

SAFETY DATASHEET

COPPER METAL

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Copper Anodes

Manufacturer:

Emergency Telephone:

Outside the US Call: 011-704-482-8200

Product Use: Copper is used in the manufacture of copper alloys, electrical conductors and as anodes for electroplating.

SECTION 2: HAZARDS IDENTIFICATION

Emergency Overview: Reddish metal that does not burn in bulk but may form explosive mixtures if dispersed in air as a fine powder and exposed to heat or flames. This metal is relatively non-toxic and poses little immediate hazard to personnel or the environment in an emergency situation.

Potential Health Effects: Inhalation of fumes or dust may result in irritation of the nasal mucous membranes. Inhalation of copper oxide may cause irritation of the upper respiratory tract and may result in a form of metal fume fever, characterized by flu-like symptoms such as chills, fever, nausea, and vomiting. Ingestion of copper metal may cause nausea, vomiting, headaches, dizziness, and gastrointestinal irritation. Direct eye contact may cause redness or pain. Direct skin contact may result in irritation. Discoloration of the skin often occurs from handling copper, but does not indicate any actual injury. Copper is not listed as a carcinogen by OSHA, the NTP, the ACGIH, IARC, or the EU.

Potential Environmental Effects: Copper can be toxic to aquatic and terrestrial organisms. However, in metal form it is not readily bio-available in the environment. (see Ecological Information, Section 12)

EU Risk Phrase(s): Not applicable – copper not listed as a dangerous substance.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredient	Approximate Percentage by Weight Varies by product	CAS Number & EINECS Number	Occupational Exposure Limits OELs	LD50/LC50 Species & Route
Copper	99.99% max. 99.95% min.	7440-50-8	OSHA PEL 0.1 mg/m ³ fume 1.0 mg/m ³ dusts/mists ACGIH 0.2 mg/m ³ fume TLV* 1.0 mg/m ³ dusts/mists 0.1 mg/m ³ (Respirable) fume NIOSH REL 1.0 mg/m ³ dusts/mists	No Data

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction.

OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit, PEL – Permissible Exposure Limit, TLV – Threshold Limit Value, REL – Recommended Exposure Limit.

*In 2005 the ACGIH published a Notice of Intended Changes for Copper, Elemental Metal and Copper Oxides to introduce a TLV of 0.1 mg/m³ (as Cu) as a time-weighted average for inhalable dust/fume.

Trade Names and Synonyms: T-Phos (C12200), Oxygen Free (C10100 & C10200), ETP (C11000)

SECTION 4: FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for five minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: Dust: No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice. Molten Metal: Flush contact area to solidify and cool but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: Remove victim from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. Keep affected person warm and at rest. Administer oxygen, if required. Seek medical attention immediately.

NOTE: Metal fume fever may develop 3-10 hours after exposure. If symptoms of metal fume fever (flu-like symptoms) develop, obtain medical attention.

Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2 – 8 oz. (60 – 240 ml) of water. If vomiting occurs naturally, have victim rinse mouth with water again. Obtain medical advice and bring a copy of this MSDS.

SECTION 5: FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not considered a fire or explosion hazard. Finely-divided copper metal dust or powder may be flammable or explosive when dispersed in the air at high concentrations and exposed to heat, flame, or other ignition sources. Explosions may also occur upon contact with certain incompatible materials (see Stability and Reactivity, Section 10).

Extinguishing Media: Do NOT use water, carbon dioxide, foam, or halons. Apply dry sand, dolomite, graphite, powdered sodium chloride, soda ash, or other suitable dry powders.

Fire Fighting: Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

Flashpoint and Method: Not Applicable.

Upper and Lower Flammable Limit: Not Applicable

SECTION 6: ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible, to do so safely. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection. Molten metal should be allowed to cool and harden before cleanup. Once solidified wear gloves, pick up and return to process. Powder or dust should be cleaned up using methods which will minimize dust generation (e.g., vacuum solids, dampen material and shovel or wet sweep). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labeled containers for later recovery in view of the commercial value of copper.

Personal Precautions: Persons responding to an accidental release should wear protective clothing, gloves and a respirator (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust and fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from hot-metal splash.

Environmental Precautions: Copper compounds can pose a significant threat to aquatic life forms. However, in metal form it is not readily bio-available in the environment. Nevertheless, contamination of water and soil should be prevented.

SECTION 7: HANDLING AND STORAGE

Store copper in a dry, covered area. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking.

EU Safety Phrase(s): Not applicable - copper is not listed as a dangerous substance.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Clothing: Protective clothing, close-fitting safety goggles, gloves, and respiratory equipment are recommended when copper is handled at potentially hazardous levels. Where hot or molten metal is handled, heat resistant gloves, goggles or face shield, and clothing to protect from hot metal splash should be worn. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration of copper fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system.

Respirators: Where copper dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-95 particulate filter cartridge or better).

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Odor	Physical State	pH	Vapor Pressure	Vapor Density	Boiling Point / Range
Reddish Metal	None	Solid	Not Applicable	1 mm at 1083°C	Not Applicable	2595°C / 1083°C

Freezing / Melting Point / Range	Specific Gravity	Evaporation Rate	Coefficient of Water / Oil Distribution	Odor Threshold	Solubility
Negligible	8.94	Not Applicable	None	Not Applicable	Insoluble in Water

SECTION 10: STABILITY AND REACTIVITY

Stability & Reactivity: Copper is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Incompatibilities: Copper is incompatible with acetylene, ammonium nitrate, bromates, chlorates, iodates, chlorine fluorine, chlorine trifluoride, and peroxides. Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxide or azide compounds. Copper reacts with strong oxidants like chlorates, bromates, iodates and ammonium nitrate causing a potential explosion hazard.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting, electric arc welding, arc-air gouging or overheating a molten metal bath may generate fumes. The fumes will contain copper oxides, which, on inhalation in sufficient quantity, can produce metal fume fever.

SECTION 11: TOXICOLOGICAL INFORMATION

General: Copper is an essential element, but can become toxic when inhaled or ingested in large doses. Individuals with a rare disorder called “Wilson’s Disease” (estimated prevalence 0.003% of the population) are predisposed to accumulate copper and should not be occupationally exposed.

Acute:

Skin/Eye: Contact with dust or fume may cause local irritation but would not cause tissue damage.

Inhalation: An intense, short-term exposure to fumes from cutting or welding, etc. could result in the condition called metal fume fever. The symptoms of metal fume fever generally occur within 3 to 10 hours. They may include immediate dryness and irritation of the throat, tightness of the chest, and coughing that may later be followed by flu-like symptoms of fever, malaise, perspiration, frontal headache, muscle cramps, low back pain, occasionally blurred vision, nausea, and vomiting. Severe cases could cause pulmonary congestion and edema as well as acute encephalopathy with possible seizures, coma, and death. However, short-term exposures of this magnitude are unlikely in industry today. Those experiencing a single acute episode of metal fume fever generally recover slowly but without apparent residual effects.

Ingestion: Individuals reported to have ingested large quantities of copper salts have reported gastrointestinal effects including vomiting, diarrhea, nausea, abdominal pain and a metallic taste in the mouth. Effects on the kidneys and liver, and even death have also been reported in severe cases of copper poisoning. However, copper is a strong emetic and spontaneous vomiting following ingestion usually limits uptake of copper.

Chronic: Prolonged exposure to copper dust or fume can cause irritation to the eye and skin. A green discoloration of the skin has been reported similar to that caused by wearing jewelry made of copper. Copper is not listed as a human carcinogen by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH) or the European Union (EU).

SECTION 12: ECOLOGICAL INFORMATION

Copper metal is insoluble in water and generally has essentially no direct bioavailability. However, its processing or extended exposure in the aquatic and terrestrial environments can lead to the release of copper in bioavailable forms. These can cause detrimental environmental effects. The mobility of copper in soluble forms is media dependent. These can bind with inorganic and organic ligands and particulates, reducing mobility and bioavailability in soil and water. Bioavailability is also controlled by other factors such as pH and hardness in the aquatic environment.

SECTION 13: DISPOSAL CONSIDERATIONS

If material cannot be returned to process, dispose of only in accordance with applicable regulations.

SECTION 14: TRANSPORT INFORMATION

No special shipping or transportation requirements in solid form.

SECTION 15: REGULATORY INFORMATION

U.S. Ingredient Listed on TSCA Inventory Yes
Hazardous Under Hazard Communication Standard Yes
CERCLA Section 103 Hazardous Substances Yes RQ: 1,000 lbs. (454 kg.) *

*reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers

(0.004 inches).

EPCRA Section 302 Extremely Hazardous Substance No
EPCRA Section 311/312 Hazard Categories..... No Hazard Categories Apply
EPCRA Section 313 Toxic Release Inventory..... Copper CAS No. 7440-50-8
Percent by Weight - At least 99%

CANADIAN:

WHMIS Classification Not applicable. Copper is not a controlled product under WHMIS. This Material Safety Data Sheet is provided for information purposes only.

EUROPEAN UNION:

Listed on the European Inventory of Existing Commercial Chemical Substances (EINECS): Yes
EU Classification:.....Not applicable. Copper is not listed as a dangerous substance.

SECTION 16: OTHER INFORMATION

The information in this Material Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, 7th Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2006, Guide to Occupational Exposure Values.
- American Conference of Governmental Industrial Hygienists, 2006, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urben ed.) 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS) CHEMINFO Record No: 2073, Copper - Last Revised 2005 03-24.
- Commission de la santé et la sécurité du travail, Service du répertoire toxicologique, Cuivre, 2001-07.
- Industry Canada, Controlled Products Regulations SOR/88-66, as amended.
- International Chemical Safety Cards (WHO/IPCS/ILO) ICSC:0240 – Copper (Revised Sept 1993).
- International Labour Office (WHO/ILO) Encyclopedia of Occupational Health & Safety 4th Ed. CD-ROM Version (1998).
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- Patty's Toxicology, 5th Edition, (E Bingham, B Cohrssen & C H Powell, ed.) 2001.
- U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Copper (Sept 2004).
- U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards. CD-ROM Edition September 2005.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

NOTICE TO READER

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