



Harris Products Group
Since 1905

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Safety Data Sheet

WARNING: PRODUCT COMPONENTS PRESENT HEALTH AND SAFETY HAZARDS. READ AND UNDERSTAND THIS MATERIAL SAFETY DATA SHEET (M.S.DS.). ALSO, FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. **BE SURE TO CONSULT THE LATEST VERSION OF THE MSDS. MATERIAL SAFETY DATA SHEETS ARE AVAILABLE FROM HARRIS PRODUCTS GROUP Harris Products Group, HGE PTY LTD, Brisbane | Melbourne | Perth | New Zealand, 14 Queensland Rd, Darra, QLD 4076, Phone: (07) 3375 3670 | Fax: (07) 3375 3620, Email: sales@hgea.com.au, www.harrisproductsgroup.com.au,**

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1. PRODUCT IDENTIFICATION

**TRADE NAME (AS LABELED): COPPER BASED ALLOYS, INCLUDING:
SILICON BRONZE, PHOSPHOR BRONZE C, DEOXIDIZED COPPER, ALUMINUM
BRONZE A2, ALUMINUM BRONZE A1**

CHEMICAL NAME/CLASS: Metal Alloy
SYNONYMS: Not Applicable
PRODUCT USE: Metal Welding
DOCUMENT NUMBER: 0079
SUPPLIER/MANUFACTURER'S NAME: HARRIS PRODUCTS GROUP
ADDRESS: 14 Queensland Rd, Darra, QLD, Australia 4076
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DATE OF PREPARATION: August 20, 2010

2. COMPOSITION and INFORMATION ON INGREDIENTS*

| NOMINAL COMPOSITION WEIGHT % WIRE | | | | | | | | | |
|-----------------------------------|---------|------|---------|------|------|---------|-----------|----------|------|
| ALLOY | Cu | Zn | Sn | Mn | Fe | Si | P | Al | Pb |
| Silicon Bronze | Balance | 1.0 | 1.0 | 1.5 | 0.50 | 2.8-4.0 | | 0.01 | 0.02 |
| Deoxidized Copper | Balance | | 1.0 | 0.50 | | 0.50 | 0.15 | 0.01 | 0.02 |
| Phosphor Bronze C | Balance | | 7.0-9.0 | | | | 0.10-0.35 | 0.01 | 0.02 |
| Aluminum Bronze A1 | Balance | 0.20 | | 0.50 | | 0.10 | | 6.0-8.5 | 0.02 |
| Aluminum Bronze A2 | Balance | 0.20 | | | 1.5 | | | 8.5-11.0 | 0.02 |

*Single values are maximum percentages.

2. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

| CHEMICAL NAME | CAS # | % w/w | EXPOSURE LIMITS IN AIR | | | | | |
|--|-----------|-------------------------|--|---------------------------|---|-------------------------------------|---------------------------|--|
| | | | ACGIH-TLV | | OSHA-PEL | | IDLH mg/m ³ | OTHER mg/m ³ |
| | | | TWA mg/m ³ | STEL mg/m ³ | TWA mg/m ³ | STEL mg/m ³ | | |
| Aluminum (exposure limits are for aluminum, metal dust and aluminum, welding fume, as aluminum) | 7429-90-5 | See Table Previous Page | 10 (dust) 5 (fumes) | NE | 15 (Total dust) 5 (Respirable fraction) 5 (fume) (vacated 1989 PEL) | NE | NE | NIOSH RELS: TWA = 10 (Total dust); 5 (Respirable fraction); 5 (fumes) DFG MAK: TWA = 1.5 (dust - Respirable fraction) |
| Copper (exposure limits are for copper fume and dusts and mists, as Cu) | 7440-50-8 | See Table Previous Page | 0.2 (fume) 1 (dust and mists) | NE | 0.1 (fume) 1 (dust and mists) | NE | 100 | NIOSH RELS: TWA 1 = (dust); 0.1 (fume) DFG MAKs: TWA = 0.1 (fume- Respirable fraction); 1 (dusts & mists-inhalable fraction) PEAK = 2 MAK, 30 min., average value Carcinogen: EPA-D (dusts & mists) |
| Iron (exposure limits are for Iron Oxide dust and fume as Fe) | 1309-37-1 | See Table Previous Page | 5, A4 (Not Classifiable as a Human Carcinogen) | NE | 10 | NE | 2500 | NIOSH REL: TWA = 5 DFG MAK: TWA = 6 (Respirable Fraction) Carcinogen: IARC-3, TLV-A4 |
| Lead (exposure limits are for Lead, elemental & inorganic compounds, as Pb) | 7439-92-1 | See Table Previous Page | 0.05, A3 (Confirmed Animal Carcinogen) | NE | 0.05 (see 29 CFR 1910.1025) | NE | 100 | NIOSH REL: TWA = < 0.1; Blood Lead Content <0.06 mg/100 g whole blood. DFG MAKs: TWA = 0.1 (Measured as the inhalable fraction of the aerosol) DFG MAK Pregnancy Risk Classification: B Carcinogen: EPA-B2, IARC-2B, TLV-A3 |
| Manganese (exposure limits are for Manganese, elemental, inorganic compounds, and fume, as manganese) | 7439-96-5 | See Table Previous Page | 0.2 | NE | 1 (vacated 1989 PEL) | 5 (ceiling) 3 (vacated 1989 PEL) | 500 | NIOSH RELS: TWA = 1 STEL = 3 DFG MAK: TWA = 0.5 (Inhalable Fraction) PEAK = 10•MAK 30 min., average value DFG MAK Pregnancy Risk Classification: C Carcinogen: EPA-D |

NE = Not Established.

See Section 16 for Definitions of Terms Used.

NOTE (1): The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m³. NIOSH classifies welding fumes as carcinogens. Single values shown are maximum, unless otherwise noted.

NOTE (2): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

2. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

| CHEMICAL NAME | CAS # | % w/w | EXPOSURE LIMITS IN AIR | | | | | |
|---|-----------|-------------------------|--------------------------|---------------------------|---|---------------------------|---------------------------|---|
| | | | ACGIH-TLV | | OSHA-PEL | | IDLH mg/m ³ | OTHER mg/m ³ |
| | | | TWA mg/m ³ | STEL mg/m ³ | TWA mg/m ³ | STEL mg/m ³ | | |
| Phosphorous (yellow) | 7723-14-0 | See Table Previous Page | 0.1 | NE | 0.1 | NE | 5 | NIOSH REL: TWA = 0.1 DFG MAKs: TWA = 0.1 PEAK = 2•MAK 5 min., momentary value DFG Pregnancy Risk Classification: D Carcinogen: EPA-D |
| Silicon | 7440-21-3 | See Table Previous Page | 10 | NE | 15 (Total dust) 5 (Respirable fraction) 10 (Total dust) (vacated 1989 PEL) | NE | NE | NIOSH REL: TWA = 10 (Total dust; 5 (Respirable fraction) |
| Tin, metal | 7440-31-5 | See Table Previous Page | 2 | NE | 2 | NE | 100 | NIOSH REL: TWA = 2 |
| Zinc Exposure limits given are for Zinc oxide, Fume & Dust | 7440-66-6 | See Table Page 1 | 5 (fume) 10 (dust) | 10 (fume) | 5 (fume) 5 (total dust) 15 (dust, respirable dust) 5 (dust, respirable dust, Vacated 1989 PEL) | NE | 500 | NIOSH RELs: TWA = 5 (dust & fume) STEL = 10 (fume), 15 (ceiling, 15 min., dust) DFG MAK: TWA = 1.5 (Respirable Fraction, fume) Carcinogen: EPA-D |

NE = Not Established.

See Section 16 for Definitions of Terms Used.

NOTE (1): The ACGIH has an established exposure limit for Welding Fumes, Not Otherwise Classified. The Threshold Limit Value is 5 mg/m³. NIOSH classifies welding fumes as carcinogens. Single values shown are maximum, unless otherwise noted.

NOTE (2): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: These products consist of odorless, light yellow to dark brown metal rods. There are no immediate health hazards associated with these products. These products are not flammable nor reactive. If involved in a fire, these products may generate irritating fumes and a variety of metal oxides. Copper, components of these products, are sensitizers upon repeated or prolonged exposure. Additionally, Lead (present in some of these products in trace amounts) is a suspect human carcinogen. Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

GHS classification of the substance/mixture.

Classified according to the Globally Harmonised System of Classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: During welding operations, the most significant route of over-exposure is via inhalation of fumes.

INHALATION: Inhalation of large amounts of particulates generated by these products during metal processing operations may result in irritation. Inhalation of copper oxide and zinc oxide fumes can cause metal fume fever. Initial symptoms of metal fume fever can include a metallic or sweet taste in the mouth, dryness or irritation of the throat, and coughing. Later symptoms (after 4–48 hours) can include sweating, shivering, headache, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, and tiredness. Repeated over-exposures, via inhalation, to the dusts or fumes generated by these products during welding operations may have adverse effects on the lungs with possible pulmonary edema and emphysema (life-threatening lung injuries). Chronic over-exposure to Copper dust may cause tiredness, stuffiness, diarrhea, and vomiting. Refer to Section 10 (Stability and Reactivity) for information on the specific composition of welding fumes and gases. This product contains trace amounts of lead. Exposure to Lead fumes is not anticipated to be significant during occupational use of this product.

3. HAZARD IDENTIFICATION (Continued)

CONTACT WITH SKIN or EYES: Contact of these products with the skin is not anticipated to be irritating. Rare cases of allergic contact dermatitis have been reported in people working with copper dust. Contact with these products can be physically damaging to the eye (i.e. foreign object). Fumes generated during welding operations can be irritating to the skin and eyes. Symptoms of skin over-exposure may include irritation and redness. Contact with the molten wire will burn contaminated skin or eyes.

SKIN ABSORPTION: Skin absorption is not known to be a significant route of over-exposure for any component of these products.

INGESTION: Ingestion is not anticipated to be a route of occupational exposure for these products. If swallowed call physician immediately! Do not induce vomiting unless directed by medical personnel. Rinse mouth with water if person is conscious. Never give fluids or induce vomiting if person is unconscious, having convulsions, or not breathing.

INJECTION: Though not a likely route of occupational exposure for these products, injection (via punctures or lacerations in the skin) may cause local reddening, tissue swelling, and discomfort.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Symptoms associated with over-exposure to these products and the fumes generated during welding operations are as follows:

ACUTE: The chief acute health hazard associated with these products would be the potential for irritation of contaminated skin and eyes when exposed to fumes during welding operations. Inhalation of large amounts of particulates generated by these products during metal processing operations may result in irritation. Inhalation of copper oxide and zinc oxide fumes can cause metal fume fever. Inhalation of large amounts of particulates generated by these products during metal processing operations can result in pneumoconiosis (a disease of the lungs). Contact with the molten material will burn contaminated skin or eyes. Severe ingestion over-exposure to Copper (a component of these products) may be fatal.

CHRONIC: Chronic skin over-exposure to the fumes of these products during welding operations may produce dermatitis (red, inflamed skin). Chronic over-exposure to Copper dust may cause tiredness, stuffiness, diarrhea, vomiting, discoloration of the skin and eyes, and kidney and liver disorder. Additionally, rare cases of allergic contact dermatitis have been reported in people working with copper dust. Exposure to high levels of airborne Lead may produce symptoms of anemia, insomnia, weakness, constipation, nausea and abdominal pain. Prolonged exposure may result in kidney and nervous system involvement. Women of child-bearing age should avoid exposure to Lead due to post natal effects. Lead, a trace component of these products, is potentially carcinogenic to humans. Refer to Section 11 (Toxicological Information) for further information.

TARGET ORGANS: For fumes: ACUTE: Skin, eyes, respiratory system. CHRONIC: Skin, respiratory system, kidneys, central nervous system, and liver.

| HAZARDOUS MATERIAL IDENTIFICATION SYSTEM | | | |
|--|---------------|---|---------------|
| HEALTH | | (BLUE) | 2 |
| FLAMMABILITY | | (RED) | 0 |
| REACTIVITY | | (YELLOW) | 0 |
| PROTECTIVE EQUIPMENT | | | X |
| EYES | RESPIRATORY | HANDS | BODY |
|  | See Section 8 |  | See Section 8 |
| For routine industrial applications for the wires | | | |

See Section 16 for Definition of Ratings

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take a copy of label and MSDS to health professional with victim.

SKIN EXPOSURE: If fumes generated by welding operations involving this product contaminate the skin, begin decontamination with running water. If molten material contaminates the skin, immediately begin decontamination with cold, running water. Minimum flushing is for 15 minutes. Victim must seek medical attention if any adverse reaction occurs.

EYE EXPOSURE: If fumes generated by welding operations involving this product enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.

4. FIRST-AID MEASURES (Continued)

INHALATION: If fumes generated by welding operations involving this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.

INGESTION: Ingestion is not a likely route of exposure for these products. If swallowed call physician immediately! Do not induce vomiting unless directed by medical personnel. Rinse mouth with water if person is conscious. Never give fluids or induce vomiting if person is unconscious, having convulsions, or not breathing.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin, respiratory disorders, kidney and liver disorders may be aggravated by prolonged over-exposures to the dusts or fumes generated by these products. Additionally, lead over-exposures can cause adverse effects on the human reproductive system.

RECOMMENDATIONS TO PHYSICIANS: Very heavy intoxication with Lead (a component of this product) can sometimes be detected by formation of a dark line on the gum margins, the so-called "lead line." Treat symptoms and eliminate over-exposure. Be observant for renal problems and encephalopathy in the event of chronic over-exposures. Zinc (a component of this product) is antagonistic to the toxic effects of lead. Refer to the OSHA Lead Standard (29 CFR 1910.1025; paragraph J) for specific information on Medical Surveillance requirements (i.e. Biological Monitoring, Medical examinations and consultations, blood tests and re-examination protocol).

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not flammable.

AUTOIGNITION TEMPERATURE: Not flammable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS:

Water Spray: YES

Halon: YES

Dry Chemical: YES

Carbon Dioxide: YES

Foam: YES

Other: Any "ABC" Class

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, these products may generate irritating fumes and a variety of copper, zinc, and aluminum and other metal compounds. The molten material can present a significant thermal hazard to firefighters.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

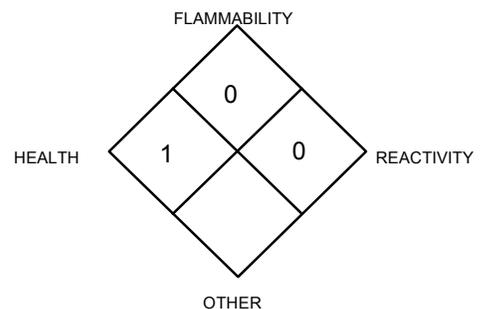
Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Not applicable.

Additional information

Read and understand the Work Safe Australia Code of Practice on Welding Processes and "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" before using this product. Section 274 of the Work Health and Safety Act (the WHS Act).

NFPA RATING



See Section 16 for Definition of Ratings

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: These products are solid wire, with no spill or leak hazards.

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting these products ON YOU or IN YOU. Wash thoroughly after handling these products. Do not eat or drink while handling these products. Use in a well-ventilated location. Use ventilation and other engineering controls to minimize potential exposure to these products.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid breathing fumes of these products during welding operations. Open containers on a stable surface. Packages of these products must be properly labeled. Read and understand the manufacturer's instruction and the precautionary label on the product. Refer to Lincoln Safety Publications at www.lincolnelectric.com/safety. See the Australian Standard - AS 1674.1 - 1997 - Reconfirmed 2016. Safety in Welding and Allied Processes Australia.

Store packages in a cool, dry location. Storage in an atmosphere that is wet, moist, or highly humid may lead to corrosion of these products. Store away from incompatible materials (see Section 10, Stability and Reactivity).

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

Control parameters Exposure Guidelines:

Refer to the Safe Environments risk management document – Welding Fume - <http://www.safeenvironments.com.au/welding-fume/> The exposure standard refers to the publication by Work Safe Australia “Workplace Exposure Standard for Airborne Contaminants” with the Date of Effect being 22 December 2011. Work Safe Australia note that “exposure standards do not represent a fine dividing line between a healthy and unhealthy work environment. Natural biological variation and the range of individual susceptibilities mean that a small number of people might experience adverse health effects below the exposure standard.

The American Governmental Congress of Industrial Hygienists (ACGIH) however recommends a Threshold Limit Value (TLV) Time Weighted Average (TWA) of 5 mg/m³ for welding fume, on the assumption that there are no highly toxic constituents.; However, in Australia, there is no specific exposure standard for welding fume This is due to the fume being a combination of the metals and filler material being molten together along with cleaning and fluxing agents present. Each metal or material within the process of welding will generally have its own exposure standard.

Refer to Worksafe Australia for standards: http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/639/Workplace_Exposure_Standards_for_Airborne_Contaminants.pdf

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients). Prudent practice is to ensure eyewash/safety shower stations are available near areas where these products are used.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed (i.e. a Weld Fume Respirator, or Air-Line Respirator for welding in confined spaces), 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 respiratory protection recommendations for Copper (a main component of these products) are provided as follows:

CONCENTRATION

Up to 5 mg/m³:

Up to 10 mg/m³:

Up to 25 mg/m³:

Up to 50 mg/m³:

Up to 100 mg/m³:

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.

NOTE: Follow the specific respiratory selection guidelines of the OSHA Lead Standard in regulated areas (as defined by 29 CFR 1910.1025)

EYE PROTECTION: Safety glasses. When these products are used in conjunction with welding, wear safety glasses, goggles, or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, “Safety in Welding and Cutting”).

HAND PROTECTION: Wear gloves for routine industrial use. When these products are used in conjunction with welding, wear gloves that protect from sparks and flame (per ANSI Z49.1-1988, “Safety in Welding and Cutting”).

BODY PROTECTION: Wear body protection appropriate for task.

RESPIRATORY EQUIPMENT

Dust and mist respirator.

Dust and mist respirator except single-use and quarter-mask respirator (if not present as a fume); or Supplied Air Respirator (SAR).

Powered air-purifying respirator with dust and mist filter(s); or SAR operated in a continuous-flow mode.

Full-facepiece respirator with high-efficiency particulate filter(s); or full-facepiece Self-Contained Breathing Apparatus (SCBA); or full-facepiece SAR; or powered air-purifying respirator with tight-fitting facepiece and high-efficiency particulate filter.

Positive pressure, full-facepiece SAR.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Copper, a main component of these products, unless otherwise indicated:

RELATIVE VAPOR DENSITY (air = 1): Not applicable.

SPECIFIC GRAVITY (water = 1): 7.6-8.95 (For product)

SOLUBILITY IN WATER: Insoluble.

VAPOR PRESSURE, mm Hg @ 20°C: Not applicable.

FREEZING/MELTING POINT: 865-1243°C (1590-2270°F) [For product]

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable.

EVAPORATION RATE (nBuAc = 1): Not applicable.

pH: Not applicable.

ODOR THRESHOLD: Not applicable.

BOILING POINT: 2595°C (4703°F)

The following information is for the products:

APPEARANCE AND COLOR: These products consist of odorless, light yellow to dark brown solid metal rods.

HOW TO DETECT THIS SUBSTANCE (warning properties):The appearance is a distinctive characteristic of these products.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition products can include copper, zinc, aluminum and lead compounds and a variety of metal oxides.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids, strong oxidizers, some halogenated compounds and mercury.

HAZARDOUS POLYMERIZATION: Will not occur.

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

11. 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 Material Safety Data Sheet.

COPPER:

TDLo (oral, human) = 120 µg/kg; gastrointestinal tract effects

IRON:

TDLo (oral, child) = 77 mg/kg; BAH, gastrointestinal tract, blood effects

LEAD:

Cytogenic Analysis System (unreported route, human) = 50 :g/m³

TDLo (oral, women) 450 mg/kg; peripheral and central nervous system effects

TCLo (inhalation, human) = 10 :g/m³; gastrointestinal and liver effects

MANGANESE:

TCLo (inhalation, man) = 2300 µg/m³; BRN, central nervous system effects

ZINC:

Skin Irritancy (human) = 300 µg/ 3 days/ intermittent; mild

TCLo (inhalation, human) = 124 mg/m³/ 50 minutes; pulmonary system, skin effects

SUSPECTED CANCER AGENT: The components of these products are listed as follows:

COPPER: EPA-D (Not Classifiable as to Human Carcinogenicity)

IRON (as Iron Oxide): IARC-3 Possibly Carcinogenic to Humans);,ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen)

LEAD: ACGIH-A3 (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); Cytogenetic Analysis-Human-Unreported 50 mg/m³

PHOSPHORUS: EPA-D (Not Classifiable as to Human Carcinogenicity)

MANGANESE: EPA-D (Not Classifiable as to Human Carcinogenicity)

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 not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: These products' dusts or fumes may be irritating to contaminated skin and eyes. Fumes may be irritating to the respiratory system.

SENSITIZATION TO THE PRODUCT: Rare cases of allergic contact dermatitis have been reported in people working with copper dust.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of these products and their components on the human reproductive system.

Mutagenicity: These products are not reported to produce mutagenic effects in humans. Animal mutation data are available for Lead (a trace component of these products); these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

Embryotoxicity: Lead, a component of these products, is a potential human embryotoxin.

Teratogenicity: These products are not reported to cause teratogenic effects in humans. Clinical studies on test animals exposed to relatively high doses of Copper, and Lead (components of these products) indicates teratogenic effects.

Reproductive Toxicity: These products are not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of Lead and Copper (components of these products) indicate adverse reproductive effects.

A mutagen is a chemical, which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical, which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical, which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance, which interferes in any way with the reproductive process.

11. TOXICOLOGICAL INFORMATION(Continued)

BIOLOGICAL EXPOSURE INDICES: The following Biological Exposure Indices (BEIs) have been determined for the components of this product.

| CHEMICAL DETERMINANT | SAMPLING TIME | BEI |
|-------------------------|----------------|----------------|
| LEAD • Lead in blood | • Not critical | • 30 mg/100 ml |

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of these products are expected to persist in the environment for an extended period of time. Additional environmental data are available as follows:

COPPER:

Solubility: Insoluble.

There is no evidence of any biotransformation for copper compounds.

Copper is accumulated by all plants and animals.

BCF Algae = 12; plants = 1,000; invertebrate = 1,000, fish = 667 and fish = 200(Soluble copper salts).

LEAD: Solubility: Insoluble in water. Biological Half-Life for lead in bones of humans is 10 years. Bioconcentration: Lead was absorbed (by fresh water filed crab) through the gills, and distributed to the haenolymph to hepatopancrease, muscle, and exoskeleton. Lead bioaccumulated over the course of the study showed a high degree of organ specificity.

ZINC: Solubility: Insoluble in water. Biological Half-Life for normal humans 162-500 days. Bioconcentration: The Bioconcentration Factor in edible portions of *Crassostrea virginia*, adult oyster) is 16,700 (total zinc).

EFFECT OF MATERIAL ON PLANTS or ANIMALS: These products are not expected to cause adverse effects on plant or animal life. Specific data on test animals are available but are not presented in this Material Safety Data Sheet.

EFFECT OF CHEMICAL ON AQUATIC LIFE: These products may cause adverse effects on aquatic life, especially if large quantities are released into bodies of water. Additional data are available as follows:

COPPER:

LC₅₀ (fathead minnows) = 0.14 ppm in hard water

LC₅₀ (bluegill) = 0.02 ppm in soft water

LC₅₀ (brook trout) = 0.09 ppm in soft water

LC₅₀ (*Anguilla* American eel) 96 hours = 6.4

MATC (*Oncorhynchshawtsch* chinook salmon) = 0.0074

NOAEL (*Oncorhynchshawtsch* chinook salmon) = 0.0074

MATC (*Salmo gairdneri* brown trout) = 0.01901

NOAEL (*Salmo gairdneri* brown trout) = 0.0114

LOAEL (*Salmo gairdneri* brown trout) = 0.0317

IRON:

LC (*Gymnodinium spendens*, plankton) = 1-30 mg/L/ 48 hours

LC (*Isocrysis galbana*, plankton) > 35 mg/L/ 48 hours

TC (*Isocrysis galbana*, plankton) = 1-30 mg/L/ 48 hours; growth inhibition

TC (*Thalassiosira pseudonana*, plankton) = 8-20 mg/L/ 48 hours; growth inhibition

IRON (continued):

LC (*Glenodinium halli*, plankton) = 10 - 100 mg/L/ 48 hours

TC (*Glenodinium halli*, plankton) = 0.5-10 mg/L/ 48 hours; growth inhibition

LEAD:

LC₅₀ (Japanese quail) =, males, females, 14 days old, oral (5-day ad libitum in diet) = 5,000 ppm. At 1,000, 2236, and 5000 ppm, onset of toxic symptoms began at 7 days and remised at 11-12 days

Concentration for fresh and salt water fish, 0.1

Lobster die after 20 days when kept in lead-lined tanks.

LC₅₀ (brook trout) = 0.13 ppm

LC₅₀ (rainbow trout) = 0.43 ppm

ZINC: Odorless zinc poisoning causes inflamed gills in fish. Laboratory studies of Atlantic salmon, rainbow trout, carp, and goldfish have shown avoidance reactions by these fish to zinc in water.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. These products, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

EPA WASTE NUMBER: Wastes of this product should be analyzed for Toxicity Characteristic Leach Procedure chemicals, as follows: Lead: D008, Regulated Level: 0.4 mg/L

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT HAZARDOUS (Per 49 CFR 172.101) BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME:

Not applicable.

HAZARD CLASS NUMBER and DESCRIPTION:

Not applicable.

UN IDENTIFICATION NUMBER:

Not applicable.

PACKING GROUP:

Not applicable.

DOT LABEL(S) REQUIRED:

Not applicable.

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2000: Not applicable.

14. TRANSPORTATION INFORMATION (Continued)

MARINE POLLUTANT: The Department of Transportation (49 CFR 172.101, Appendix B), lists Copper, metal powder, and Lead compounds, soluble, n.o.s., as Marine Pollutants. These components are not present in the specific forms listed and therefore these products do not meet the marking requirement of 49 CFR 172.322.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This material is not considered as dangerous goods, per regulations of Transport Canada.

15. REGULATORY INFORMATION

Product Name: COPPER BASED ALLOYS, INCLUDING: SILICON BRONZE, PHOSPHOR BRONZE C, DEOXIDIZED COPPER, ALUMINUM BRONZE A2, ALUMINUM BRONZE A1

Refer to the Australian Inventory of Chemical Substances – AICS at <https://www.nicnas.gov.au/chemicals-on-AICS#main>

Poison schedule: Classified as a Schedule 6 (S6) Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP). <https://www.legislation.gov.au/Details/F2016L01638>

Classifications: Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].

16. OTHER INFORMATION

References

Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice Standard for the Uniform Scheduling of Medicines and Poisons

Australian Code for the Transport of Dangerous Goods by Road & Rail.

Modell Work Health and Safety Regulations, Schedule 10: Prohibited carcinogens, restricted carcinogens and restricted hazardous chemicals.

Workplace exposure standards for airborne contaminants, Safe work, Australia

American Conference of Industrial Hygienists (ACGIH)

Globally Harmonised System of classification and labelling of chemicals.

WELDING (1): Due to the diversity of welding techniques, processes, materials used, nature of the surface being welded and the presence of contaminants, the fumes & gases associated with welding will vary in composition and quantity. When assessing a welding process, the toxic fumes generated may not only be associated with the parent metal, filler wire or electrode. The welding/cutting arc may generate nitrogen oxides, carbon monoxide & other gases, whilst UV radiation emitted from some arcs generates ozone. Ozone may irritate mucous membranes and cause pulmonary oedema & haemorrhage. Shielding gases (e.g. carbon dioxide and inert gases i.e. argon and helium) in high concentrations, in confined spaces, may reduce oxygen in the atmosphere to dangerous levels, resulting in possible asphyxiation.

WELDING (2): In addition to complying with individual exposure standards for specific contaminants, where current manual welding processes are used, the fume concentration inside the welder's helmet should not exceed 5 mg/m³ (unless otherwise classified) when collected in accordance with Australian Standard AS 3853.1: Fume from welding and allied processes - Guide to methods for the sampling and analysis of particulate matter and AS 3853.2: Fume from welding and allied processes - Guide to methods for the sampling and analysis of gases. Airway irritation and metal fume fever are the most common acute effects from welding fumes. Reported to cause reduced sperm quality in welders

WELDING (3): Other gases and fumes associated with welding processes include: Inert shielding gases (e.g. argon, carbon dioxide, helium) which may reduce the atmospheric oxygen content in poorly ventilated areas. UV-radiation and Infra-Red radiation may decompose chlorinated degreasing agents to form highly toxic and irritating phosgene gas. This may occur if a metal has been degreased but inadequately dried or when vapours from a nearby degreasing bath enter the welding zone.

WELDING (4): Welding fumes may contain a wide variety of chemical contaminants, including oxides and salts of metals and other compounds which may be generated from electrodes, filler wire, flux materials and from the welded material (e.g. painted surfaces). Welding stainless-steel and its alloys generates nickel and chromium (VI) compounds. Welding fumes are retained in the lungs. Sparingly soluble compounds may be released slowly from the lungs. Welding fume is classified as possibly carcinogenic to humans (IARC Group 2B).

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Disclaimer:

We urge each end user and recipient of this SDS to study it carefully. If necessary, consult an industrial hygienist or other expert to understand this information and safeguard the environment and protect workers from potential hazards associated with the handling or use of this product.

Harris Products Group cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for use, handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

[End of SDS]

