

CROWN ALLOYS COMPANY

MATERIAL SAFETY DATA SHEET

Section 1 - COMPANY AND MATERIAL IDENTIFICATION

PRODUCT TYPE: Low melting solder (S) for aluminum.

TRADE NAME: ROYAL 133

SPECIFICATION: N/A

CLASSIFICATION: N/A

VENDOR: Crown Alloys Company

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

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CHEMTREC (800) 424-9300

WEBSITE: www.crownalloys.com

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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.%
Tin	7440-31-5	2.0	2.0	100	50.0 – 70.0
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	30.0 – 50.0

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.

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.

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Section 3 - PHYSICAL and CHEMICAL CHARACTERISTICS

APPEARANCE AND COLOR:

- Lustrous, silver metal. No odor.

SPECIFIC GRAVITY @ 20°C (water = 1): .2633 lbs./in.³ **FREEZING/MELTING RANGE:** 390-650°F (198-343°C)

SOLUBILITY IN WATER: Insoluble **BOILING POINT @ 24 mm Hg:** Sn @ 4120°F (2270°C)

VAPOR PRESSURE: (mm Hg): N/A Zn @ 1665°F (907°C)

VAPOR DENSITY (AIR = 1): N/A

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

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: Not Flammable

AUTOIGNITION TEMPERATURE: Not Flammable

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: Structural firefighters must wear NIOSH/MSHA approved Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. If possible, prevent run-off water from entering storm drains, bodies of water or other environmentally sensitive areas.

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, and a variety of metal oxides.

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 these soldering/brazing alloys are 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 these products include 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 or zinc may be reached before the general limit for welding fumes (TLV 5 mg/m³) is reached.**

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Section 6 - HEALTH HAZARD DATA

- **Medical conditions aggravated by exposure to this product:** Skin, respiratory, pancreas, kidney and liver disorders may be aggravated by prolonged *overexposure* to the dusts or fumes generated by these products.
- **EYES:** Contact with the rod form of these products 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 these products 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. *Severe ingestion overexposure* may be fatal.
- **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. 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, 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):** It is unlikely that *normal* exposure (USING APPROPRIATE PROTECTIVE EQUIPMENT) to this solder would result in illness.

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).

NIOSH/OSHA respiratory protection recommendations for zinc oxide concentrations in air:

Up to 50 mg/m ³	Dust, mist and fume respirator or SAR.
Up to 125 mg/m ³	Powered air-purifying respirators with dust, mist and fume filter(s) or SAR operated in a continuous flow mode.
Up to 250 mg/m ³	Full-facepiece air-purifying respirator with high-efficiency particulate filter(s), powered air-purifying respirator with tight fitting facepiece and high efficiency particulate filter(s), SAR with a tight-fitting facepiece operated in a continuous flow mode, full-facepiece SCBA, or full-facepiece SAR.
Up to 500 mg/m ³	Positive pressure SAR.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Positive pressure, full-facepiece SCBA or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
Escape:	Full-facepiece air-purifying respirator with high-efficiency particulate filter(s) or escape-type SCBA.

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.

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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.
- **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.
- **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.

ZINC: TCLo(inhalation,human)=124mg/m ³ 50 minutes; pulmonary system, skin effects	ZINC: SkinIrritancy (human)=300µg/3days intermittent; mild
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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.
- 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)
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.

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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