

SAFETY DATA SHEET



This Safety Data Sheet (SDS) complies with the requirements of the U.S. Federal Occupational Safety and Health Administration Hazard Communication Standard (29 CFR 1910.1200, as updated in 2012) and equivalent state Standards. It has also been developed in accordance with the United Nations Globally Harmonized System of Classification of Chemicals (GHS), and the Canadian Workplace Hazardous Materials Information System (WHMIS). Refer to Section 16 of this document for the definition of terms and abbreviations.

SECTION 1: IDENTIFICATION of the Substance/Mixture and of the Company/Undertaking

1.1 PRODUCT IDENTIFIER:

- PRODUCT NAME: **GOLD SOLDER WITH CADMIUM**

PRODUCT CODES: 1K YELLOW SOFT, 10 GREEN HARD, 10 GREEN SOFT, 10K PINK HARD, 10K PINK SOFT, 10K WHITE HARD, 10K WHITE MEDIUM, 10K WHITE SOFT, 10K YELLOW HARD, 10K YELLOW MEDIUM, 10K YELLOW SOFT, 10K YELLOW SPECIAL, 10K YELLOW SOFT-G, 10 PINK SOFT, 10 WHITE HARD, 10 WHITE MEDIUM, 10 WHITE REPAIR, 10 WHITE SOFT, 10 YELLOW EXTRA SOFT, 10 YELLOW HARD, 10 YELLOW HARD REPAIR, 10 YELLOW MEDIUM, 10 YELLOW REPAIR, 10 YELLOW SOFT, 1 1/2K YELLOW SOFT, 12 GREEN HARD, 12 GREEN SOFT, 12K WHITE EASY, 12K WHITE HARD, 12K WHITE MEDIUM, 12K WHITE SOFT, 12K WHITE SPECIAL, 12K YELLOW HARD, 12K YELLOW HARD SPECIAL, 12K YELLOW MEDIUM, 12K YELLOW SOFT, 12K YELLOW SPECIAL, 12 PINK HARD, 12 PINK SOFT, 12 WHITE HARD, 12 WHITE MEDIUM, 12 WHITE REPAIR, 12 WHITE SOFT, 12 YELLOW HARD, 12 YELLOW MEDIUM, 12 YELLOW REPAIR, 12 YELLOW SOFT, 14 GREEN HARD, 14 GREEN MEDIUM, 14 GREEN REPAIR, 14 GREEN SOFT, 14K GREEN HARD, 14K GREEN MEDIUM, 14K GREEN SOFT, 14K PINK HARD, 14K PINK MEDIUM, 14K PINK SOFT, 14K PINK SPECIAL, 14K WHITE HARD, 14K WHITE MEDIUM, 14K WHITE SOFT, 14K YELLOW EXTRA SOFT, 14K YELLOW HARD, 14K YELLOW MEDIUM, 14K YELLOW SOFT, 14K YELLOW SOFT F (WIRE), 14K YELLOW SPECIAL, 14 PINK HARD, 14 PINK HARD REPAIR, 14 PINK REPAIR, 14 PINK SOFT, 14 WHITE HARD, 14 WHITE HARD REPAIR, 14 WHITE MEDIUM, 14 WHITE REPAIR, 14 WHITE SOFT, 14 YELLOW HARD, 14 YELLOW HARD REPAIR, 14 YELLOW MEDIUM, 14 YELLOW REPAIR, 14 YELLOW SOFT, 14 YELLOW SPECIAL, 16 WHITE MEDIUM, 18 GREEN HARD, 18 GREEN MEDIUM, 18 GREEN REPAIR, 18 GREEN SOFT, 18K GREEN HARD, 18K GREEN MEDIUM, 18K GREEN SOFT, 18K PINK EASY, 18K PINK HARD, 18K PINK MEDIUM, 18K PINK SOFT, 18K WHITE HARD, 18K WHITE MEDIUM, 18K WHITE SOFT, 18K YELLOW HARD, 18K YELLOW MEDIUM, 18K YELLOW SOFT, 18K YELLOW SPECIAL, 18K YELLOW WELD, 18 WHITE HARD, 18 WHITE HARD REPAIR, 18 WHITE MEDIUM, 18 WHITE REPAIR, 18 WHITE SOFT, 18 YELLOW EASY, 18 YELLOW HARD REPAIR, 18 YELLOW REPAIR, 19K WHITE WELD, 19 WHITE WELD 699, 2K YELLOW SOFT, 20K YELLOW HARD, 20K YELLOW MEDIUM, 20K YELLOW SOFT, 20K YELLOW WELD, 22K YELLOW HARD, 22K YELLOW MEDIUM, 22K YELLOW SOFT, 3 YELLOW SOFT, 3/4K YELLOW SOFT, 6K WHITE HARD, 6K WHITE MEDIUM, 6K WHITE SOFT, 6K YELLOW HARD, 6K YELLOW MEDIUM, 6K YELLOW SOFT, 6 WHITE HARD, 6 WHITE REPAIR, 6 WHITE REPAIR HARD, 6 WHITE SOFT, 6 YELLOW HARD, 6 YELLOW MEDIUM, 6 YELLOW REPAIR, 6 YELLOW REPAIR SPECIAL, 6 YELLOW SOFT, 8 GREEN SOFT, 8K WHITE HARD, 8K WHITE SOFT, 8K YELLOW HARD, 8K YELLOW MEDIUM, 8K YELLOW SOFT, 8 PINK SOFT, 8 WHITE HARD, 8 WHITE SOFT, 8 YELLOW EXTRA SOFT, 8 YELLOW HARD, 8 YELLOW MEDIUM, 8 YELLOW REPAIR, 8 YELLOW SOFT, 9K PINK SOFT, 9K YELLOW EXTRA EASY, 9K YELLOW SOFT

1.2 RELEVANT IDENTIFIED USES OF THE MIXTURE OR USES ADVISED AGAINST

- IDENTIFIED USE: Solder or Master Alloy
- USES ADVISED AGAINST: None Specified

1.3 DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

- MANUFACTURER/
SUPPLIER: **KROHN INDUSTRIES, INC.**
- ADDRESS: 303 Veterans Blvd.; Carlstadt, NJ; 07072
- BUSINESS PHONE: 201-933-9696
- EMERGENCY PHONE: 1-800-255-3924 (CHEMTEL; 24 hours)

1.4 OTHER PERTINENT INFORMATION

- This product is used as a solder; it has limited hazards except when heated to the point fumes are emitted. All pertinent hazards related to soldering metals are provided in the pertinent sections of this document (i.e. sections 7, 8, and 11).


SECTION 2: HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

REGULATION	CLASSIFICATION
US OSHA HCS CANADA WHMIS	The product has limited hazards in its original form. When heated to the point fumes are generated, the following Hazard Classifications are applicable: Acute Toxicity – Inhalation (Category 2); Mutagenicity (Category 2); Carcinogenicity (Category 1B); Specific Target Organ Toxicity – Repeated Exposure (Category 1; Inhalation/Kidneys, Lungs)

SECTION 2: HAZARDS IDENTIFICATION (Continued)

- LABEL ELEMENTS:** BASED ON GLOBALLY HARMONIZED SYSTEM



Symbols:
Signal Word: Danger.
Hazard statement(s):

- H330: Fatal if inhaled.
- H341: Suspected of causing genetic effects.
- H350: May cause cancer.
- H370: Causes damage to kidneys and lungs when inhaled.

Precautionary statement(s):

- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P260: Do not breathe dusts or fumes.
- P264: Wash exposed skin thoroughly after handling.
- P270: Do not eat, smoke or drink when using this product.
- P271: Use only outdoors or in a well-ventilated environment.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P284: In case of inadequate ventilation wear respiratory protection.
- P304+340: INHALED: Remove person to fresh air and keep comfortable for breathing. P310: Immediately call a Poison Center/Doctor.
- P308+311: If exposed or concerned: Call a Poison Center/Doctor.
- P403+233: Store in well ventilated place. Keep container tightly closed. P405: Store locked up.
- P501: Dispose of according to local, regional and national waste regulations.

2.2 OTHER PERTINENT DATA ON CHEMICAL AND PHYSICAL HAZARDS:

- HAZARDOUS MATERIALS IDENTIFICATION SYSTEM**

Health	3*	HMIS Personal Protective Equipment Rating: Occupational use (i.e. soldering): B/C; Safety glasses and gloves/ body protection suitable to specific circumstances of use should be considered. *Genetic effects; Cancer hazard; Specific Target Organ Toxicity – Repeated Exposure (Inhalation/Kidneys and Liver): Note – Hazards are associated with fumes of product only. The metal form presents limited hazards when not heated.
Flammability	0	
Physical Hazard	0	
Protective Equipment	B/C	

- CANADIAN REGULATORY STATUS**
 - WHMIS 2015: See Previous Section.

- This SDS contains all the information required by the Hazardous Products Regulations.
- **AQUATIC TOXICITY**
 - This product is classified as Aquatic Toxicity – Acute (Category 1); Aquatic Toxicity – Chronic (Category 1)



Symbol:

Signal Word: Danger.

Hazard statement(s): H410: Very toxic to aquatic life with long lasting effects.

Precautionary statement(s): P273: Avoid release to the environment. P291: Collect spillage. P501: Dispose of according to local, regional and national waste regulations.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 SUBSTANCES/MIXTURES

COMPONENT	CAS NUMBER	GHS HAZARD CLASSIFICATION	% (w/w)
Silver	7440-22-4	In this form: Not classified has hazardous.	5.0 - 45%
Gold	7440-57-5	In this form: Not classified has hazardous.	3.0 – 75%
Zinc	7440-66-6	In this form: Not classified has hazardous.	1.0 -9.0 %
Cadmium	7440-43-9	Acute Toxicity – Inhalation (Category 2); Mutagenicity (Category 2); Carcinogenicity (Category 1B; Specific Target Organ Toxicity – Repeated Exposure (Category 1; Inhalation/Kidneys, Lungs)	3.0 – 22%
Copper	7440-50-8	In this form: Not classified has hazardous.	Balance

SECTION 4: FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES

The following steps should be taken in the event there is exposure to the dusts or fumes of the product:

Eyes: Flush with copious amounts of water for 15 minutes. “Roll” eyes during flush. Seek medical attention if irritation continues. **Skin:** Flush area with warm, running water for 15 minutes. Seek medical attention if irritation persists. **Inhalation:** If dusts of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical advice/assistance promptly. **Ingestion:** Contact a Poison Control Center or physician for instructions. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow.

4.2 MOST IMPORTANT ACUTE AND CHRONIC EXPOSURE SYMPTOMS

- **ACUTE:** The following symptoms may arise in the event there is exposure to dusts or fumes of this product:

AREA EXPOSED

Eye Contact

Can causes eye irritation. Can cause pain and redness upon contact; prolonged contact can be damaging though mechanical irritation.

Skin Contact

May cause skin irritation. May cause pain and redness upon contact through mechanical irritation

Inhalation

This product presents limited inhalation hazards unless heated. Due to the presence of cadmium, inhalation of fumes or dusts of this product may be fatal, and can also irritate the nose, throat and other tissues of the respiratory system.

Ingestion

May be harmful if swallowed. Can cause gastrointestinal system irritation; symptoms may include pain, sore throat, nausea and vomiting.

Molten Solder

Contact with molten material can cause thermal burns.

- **CHRONIC:** Repeated exposure to fumes or dusts via inhalation can cause adverse effects on the lungs and kidneys. See section 11 for information on Metal Fume Fever.
- **TARGET ORGANS:** Via Inhalation: Lung and Kidneys.

4.3 INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

- **RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate exposure.
- **MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** None known for product. Inhalation of solder fumes/dusts can aggravate respiratory and renal conditions.

SECTION 5: FIREFIGHTING MEASURES**5.1 EXTINGUISHING MEDIA**

- **RECOMMENDED FIRE EXTINGUISHING MEDIA:** Water Spray, Water Jet, Dry Powder, Foam, Carbon Dioxide, or any other.
- **UNSUITABLE FIRE EXTINGUISHING MEDIA:** None known.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

- **NFPA FLAMMABILITY CLASSIFICATION:** Not flammable.
- **UNUSUAL HAZARDS IN FIRE SITUATIONS:** This product is non-combustible. This product does not significantly contribute to the intensity of a fire. Use extinguishing material suitable to the surrounding fire. Under conditions of a fire, the fumes generated from this product can contain potentially fatal levels of cadmium oxides.
 - Sensitivity to Mechanical Impact: Not sensitive.
 - Explosion Sensitivity to Static Discharge: Not sensitive.

**5.3 ADVICE FOR FIREFIGHTERS**

- Wear Self Contained Breathing Apparatus and full protective equipment for fire response. Move containers from fire area if it can be done without risk to personnel. Otherwise, use water spray to keep fire-exposed containers cool. Contaminated equipment should be rinsed thoroughly with water before returning to service.

SECTION 6: ACCIDENTAL RELEASE MEASURES**6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES**

- **RESPONSE TO INCIDENTAL RELEASES:** Personnel who have received basic chemical safety training can generally handle small-scale releases (e.g., under 1 kg). For small releases, the minimum Personal Protective Equipment should be rubber gloves and splash goggles/safety glasses (in the event there are dusts generated). Use caution during clean-up; avoid stepping into spilled solid or clean-up procedures that generate substantial amounts of dust.
- **RESPONSE TO NON-INCIDENTAL RELEASES:** For large-scale releases of this product in non-heated form, minimum Personal Protective Equipment should be Level C: triple-gloves, chemical resistant apron, boots, and splash goggles and air purifying respirator equipped with a high-efficiency particulate filter.
- **RESPONSE PROCEDURES FOR ANY RELEASE:** Wipe up solid residue with damp polypads or sponge. Rinse area with soap/water solution followed by a water rinse. Alternatively, use a HEPA (high efficiency particle air) vacuum to collect material and place in a sealable container for disposal.

6.2 ENVIRONMENTAL PRECAUTIONS

- Avoid response actions that can cause a release of a significant amount of the substance into the environment.

6.3 METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

- **SPILL RESPONSE EQUIPMENT:** Polypad/sponge or HEPA vacuum.

6.4 REFERENCES TO OTHER SECTIONS

- **SECTION 8:** For exposure levels and detailed personal protective equipment recommendations.
- **SECTION 13:** For waste handling guidelines.

SECTION 7: HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING

- **HYGIENE PRACTICES:** Keep out of reach of children. Follow good chemical hygiene practices. Do not smoke, drink, eat, or apply cosmetics in the chemical use area. Avoid inhalation of dusts or fumes. Use in well-ventilated area. Avoid contact with skin or eyes. Remove contaminated clothing promptly. Clean up spilled product immediately.
- **HANDLING RECOMMENDATIONS:**
 - **General:** Employees must be appropriately trained to use this product safely as needed. Keep containers closed when not in use.
 - **Soldering Applications:** Any surface that comes in contact with molten metal must be preheated or specially coated and rust free. Keep melting/soldering temperatures as low as possible to minimize the generation of fumes.

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

- **STORAGE RECOMMENDATIONS:** Ensure all containers are correctly labeled. Store containers away from direct sunlight, sources of intense heat, or where freezing is possible. Store this product away from incompatible chemicals (See Section 10, Stability and Reactivity). Empty containers may contain residual material; therefore, empty containers should be handled with care. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 CONTROL PARAMETERS

- **AIRBORNE EXPOSURE LIMITS:** The following exposure limits are applicable to dusts or fumes of the component metals only:

COMPONENT	ACGIH TLV	OSHA PEL	NIOSH REL	OTHER
Cadmium (as Cadmium and compounds, as Cd)	TWA = 0.01 mg/m ³ /0.002 mg/m ³ (Respirable Fraction)	TWA = 0.005 mg/m ³ (see 29 CFR 1910.1027)	Apply OSHA PEL	IDLH = 9 mg/m ³ (as Cd)
Copper (Dust)	TWA = 1 mg/m ³	TWA = 1 mg/m ³	TWA = 1 mg/m ³	NE
Copper (Fume)	TWA = 0.2 mg/m ³	TWA = 0.1 mg/m ³	TWA = 0.1 mg/m ³	NE
Silver (Dust and Fume)	TWA = 0.1 mg/m ³	TWA = 0.01 mg/m ³	TWA = 0.01 mg/m ³	NE
Zinc (oxide, fumes)	NE	TWA = 5 mg/m ³	TWA = 5 mg/m ³ STEL = 10 mg/m ³	NE

- **BIOLOGICAL OCCUPATIONAL EXPOSURE LIMITS:** The following BEIs are applicable to the components of this product:

- **CADMIUM:** Cadmium in urine = 5 µg/g creatinine; Cadmium in blood = 5 µg/L.

8.2 EXPOSURE CONTROLS

- **ENGINEERING CONTROLS:** Use this product in well-ventilated environment. Safety showers, eye wash stations, and hand-washing equipment should be available.
- **RESPIRATORY PROTECTION:** Use NIOSH approved respirators if ventilation is inadequate to control dusts or fumes. For situations in which significant amounts of dusts or fumes could be generated, wear a respirator. The following guidelines are offered by NIOSH for exposures to cadmium fumes:
 - **At concentrations above the NIOSH REL:** (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode; (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

- **Escape:** (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (Continued)

- **HAND PROTECTION:** Neoprene gloves should be used. If necessary, refer to U.S. OSHA 29 CFR 1910.138, or appropriate state, local, or national standards.
- **EYE PROTECTION:** Splash goggles or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate state, local, or national standards.
- **BODY PROTECTION:** Use a body protection appropriate to task (e.g., lab coat, coveralls, or apron). Care should be taken to select protection for potentially exposed areas when prolonged exposure to fumes or dusts could occur in occupational settings.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

- | | |
|--|---|
| <p>(a) APPEARANCE: Various colors; metal in sheet, wire powder, cut and shot forms.</p> <p>(b) ODOR: Odorless.</p> <p>(c) ODOR THRESHOLD: Not applicable.</p> <p>(d) pH: Not applicable.</p> <p>(e) MELTING POINT/FREEZING POINT: For gold - 1064 °C (1947 °F). For silver - 961 °C (2212 °F).</p> <p>(f) INITIAL BOILING POINT AND BOILING RANGE: Not applicable.</p> <p>(g) FLASH POINT: Not applicable.</p> <p>(h) EVAPORATION RATE (water=1): Not applicable.</p> <p>(i) FLAMMABILITY: Not flammable.</p> <p>(j) UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS: Not applicable.</p> | <p>(k) VAPOR PRESSURE (mmHg @ 20°C): Not applicable.</p> <p>(l) VAPOR DENSITY: Not applicable.</p> <p>(m) RELATIVE DENSITY (water=1): For gold – 19.32.
For silver – 10.49.</p> <p>(n) SOLUBILITY: Insoluble.</p> <p>(o) PARTITION COEFFICIENT: N-OCTANOL/WATER:
Not determined.</p> <p>(p) AUTO-IGNITION TEMPERATURE: Not applicable.</p> <p>(q) DECOMPOSITION TEMPERATURE: Not determined.</p> <p>(r) VISCOSITY: Not applicable.</p> <p>(s) EXPLOSIVE PROPERTIES: Not applicable.</p> <p>(t) OXIDIZING PROPERTIES: Not an oxidizer.</p> |
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9.2 OTHER INFORMATION

- **VOC (less water & exempt):** Not applicable.

SECTION 10: STABILITY AND REACTIVITY

10.1 REACTIVITY

- Not reactive under typical conditions of use or handling.

10.2 CHEMICAL STABILITY

- Normally stable under standard temperatures and pressures.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS

- This product is not self-reactive or air-reactive. This product will not undergo hazardous polymerization.

10.4 CONDITIONS TO AVOID

- Avoid contact with incompatible chemicals.

10.5 INCOMPATIBLE MATERIALS

- This product is not compatible with strong oxidizing agents, strong acids, strong bases, amines, combustible material, and peroxides.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS

- Heating of this product can release silver, cadmium, gold, copper and zinc oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON TOXICOLOGICAL EFFECTS

- **ACUTE TOXICITY:**

- **PRODUCT ESTIMATED TOXICITY:**

- Acute Toxicity Estimate (Oral) > 2000 mg/kg]
 - Acute Toxicity Estimate (Dermal) > 5000 mg/kg
 - Acute Toxicity Estimate (Inhalation) = 0.22 mg/L

- **TOXICOLOGY DATA:** The following data are available for hazardous components in this product greater than 1% in concentration

COPPER METAL

Oral-Rat LD50 > 5000 mg/kg
Dermal-Rabbit LD50 > 2000 mg/kg

SILVER METAL

Oral-Rat LD50 > 5000 mg/kg
Dermal-Rabbit LD50 > 2000 mg/kg

CADMIUM METAL

Oral-Rat LD50 = 2330 mg/kg
Inhalation-Rat LC50 = 25 mg/m³/L 30 minutes

ZINC METAL

Oral - Rat - LD50 = 630 mg/kg

- **DEGREE OF IRRITATION:** Contact with fumes and dusts can be irritating to the eyes and skin.
 - **SENSITIZATION:** Not reported to have skin or respiratory sensitization effects.
 - **REVIEW OF ACUTE SYMPTOMS AND EFFECTS:** See Section 2 (Hazards Information) and Section 4 (First-Aid Measures) for further details.
 - **EYES:** Contact with dusts/fumes can cause irritation.
 - **SKIN:** Contact with dusts/fumes can cause irritation.
 - **INHALATION:** Due to the presence of cadmium, inhalation of dusts or fumes can be fatal, and can also cause mild to severe nasal irritation.
 - **INGESTION:** Although not anticipated to be a significant route of occupational over-exposures, ingestion of this product may irritate the mouth, throat, and other contaminated tissue and cause other adverse health effects.
 - **MOLTEN MATERIAL CONTACT:** Can cause thermal burns.
 - **METAL FUME FEVER** Acute overexposure to product fumes result in metal fume fever, which causes symptoms such as sweet metal taste, dry throat, coughing, fever and chills, tight chest, dyspnea, headache, blurred vision, back pain, nausea, vomiting, fatigue. Symptoms usually disappear within 24 hours. Copper may cause skin and hair discoloration. Inhalation of copper dusts may change the gums and mucous lining of the mouth.

- **CHRONIC TOXICITY:**

- **CARCINOGENICITY STATUS:** The following table summarizes the carcinogenicity listing for the components of this product. "NO" indicates that the substance is not considered to be, or suspected to be, a carcinogen by the listed agency.

CHEMICAL	IARC	NTP	NIOSH	OSHA	OTHER
Cadmium	IARC-1 Carcinogenic to Human	NTP-K Known Human Carcinogen	NIOSH A-Ca	Carcinogen	EPA-B1: Limited evidence of carcinogenicity from epidemiological studies.
Copper (Dusts and Fumes)	NO	NO	NO	NO	EPA D: Not classifiable as to human carcinogenicity
Silver (Dusts and Fumes)	NO	NO	NO	NO	EPA D: Not classifiable as to human carcinogenicity
Zinc	NO	NO	NO	NO	EPA DII: Not classifiable as to human carcinogenicity; inadequate data.

- **REPRODUCTIVE TOXICITY INFORMATION:** The components of this product are not reported to cause reproductive effects under typical circumstances of exposure at the concentrations present in this product.

SECTION 11: TOXICOLOGICAL INFORMATION (Continued)

- **MUTAGENIC EFFECTS:** The following mutagenic effects data are available for components of this product:
 - **CADMIUM:** Micronucleus Test: Mouse, Embryo = 6 umol/L.; Cytogenetic Analysis: Hamster, Ovary = 1 umol/L.
- **SPECIFIC TARGET ORGAN TOXICITY – SINGLE EXPOSURE:** Not applicable.
- **SPECIFIC TARGET ORGAN TOXICITY – REPEATED EXPOSURE:** Due to the presence of cadmium, inhalation of this product can cause adverse effects on the lungs and kidneys.
- **ASPIRATION HAZARD:** Not applicable.
- **OTHER INFORMATION**
 - **TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** None known.
 - **ADDITIONAL TOXICOLOGY:** None known.

SECTION 12: ECOLOGICAL INFORMATION

12.1 TOXICITY

- Alloys of silver, copper and zinc present no threat to the environment when they occur in the size and form associated with this product. In ionic form, silver compounds can be highly toxic to the aquatic environment.
- Because of the presence of cadmium, this product is classified as Aquatic Toxicity – Acute (Category 1) and Aquatic Toxicity – Chronic (Category 1).
- The following aquatic toxicity data are available for the components of this product:

CADMIUM

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 0.001 mg/l - 96 hours

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 0.024 mg/l - 48 hours

Toxicity to algae static test EC50 - Selenastrum capricornutum (green algae) - 0.023 mg/l - 72 hours

12.2 PERSISTENCE AND DEGRADABILITY

- All components of this alloy occur naturally in the environment. It is anticipated that they will slowly react with water, salts, and other compounds found naturally in the environment over prolonged periods of time.

12.3 BIOACCUMULATIVE POTENTIAL

- The following bioaccumulation data are available for the components of this product:
 - **CADMIUM:** Oncorhynchus mykiss (rainbow trout) - 72 d - 1.27 µg/l; Bioconcentration factor (BCF): 55. M Factor = 1.

12.4 MOBILITY IN SOIL

- Alloys in the product's form are not mobile in the environment.

SECTION 13: DISPOSAL CONSIDERATION

13.1 WASTE TREATMENT METHODS

- **WASTE HANDLING RECOMMENDATIONS:** Prepare, transport, treat, store, and dispose of waste product according to all applicable local, U.S. State and U.S. Federal regulations, or the applicable Canadian standards.
- **METAL RECLAMATION:** When applicable and practical, users of the product may wish to utilize metal reclamation services for final disposition of wastes.

13.2 DISPOSAL CONSIDERATIONS

- **EPA RCRA WASTE CODE:** D006 (Cadmium); D011 (Silver).

SECTION 14: TRANSPORT INFORMATION

14.1 TRANSPORTATION REGULATIONS

- **DEPARTMENT OF TRANSPORTATION HAZARDOUS MATERIALS SHIPPING REGULATIONS:**

UN/NA Number	Proper Shipping Name	Packing Group	Hazard Class	Label	North American Emergency Response Guide #	Marine Pollutant Status
NOT APPLICABLE						

- **CANADIAN TRANSPORTATION INFORMATION:** This product is not regulated by Transport Canada as dangerous goods under Canadian transportation standards. Refer to above information.
- **IATA DESIGNATION:** This product is not regulated as dangerous goods by the International Air Transport Association.
- **IMO DESIGNATION:** This product is not regulated as dangerous goods by the International Maritime Organization.

14.2 ENVIRONMENTAL HAZARDS

- None described, as related to transportation.

14.3 SPECIAL PRECAUTIONS FOR USERS

- Not applicable.

14.4 TRANSPORT IN BULK

- Not applicable.

SECTION 15: REGULATORY INFORMATION

15.1 SAFETY, HEALTH, AND ENVIRONMENTAL REGULATIONS SPECIFIC FOR PRODUCT

- **OTHER IMPORTANT U.S. REGULATIONS**

- **U.S. SARA THRESHOLD PLANNING QUANTITY:** Not applicable.
- **U.S. SARA HAZARD CATEGORIES (SECTION 311/312, 40 CFR 370-21):** Not applicable.
- **U.S. CERCLA REPORTABLE QUANTITY (RQ):** Not applicable. For metals listed under CERCLA (i.e., silver, cadmium, copper and zinc), no reporting of releases of the solid form is required if the mean diameter of the pieces of the solid metal released is greater than 100 micrometers (0.004 inches).
- **U.S. TSCA INVENTORY STATUS:** All components of this product are listed on the TSCA Inventory.
- **US SARA 313:** Silver, cadmium and copper are subject to the SARA 313 reporting requirements.
- **CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) STATUS:** Cadmium is on the Proposition 65 list.



- **WARNING:** This product can expose you to cadmium, a chemical known to the state of California to cause cancer, birth defects, and other reproductive harm. For more information, go to www.p65Warnings.ca.gov

- **INTERNATIONAL REGULATIONS**

- **CANADIAN DSL/NDSL INVENTORY STATUS:** The listed components of this product are on the DSL/NDSL Inventory.
- **CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITY SUBSTANCES LISTS:** Cadmium (as inorganic cadmium compound) is on Priority Substances List 1.

15.2: CHEMICAL SAFETY ASSESSMENT.

- No information available.

SECTION 16: OTHER INFORMATION

16.1 INDICATION OF CHANGE.

- **ORIGINAL DATE OF ISSUE:** December 20, 2018
- **SUPERCEDES:** Not applicable.
- **CHANGE INDICATED:** Not applicable.

16.2 KEY LITERATURE REFERENCES AND SOURCES FOR DATA

- SAFETY DATA SHEETS FOR COMPONENT PRODUCTS.
- Federal OSHA Hazard Communication Standard: 29 CFR 1910.1200
- TOXNET – <http://toxnet.nlm.nih.gov/>

16.3 CLASSIFICATION AND PROCEDURE USED TO DERIVE THE CLASSIFICATIONS FOR MIXTURES

- **CLASSIFICATION:** Section 2 (Hazards Information) provides all relevant classification information used for this product. The assignments were based on data available for the component products, calculations, expert judgment, and weight of evidence.

16.4 WARRANTY AND COPYRIGHT

- **WARRANTY:** The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Krohn Industries assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, Krohn Industries assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.
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16.5 ABBREVIATIONS AND ACRONYMS.

ALL SECTIONS: **OSHA:** U.S. Federal Occupational Safety and Health Administration. **WHMIS:** Canadian Workplace Hazardous Materials Standard. **GHS:** Globally Harmonized System of Classification of Chemical Substances

SECTION 2: HAZARDOUS MATERIALS IDENTIFICATION

SYSTEM RATING: This is a rating system used by industry to summarize physical and health hazards to chemical users and was originally developed by the National Paint and Coating Association. 0 = No Significant Hazard. 1 = Slight Hazard. 2 = Moderate Hazard. 3 = Severe Hazard. 4 = Extreme Hazard.

SECTION 3: **CAS Number:** Chemical Abstract Service Number, which is used by the American chemical Society to uniquely identify a chemical.

SECTION 5: **NFPA:** National Fire Protection Association. **NFPA FLAMMABILITY CLASSIFICATION:** The NFPA uses the flash point (F.P.) and boiling point (BP) to classify flammable or combustible liquids. Class IA: F.P. below 73°F and BP below 100°F. Class IB: F.P. below 73°F and BP at or above 100°F. Class IC: F.P. at or above 73°F and BP at or above 100°F. Class II: F.P. at or above 100°F and below 140°F. Class IIIA: F.P. at or above 140°F and below 200°F. Class IIIB: F.P. at or above 200°F. **NFPA HAZARDOUS MATERIALS RATING:** This is a rating system used to summarize physical and health hazards to firefighters. 0 = No Significant Hazard. 1 = Slight Hazard. 2 = Moderate Hazard. 3 = Severe Hazard. 4 = Extreme Hazard.

SECTION 8: **NE:** Not established. **ACGIH:** American Conference of Government Industrial Hygienists; **TWA:** Time-Weighted Average (over an 8-hour work day); **STEL:** Short-Term Exposure Limit (15-minute average, no more than 4-times daily and each exposure separated by one-hour minimally); **C:** Ceiling Limit (concentration not to be exceeded in a work environment). **PEL:** Permissible Exposure Limit. **NIOSH:** National Institute of Occupational Safety and Health; **REL:** Recommended Exposure Limit; **IDLH:** Immediately Dangerous to Life and Health Concentrations. *Note:* In July 1992, a court ruling vacated the more protective PELs set by OSHA in 1989. Because OSHA may enforce the more protective levels under the "general duty clause", both the current and vacated levels are presented in this document. **ppm:** Parts per Million. **mg/m³:** Milligrams per cubic meter. **mpcf:** Millions of Particles per Cubic Foot. **BEI:** Biological Exposure Limit.

SECTION 9: **pH:** Scale (0 to 14) used to rate the acidity or alkalinity of aqueous solutions. For example, a pH value of 0 indicates a strongly acidic solution, pH of 7 indicates a neutral solution, and a pH value of 14 indicates an extremely basic solution. **FLASH POINT:** Temperature at which a liquid generates enough flammable vapors so that ignition may occur. **AUTOIGNITION TEMPERATURE:** Temperature at which spontaneous ignition occurs. **LOWER EXPLOSIVE LIMIT (LEL):** The minimal concentration of flammable vapors in air which will sustain ignition. **UPPER EXPLOSIVE LIMIT (UEL):** The maximum concentration of flammable vapors in air which will sustain ignition. ≈: Approximately symbol.

SECTION 11: **CARCINOGENICITY STATUS:** NTP: National Toxicology Program. IARC: International Agency for Research on Cancer. **REPRODUCTIVE TOXICITY INFORMATION:** Mutagen: Substance capable of causing chromosomal damage to cells. Embryotoxin: Substance capable of damaging the developing embryo in an overexposed female. Teratogen: Substance capable of damaging the developing fetus in an overexposed female. Reproductive toxin: Substance capable of adversely affecting male or female reproductive organs or functions. **TOXICOLOGY DATA:** LD_{xx} or LC_{xx}: The Lethal Dose or Lethal Concentration of a substance which will be fatal to a given percentage (xx) of exposed test animals by the designate route of administration. This value is used to assess the toxicity of chemical substances to humans. TD_{xx} or TC_{xx}: The Toxic Dose or Toxic Concentration of a substance which will cause an adverse effect to a given percentage (xx) of exposed test animals by the designate route of administration.

SECTION 12: **TLm** – Median Tolerance Limit

SECTION 13: **RCRA:** Resource Conservation and Recovery Act. The regulations promulgated under this Act are found in 40 CFR, Sections 260 ff, and define the requirements of hazardous waste generation, transport, treatment, storage, and disposal. **EPA RCRA Waste Codes:** Defined in 40 CFR Section 261.

SECTION 15: **CERCLA:** Comprehensive Environmental Response Compensation and Liability Act (a.k.a. "Superfund") and SARA: (Superfund Amendment and Reauthorization Act). The regulations promulgated under this Act are located under 40 CFR 300 ff. and provide "community right-to-know" requirements. **DSL/NDSL:** Canadian Domestic Substances and Non-Domestic Substances Lists.