

CROWN ALLOYS COMPANY

MATERIAL SAFETY DATA SHEET

Section 1 - COMPANY AND MATERIAL IDENTIFICATION

PRODUCT TYPE: Galvanizing solder (S).

TRADE NAME: ROYAL GALV-BAR 70

SPECIFICATION: N/A

CLASSIFICATION: N/A

VENDOR: Crown Alloys Company

ADDRESS: 30105 Stephenson Hwy.
Madison Heights, MI. 48071

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Section 2 - HAZARDOUS INGREDIENTS

IMPORTANT! This section covers the material from which these products are manufactured. The fumes and gases produced when welding with normal use of these products are covered in Section 5 & 6.

Ingredient	CAS No.	OSHA – TWA PEL,mg/m ³	(ACGIH – TWA) ² TLV,mg/m ³	IDLH ¹ mg/m ³	Wt. %
Lead*	7439-92-1	0.05 (Dust & Fume)	0.15 (Dust & Fume)	NE	40.0 – 60.0
Tin	7440-31-5	2.0	2.0	100	20.0 – 40.0
Zinc	7440-66-6	5.0 (Fume), 5.0 (Total Dust) 15.0 (Dust, Respirable Dust) 5 (Dust, Respirable Dust, Vacated 1989 PEL) 10 Fume (STEL, Vacated 1989 PEL)	5.0 Fume 10.0 Dust 10.0 Fume (STEL)	500	10.0 – 30.0

***The OSHA standard limit for occupational exposure to lead as referenced in CFR Title 29, Part 1910.1025 is 50 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 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. CAUTION!! The ROYAL GALV-BAR 70 contains lead and is by law prohibited for usage on private or public water systems.**

¹Immediately Dangerous to Life and Health – This level represents a concentration from which one can escape within 30 minutes without suffering escape-preventing or permanent injury.

NE – Not Established

Single values shown are maximum.

NIOSH classifies welding fumes as carcinogens.

²The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. That Threshold Limit Value is 5 mg/m³.

Section 3 - PHYSICAL and CHEMICAL CHARACTERISTICS

APPEARANCE AND COLOR: Lustrous, silver metal. No odor.

SPECIFIC GRAVITY @ 20°C (water = 1): .2661 lbs./in.³

SOLUBILITY IN WATER: Insoluble

EVAPORATION RATE (Butyl Acetate = 1): N/A

VAPOR PRESSURE: (mm Hg): LEAD ONLY: Health Effects ONLY > 500°C **VAPOR DENSITY (AIR = 1):** N/A

FREEZING/MELTING RANGE: 350-550°F (177-88°C)

BOILING POINT @ 24 mm Hg: No Applicable Information Found

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Section 4 - FIRE and EXPLOSION HAZARD DATA

FLAMMABLE PROPERTIES: Non-flammable as *shipped*. Brazing flame, welding arc and sparks can ignite combustibles and flammables. Refer to American National Standard Z49.1 "Safety in Welding and Cutting" and "Safe Practices" Code: SP, published by the American Welding Society for fire prevention during the use of welding, brazing and allied procedures.

FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): Not Applicable Upper (UEL): Not Applicable

FLASH POINT: N/A

AUTOIGNITION TEMPERATURE: N/A

FIRE EXTINGUISHING MATERIALS: Water Spray: YES (Large fires may be flooded with water from a distance!) Carbon Dioxide: YES / Dry Chemical: YES

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this product may generate irritating fumes and a variety of metal compounds. The molten material can present a significant thermal hazard to firefighters. Finely divided dust may form an explosive mixture with air.

NEVER DROP WATER OR LIQUIDS INTO MOLTEN SOLDER! DO NOT PLUNGE DAMP OR WET SOLDER PIECES INTO MOLTEN SOLDER!

SPECIAL FIRE-FIGHTING PROCEDURES: 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.

Section 5 - STABILITY AND REACTIVITY DATA

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Uncontrolled exposure to extreme temperatures and incompatible materials.

DECOMPOSITION PRODUCTS: Thermal decomposition products can include zinc oxides, tin oxides, and lead oxide.

MATERIALS WITH WHICH THESE ALLOYS IS INCOMPATIBLE: Strong acids, strong alkalis.

Hazardous Decomposition Products

Brazing/soldering fumes and gases can not be classified simply. The composition and quantity of both are dependent upon the metal being soldered/brazed and the rods used. Coatings on the metal being soldered/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 soldering/brazing consumables.

When this soldering/brazing alloy is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 2. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 2, plus those from the base metal, coatings, etc., as noted above. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from an arc, in addition to the shielding gases like argon and helium, whenever they are employed.

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, 550 N.W. LeJeune Road, Miami, FL 33126.

Reasonably expected decomposition products from normal use of this product includes a **complex of the oxides of the materials listed in Section 2, as well as carbon monoxide, carbon dioxide, ozone (TLV 0.1 ppm ceiling and PEL 0.1 ppm), nitric oxide (TLV 25 ppm and PEL 25 ppm) and nitrogen dioxide (TLV 3, 5 ppm STEL and PEL 5 ppm ceiling). The fume limit for tin, zinc or lead may be reached before the general limit for welding fumes (TLV 5 mg/m³) is reached.**

Section 6 - HEALTH HAZARD DATA

- **Medical conditions aggravated by exposure to this product:** Skin, respiratory, blood, central nervous system and peripheral system, and kidney disorders, may be aggravated by prolonged over-exposures to the dusts or fumes generated by this product.
- **EYES:** Contact with the rod form of this product can be physically damaging to the eye (i.e., foreign object). Fumes generated during brazing/soldering operations can be irritating to the eyes. Contact with the molten metal will burn the contaminated eyes.
- **SKIN:** Contact of the rod form of this product with the skin is not anticipated to be irritating. Fumes generated during brazing/ soldering operations can be irritating to the skin. Symptoms of skin *overexposure* may include irritation and redness. Prolonged or repeated skin *overexposure* may lead to allergic contact dermatitis. Contact with molten metal will burn contaminated skin. Skin absorption is not known to be a significant route of *overexposure* for any component of this product.
- **INGESTION:** 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.

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Section 6 - HEALTH HAZARD DATA (continued)

- **INHALATION:** During brazing and soldering operations, the most significant route of overexposure is via inhalation of fumes. Some of the health effects are listed below:
 - **SHORT TERM (ACUTE):** Inhalation of large amounts of particulates generated by this product during metal processing operations may be physically irritating and cause deposits of dust in nasal passages.
 - *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.
 - 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.
 - Elemental **tin** is NOT generally considered to be toxic.
 - **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.

Section 7 - PRECAUTIONS FOR SAFE HANDLING & USE/APPLICABLE

CONTROL MEASURES

VENTILATION AND ENGINEERING CONTROLS: Maintain exposures below the acceptable exposure levels (see Section 2). Use industrial hygiene air monitoring to ensure that your use of this product does not create exposures that exceed the recommended exposure limits. Always use exhaust ventilation in user operations such as high temperature cutting, grinding, welding, brazing and soldering. 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, 550 N.W. LeJeune Road, Miami, FL 33126 and OSHA Publication 2206 (29CFR1910), US Government Printing Office, Washington, D.C. 20402 for more details on many of the following.

RESPIRATORY PROTECTION: 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 2). 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).

LEAD CONCENTRATION

Up to 0.5 mg/m³;
Up to 1.25 mg/m³;

Up to 2.5 mg/m³;

Up to 50 mg/m³;
Up to 100 mg/m³;

RESPIRATORY PROTECTION

Any Air-Purifying Respirator with a high-efficiency particulate filter, or any Supplied-Air Respirator (SAR). Any SAR operated in a continuous-flow mode, or any powered, air-purifying respirator with a high-efficiency particulate filter.

Any Air-Purifying, Full-Facepiece Respirator with a high-efficiency particulate filter, or any SAR that has a tight-fitting facepiece and is operated in a continuous-flow mode, or any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter, or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece, or any SAR with a full facepiece.

Any SAR operated in a pressure-demand or other positive-pressure mode.

Any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

FOR MAXIMUM SAFETY, BE CERTIFIED FOR AND WEAR A RESPIRATOR AT ALL TIMES WHEN WELDING OR BRAZING!

EYE PROTECTION: Ensure eyewash/safety shower stations are available near areas where these products are used. Wear safety glasses, goggles or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, “Safety in Welding and Cutting”).

PROTECTIVE CLOTHING: Protective gloves are recommended especially for high temperature applications to prevent burns.

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash hands after handling this product. Do not eat or drink while handling this product. Do not smoke or apply cosmetics in areas where exposures exist.

WASTE DISPOSAL METHOD: Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

AVOID FIRE RISKS: Always preheat ingot before charging into furnace.

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Section 8 - FIRST AID MEASURES

- **EYE EXPOSURE:** Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician.
- **SKIN EXPOSURE:** Wash thoroughly with soap and water. Consult a physician if irritation persists.
- **INHALATION EXPOSURE:** Remove to fresh air. Check for clear airway, breathing and presence of pulse. Provide CPR for persons without pulse or respirations. Consult a physician immediately. Advise of chemical composition (section 2).
- **INGESTION EXPOSURE:** Ingestion is not a likely route of exposure for these rods. DO NOT INDUCE VOMITING, unless directed by medical personnel. Have victim rinse mouth with water, if conscious. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. Advise physician of chemical composition (section 2).
- **RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate overexposure.

Section 9 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Presented below are human toxicological data available for the components of these products present in concentration greater than 1%. Other data for animals are available for the components of these products, but are not presented in this MSDS.

<p>LEAD: Cytogenetic Analysis-Human-Unreported 50 µg/m TCLo (Inhalation-Human) = 10 µg/m³ Gastrointestinal tract effects: LIV TDLo (Oral-Woman) = 450 mg/kg/6years Peripheral nervous system effects: Central nervous system effects</p>	<p>ZINC: Skin Irritancy (human)=300µg/3days intermittent; mild ZINC: TCLo (inhalation, human)=124mg/m³ 50 minutes; pulmonary system, skin effects</p>
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- **SUSPECTED CANCER AGENT:** Components of these products are listed as follows:
 - **Zinc:** EPA-D (Not Classifiable as to Human Carcinogenicity – inadequate human and animal evidence of carcinogenicity or no data available.
 - **Lead:** ACGIH TLV-A3 (Confirmed Animal Carcinogen), EPA-B2 (Probable Human Carcinogen – Sufficient Evidence from Animal Studies; inadequate evidence or no data from epidemiologic studies; IARC-2B (Possibly Carcinogenic to Humans)
- The other components of these products are not found on the following lists: FEDERAL, OSHA Z LIST, NTP, IARC and CAL/OSHA and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

Section 10 – REGULATORY INFORMATION

U.S. SARA REPORTING REQUIREMENTS: The components of these products are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Lead	No	YES	YES
Zinc	No	Yes	Yes (fume or dust)

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of these products. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.

OTHER U.S. FEDERAL REGULATIONS: LEAD: EPA: Lead is listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all air emission sources that emit one or more of the listed pollutants. Lead is included on this list. Lead is designated as a toxic pollutant, pursuant to Section 307(a)(1) of the Clean Water Act and is subject to effluent limitations. Lead is designated as a hazardous substance under Section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of Lead.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The Lead component of this product is on the California Proposition 65 Lists. **WARNING: This product contains a chemical that is known to the State of California to cause cancer and reproductive harm. In addition, this product, when used for soldering may produce fumes or gases containing chemicals, known to the State of California to cause cancer, and/or birth defects (or other reproductive harm.)**

Section 11 – DEFINITIONS OF TERMS

CAS No. - Chemical Abstracts Service Number PEL - Permissible Exposure Level TLV - Threshold Limit Value
TWA - Time Weighted Average STEL - Short Term Exposure Limit IARC – International Agency for Research on Cancer
NIOSH – National Institute of Occupational Safety and Health OSHA – U.S. Occupational Safety and Health Administration
TDLo – the lowest dose to cause a symptom TCLo – the lowest concentration to cause a symptom
TDo, LDLo, and LDo, or TC, TCo, LCLo, and LCo – the lowest dose (or concentration) to cause lethal or toxic effects.
SARA – Superfund Amendments and Reauthorization Act ACGIH – American Conference of Governmental Industrial Hygienists
LD₅₀ & LC₅₀ – These values are the amount of a substance given to the stated species that causes 50% of that species to die.

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