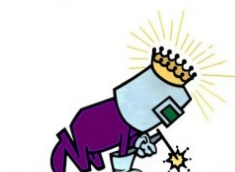
Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Physical state	Solid
Form	Rods of various shapes and sizes
Color	Silver-gray metallic
Odor	Odorless
Density	.3353 lb/cu in. or 9.281 g/ml
Melting point	350-550°F (177-288°C)
Flammability (solid, gas)	No data available
Flash Point	Not determined

Evaporation rate	Not applicable
Boiling point	No data available
Specific gravity	No data available
Vapor pressure (mm Hg)	LEAD ONLY: Health effects ONLY >500°C
Vapor density	Not applicable
Solubility in water	None (solid)
Solubility (other)	No data available
Partition coefficient	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available

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Section 10 – STABILITY AND REACTIVITY

10.1 Reactivity

This product is non-reactive under normal conditions of use, storage and transport.

10.2 Chemical stability

This product is stable under normal conditions.

10.3 Possibility of hazardous reactions

Will not occur under normal conditions of use, storage, and transportation as shipped.

10.4 Conditions to avoid

Uncontrolled exposure to extreme temperatures and moisture.

10.5 Incompatible materials

Strong acids and strong alkalis.

10.6 Hazardous decomposition products

Welding/brazing fumes and gases can't be classified simply. The composition and quantity of both are dependent upon the metal being welded/brazed and the rods used. Coatings on the metal being welded/brazed (such as paint, plating, or galvanizing), the number of welders, the volume of the work area, the quality and the amount of ventilation, the position of the welder's head with respect to the gas plume, the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities), the process and procedures, as well as the welding/brazing consumables.

When this soldering alloy is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 3, plus those from the base metal, coatings, etc., as noted above. Gaseous reaction products may include carbon monoxide and carbon dioxide. Reasonably expected fume constituents of this soldering alloy would include: Complex oxides of lead, tin, zinc, carbon dioxide, carbon monoxide, ozone and nitrogen oxides. The fume limit for lead, tin and/or zinc may be reached before the general welding fume limit of 5 mg/m³ is reached. One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes" and "Characterization of Arc Welding Fume" available from the American Welding Society, 8669 Doral Blvd. Suite 130, Doral, FL 33166.

Section 11 – TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

- Ingestion:** Health injuries from ingestion are not known or expected under normal use. However, If particulates or fumes, generated during brazing/soldering operations, are ingested (i.e., through poor hygiene practices), nausea, vomiting, diarrhea, stomach ache, degeneration of blood and liver cells, gastrointestinal bleeding, decreased urine output, listlessness, rapid heartbeat, convulsions, and coma may occur. Ingestion of this product can also result in lead poisoning. Severe **ingestion overexposure** may be fatal.
- Inhalation:** Potential chronic health hazards related to the use of welding/brazing consumables are most applicable to the inhalation route of exposure. Refer to Inhalation statements in this section.
- Skin Contact:** Dusts or fumes of these products may be irritating to contaminated skin.
- Eye contact:** Dusts or fumes of these products may be irritating to contaminated eye.

Symptoms related to the physical, chemical and toxicological characteristics

- Inhalation:** Short-term (acute) overexposure to welding/brazing fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects.

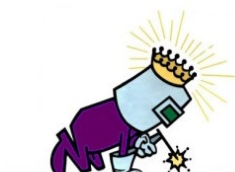
Information on toxicological effects

Acute toxicity (list all possible routes of exposure): Harmful if swallowed

Specified substance: LEAD	Specified substance: TIN	Specified substance: ZINC
Cytogenetic Analysis-Human-Unreported 50 µg/m TClO (Inhalation-Human) = 10 µg/m ³ Gastrointestinal tract effects: LIV TDLo (Oral-Woman) = 450 mg/kg/6years Peripheral nervous system effects: Central nervous system effects	LD50 (oral, rat) = 700 mg/kg	Skin Irritancy (human) = 300µg/3days intermittent; mild TClO (inhalation, human) = 124mg/m ³ 50 minutes; pulmonary system, skin effects

- Repeated dose toxicity (product):** Not classified
- Skin corrosion/irritation (product):** Not classified
- Serious eye damage/irritation (product):** Not classified
- Respiratory or skin sensitization (product):** May cause an allergic skin reaction

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Germ cell mutagenicity (product): Not classified
 • **Germ cell mutagenicity (lead):** Rat Cytogenetic Analysis

Carcinogenicity (product): May cause cancer

Lead (7439-92-1)	
International Agency for Research on Cancer (IARC) Monographs	Lead compounds - 2A (Probably Carcinogenic to Humans)
International Agency for Research on Cancer (IARC) Monographs	Lead metal - 2B (Possibly Carcinogenic to Humans)
National Toxicology Program (NTP) Status	Lead compounds and lead metal – (Reasonably anticipated to be a Human Carcinogen)
American Conference of Governmental Industrial Hygienists (ACGIH)	A3 Carcinogen (Confirmed Animal Carcinogen with Unknown Relevance to Humans)

Reproductive toxicity (product): Not classified

- **Reproductive toxicity (lead):**
 - Suspected human reproductive toxicant
 - Reproductive toxicity - Rat - Inhalation
 - Effects on Newborn: Biochemical and metabolic.
 - Reproductive toxicity - Rat - Oral
 - Effects on Newborn: Behavioral.
 - Reproductive toxicity - Mouse - Oral
 - Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).
 - Developmental Toxicity - Rat - Inhalation
 - Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow).
 - Developmental Toxicity - Rat - Oral
 - Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow). Effects on Newborn: Growth statistics (e.g., reduced weight gain).
 - Developmental Toxicity - Rat - Oral
 - Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.
 - Developmental Toxicity - Mouse - Oral
 - Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Specific target organ toxicity - single exposure (product): May cause drowsiness or dizziness. May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (product): Causes damage to organs through prolonged or repeated exposure

Aspiration hazard (product): Not classified

Other Effects: Organic polymers may be used in the manufacture of various welding/brazing consumables. Overexposure to their decomposition byproducts may result in a condition known as polymer fume fever. Polymer fume fever usually occurs within 4 to 8 hours of exposure with the presentation of flu like symptoms, including mild pulmonary irritation with or without an increase in body temperature. Signs of exposure can include an increase in white blood cell count. Resolution of symptoms typically occurs quickly, usually not lasting longer than 48 hours.

Symptoms related to the physical, chemical and toxicological characteristics under the condition of use:

Specified substance: ZINC	Inhalation of dusts and fumes of zinc can cause metal fume fever. Excessive inhalation of zinc oxide fumes may produce symptoms known as "zinc shakes" which are flu-like and usually cease when the individual is removed from the source. Typically metal fume fever begins four to twelve hours after sufficient exposure to freshly formed fumes. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, constipation, dizziness, nausea, vomiting, weakness, fatigue and shortness of breath. The syndrome usually runs its course in 24-48 hours.
Specified substance: LEAD	<p>Acute exposure to high levels of airborne or ingested lead may result lead poisoning. Symptoms of poisoning include headache, fatigue, nausea, metallic taste in the mouth, vomiting, constipation, bloody diarrhea, and harmful effects on the central nervous system.</p> <p>LONG TERM (CHRONIC): Long-term, low-level lead exposure has resulted in harm to the central nervous system and brain function. Symptoms of chronic, low to moderate levels include forgetfulness, irritability, tiredness, headache, fatigue, impotence, decreased libido, dizziness, altered mood states and depression. Symptoms of chronic exposure to moderate to high lead levels include disturbances in hand to eye coordination, reaction times, visual motor performance, mental performance, gradual decrease in visual acuity with slow recovery or possible blindness, changes in hearing ability, and in worse cases, encephalopathy (a progressive degeneration of the brain and its functions). Early symptoms of encephalopathy include dullness, irritability, poor attention span, muscular tremor, headache, and loss of memory and hallucinations. Severe, chronic exposure to lead at high concentration can result in symptoms on the central nervous system, including delirium, lack of coordination, convulsions, paralysis, coma and death. Exposure to lead can also result in significant adverse results on the peripheral nervous system, including harm to nerves in hands, legs and feet. These effects can be reversible if exposure is short term (5 months or less) and treatment is received; if not, these effects can become permanent. A syndrome known as "Lead Palsy" can occur, with symptoms such as weakness of legs or arms, weakness and paralysis of the wrist, fingers and ankles. At lower exposure levels decreased hand dexterity has been reported. At higher exposure levels an inability to hold the foot or hand in extended position can occur. Exposure to lead can also cause adverse effects on the gastrointestinal system, including loss of appetite, inflammation of the stomach walls (gastritis), colic, severe abdominal pain, cramps, nausea, vomiting, constipation, anorexia, weight loss and decreased urination. In severe cases of lead poisoning, a deposit of lead occurs in the gums near the base of the teeth, resulting in a visible blue-gray line. Reversible kidney injury has been observed in some cases of workers exposed to lead at chronic, low to moderate levels. Death due to kidney failure has occurred to workers chronically exposed to lead at moderate levels. Exposure to lead can cause harmful effects to certain types of blood cells, including reduced hemoglobin production and reduced life-span and function of red blood cells. This harm can cause anemia in workers exposed to moderate levels. Low, moderate and high level exposure to lead may increase blood pressure, especially in men. Some studies have indicated that moderate exposure to lead can result in electrocardiographic abnormalities. There is some evidence that low-level exposure to lead can cause harmful effects on the thyroid and immune systems, including possible susceptibility to colds and flu infections. Exposure to lead, especially at high levels, has resulted in significant adverse effects in the reproductive systems of both men and women.</p>

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Additional toxicological information under the conditions of use:

Acute toxicity

Specified substance: CARBON DIOXIDE LCLo (inhalation, human) = 90000 ppm/5 min.	Specified substance: CARBON MONOXIDE LC50 (inhalation, rat) = 1300 mg/l /4h	Specified substance: NITROGEN DIOXIDE LC50 (inhalation, rat) = 88 ppm/4h Specified substance: OZONE LCLo (inhalation, human) = 50 ppm/30 min.
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Section 12 – ECOLOGICAL INFORMATION

Ecotoxicity

Acute hazards to the aquatic environment:

Fish

Specified substance: ZINC and/or zinc alloys (as Zn) LC50 (Pimephales promelas) [flow-through], 96 h): 2.16 – 3.05 mg/l LC50 (Pimephales promelas) [semi-static], 96 h): 0.211 – 0.269 mg/l	Specified substance: LEAD LC50 (Cyprinus carpio) [semi-static], 96 h): 0.44 mg/l LC50 (Oncorhynchus mykiss) [flow-through], 96 h): 1.17 mg/l Mortality LOEC (Oncorhynchus mykiss (rainbow trout), 96 h): 1.19 mg/l LC50 (Micropterus dolomieu), 96 h): 2.2 mg/l Mortality NOEC (Salvelinus fontinalis), 10 d): 1.7 mg/l
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Aquatic Invertebrates

Specified substance: ZINC and/or zinc alloys (as Zn) EC50 (Pseudokirchneriella subcapitata) [static], 96 h): 0.11 – 0.271 mg/l EC50 (Pseudokirchneriella subcapitata) [static], 72 h): 0.09 – 0.125 mg/l EC50 (Daphnia Magna) [Static], 48 h): 0.139 – 0.908 mg/l	Specified substance: LEAD EC50 (Water flea (Daphnia magna), 48 h): 600 µg/l Mortality LOEC (Water flea (Daphnia magna), 24 h): 0.17 mg/l Mortality NOEC (Water flea (Daphnia magna), 24 h): 0.099 mg/l
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Chronic hazards to the aquatic environment:

- Fish (product):** Not classified
- Aquatic Invertebrates (product):** Not classified

Toxicity to Aquatic Plants

Specified substance: LEAD Mortality EC50 (Skeletonema costatum), 10 d): 7.94 mg/l

Persistence and Degradability

Biodegradation (product): No data available

Bioaccumulative Potential

Bioconcentration Factor (BCF) (product): No data available

Bioaccumulation:

Specified substance: LEAD (Oncorhynchus kisutch) – 2 Weeks – 150 µg/l, Bioconcentration Factor (BCF): 12.0

Mobility in Soil: No data available

Section 13 – DISPOSAL CONSIDERATIONS

Waste disposal recommendations: Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with international/federal/state/local regulations. However, alloy wastes are normally collected to recover metal values.

Section 14 – TRANSPORT INFORMATION

In accordance with DOT / ADR / RID / ADNR / IMDG / ICAO / IATA

14.1 UN number

Not a dangerous good in sense of transport regulations

14.2 UN proper shipping name

Not applicable

14.3 Additional information

Other information: No supplementary information available

Overland transport:

No additional information available

Transport by sea:

No additional information available

Air transport:

No additional information available

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Section 15 – REGULATORY INFORMATION

15.1 US Federal regulations

Lead (7439-92-1) Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on SARA Section 313 (Specific toxic chemical listings) SARA Section 313 – Emission Reporting: 0.1%	Zinc (7440-66-6) Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on SARA Section 313 (Specific toxic chemical listings) SARA Section 313 - Emission Reporting: 1.0 % (dust or fume only)
Tin (7440-31-5) Listed on the United States TSCA (Toxic Substances Control Act) inventory	

15.2 US State regulations

Lead (7439-92-1)				
U.S. - California - Proposition 65 - Carcinogens List YES	U.S. - California - Proposition 65 - Developmental Toxicity YES	U.S. - California - Proposition 65 - Reproductive Toxicity – Female YES	U.S. - California - Proposition 65 - Reproductive Toxicity – Male YES	No significance risk level (NSRL)
U.S. - Massachusetts - Right To Know List U.S. - Minnesota - Hazardous Substance List		U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List		
Tin (7440-31-5)		Zinc (7440-66-6)		
U.S. - Massachusetts - Right To Know List U.S. - Minnesota - Hazardous Substance List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List		U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List		

Section 16 – OTHER INFORMATION

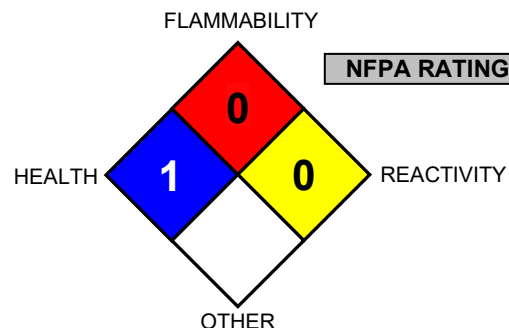
SUPERSEDES LAST REVISION: 03/15/2018 (SDS)

HMIS RATING (Hazardous Materials Information System)			
Health (blue) - 1	Flammability (red) - 0	Reactivity (yellow) - 0	Protective Equipment - X (See Sections 4, 8 & 10)

Health Hazard: 1 (slight acute or chronic exposure hazard) **Flammability Hazard:** 0 (minimal hazard) **Reactivity Hazard:** 0 (normally stable)

NATIONAL FIRE PROTECTION ASSOCIATION:

Health Hazard: 0 (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); 1 (materials that on exposure under fire conditions could cause irritation or minor residual injury); 2 (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); 3 (materials that can on short exposure cause serious temporary or residual injury); 4 (materials that under very short exposure causes death or major residual injury).
Flammability Hazard: Refer to definitions for "HMIS RATING"
Reactivity Hazard: Refer to definitions for "HMIS RATING"



DEFINITIONS OF TERMS

- ACGIH** - American Conference of Governmental Industrial Hygienists
- CAS No.** - Chemical Abstracts Service Number
- EPA** - Environmental Protection Agency
- GHS** - Globally Harmonized System
- IARC** - International Agency for Research on Cancer
- LC50** - Lethal Concentration (50 percent kill)
- LCLO** - Lowest published lethal concentration
- LD50** - Lethal dose (50 percent kill)
- LDLO** - Lowest published lethal dose
- NIOSH** - National Institute of Occupational Safety and Health

- NTP** - National Toxicology Program
- OSHA** - U.S. Occupational Safety and Health Administration
- PEL** - Permissible Exposure Limit
- SARA** - Superfund Amendments and Reauthorization Act
- STEL** - Short Term Exposure Limit
- TCLo** - the lowest concentration to cause a symptom
- TDLo** - the lowest dose to cause a symptom
- TLV** - Threshold Limit Value
- TSCA** - Toxic Substances Control Act
- TWA** - Time Weighted Average

Full text of H-phrases (from Section 2)

Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4	H302	Harmful if swallowed
Skin Sens. 1	Sensitisation — Skin, category 1	H317	May cause an allergic skin reaction
Resp. Sens. 1B	Respiratory Sensitiser, Sub-Category 1B	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
Muta. 1	Germ cell mutagenicity, Category 1	H340	May cause genetic defects
Muta. 2	Germ cell mutagenicity, Category 2	H341	Suspected of causing genetic defects
Carc. 1B	Carcinogenicity, Category 1B	H350	May cause cancer
Carc. 2	Carcinogenicity, Category 2	H351	Suspected of causing cancer
Repr. Tox. 2	Reproductive toxicity, Category 2	H361	Suspected of damaging fertility or the unborn child
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2	H373	May cause damage to organs through prolonged or repeated exposure
Aquatic Chronic 1	Hazardous to the aquatic environment — Chronic Hazard, Category 1	H410	Very toxic to aquatic life with long lasting effects
Aquatic Chronic 4	Hazardous to the aquatic environment — Chronic Hazard, Category 4	H413	May cause long lasting harmful effects to aquatic life

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