

MATERIAL SAFETY DATA SHEET
FOR COATINGS, RESINS AND RELATED MATERIALS

SECTION I PRODUCT IDENTIFICATION

Product Class (Use): CONDUCTIVE COATING

Trade Name: **292 CuPro-Cote Copper Conductive Coating**

SECTION II Composition

INGREDIENT NAME	CAS#	%
Water - for information only	7732-18-5	40.01-50.00
Copper	7440-50-8	25.01-30.00
Titanium Dioxide	13463-67-7	5.01-10.00
Silver	7440-22-4	1.01-5.00
Carbon black	1333-86-4	1.01-5.00
Cyclic Amide	872-50-4	1.01-5.00

SECTION III HAZARDS IDENTIFICATION

HMIS Information: Health- 2* Flammability- 2 Reactivity- 0 Personal Protective Equipment- 0

HAZARD INDEX: 4=Severe 3=Serious 2=Moderate 1=Slight 0=Least *=Chronic Health Effects

Routes of Entry	Inhalation, skin contact, eye contact, ingestion, absorption
Medical Conditions Aggravated	Liver disease, Kidney disease, Eye disease, Skin disease including eczema and sensitization, Lung disease

Immediate (Acute) Health Effects:

Inhalation	Can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea, and headaches. This product may cause metal fume fever with resulting flu-like symptoms. Nasal perforation is possible from a single large or repeated smaller inhalation exposures. Harmful. Can cause systemic damage, see target organs below.
Skin contact	Can cause skin irritation, defatting and dermatitis. Not likely to cause permanent damage.
Eye contact	Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue. Exposure may cause corneal injury.
Skin absorption	Toxic if absorbed through the skin. Likely to cause significant systemic damage. The absorption of silver compounds through breaks in the skin may result in local pigmentation at the site of injury.
Ingestion	Toxic if swallowed. May cause target organ failure and/or death. Can cause abdominal discomfort, nausea, vomiting and diarrhea.
Target organ acute toxicity	Respiratory system, Liver, Kidneys, Eyes, Skin, Bone marrow, Cardiovascular system, Lymphatic system

Long-Term (Chronic) Health Effects:

Inhalation	Upon prolonged and/or repeated exposure, can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache. Avoid prolonged or repeated exposure. If sensitized, exposure below the TLV or PEL, or at low levels can result in respiratory irritation and shortness of breath. These asthma-type symptoms may develop immediately or be delayed up to several hours.
Skin contact	Upon prolonged and/or repeated exposure, can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Eye contact	Upon prolonged and/or repeated exposure, can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.
Skin absorption	Upon prolonged and/or repeated exposure, toxic if absorbed through the skin. Like to cause systemic damage. Excessive absorption of silver compounds may cause argyria, a permanent gray discoloration of the skin, mucous membranes and/or eyes due to accumulation of reduced silver in the organs.
Carcinogenicity	IARC: Yes NTP: No OSHA: No
Target Organ Chronic Toxicity	Respiratory system, Liver, Kidneys, Eyes, Skin, Lymphatic system NOTICE: Reports have associated repeated and prolonged overexposure to solvents with brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. This product contains pigments which may become a dust nuisance when removed by abrasive blasting, sanding, or grinding.

SECTION IV FIRST AID

Inhalation	Remove to fresh air. If breathing is difficult, have a trained individual administer oxygen. If not breathing, give artificial respiration and have trained individual administer oxygen. Get medical attention immediately.
Eyes	Flush eyes with plenty of water for at least 20 minutes retracting the eyelids often. Remove contact lenses. Tilt the head to prevent the chemical from transferring to the uncontaminated eye. Get immediate medical attention.
Skin contact	Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.
Ingestion	Seek medical advice immediately. Provide ingredients from Section II of this MSDS to the medical care provider. Contact local Poison Control Center (listed in telephone book), or dial local emergency (911) number for additional information. Do not induce vomiting unless instructed to do so by a physician or other competent medical personnel. Never give anything by mouth to an unconscious person.

SECTION V FIRE FIGHTING MEASURES

Flammability Summary	Combustible at sufficiently elevated temperatures
Autoignition Temperature	N/A
Fire Hazards	Material may be ignited only if preheated to temperatures above flashpoint, for example in a fire.
Extinguishing methods	Use alcohol resistant foam, carbon dioxide, or dry chemical when fighting fires. Water or foams may cause frothing of liquid is burning but still may be a useful extinguishing agent if carefully applied to the surface of the fire. Do not direct

	a stream of water into the burning liquid.
Hazardous combustion products	Carbon dioxide, Carbon monoxide, Nitrogen contained gases

SECTION VI ACCIDENTAL RELEASE MEASURES

Health considerations for spill response	Exposure to the spilled material may be irritating or harmful. Follow personal protective equipment recommendations found in Section VIII of this MSDS. Additional precautions may be necessary based on special circumstances created by the spill including: the material spilled, the quantity of the spill, and the area in which the spill occurred. Also consider the expertise of the employees in the area. Isolate area. Keep unnecessary personnel away. Persons not wearing protective equipment should be excluded from the area until cleanup has been completed.
Spill mitigating procedures	
General methods	Prevent the spread of any spill to minimize harm to human health and the environment. Wear complete and proper personal protective equipment following the recommendations of Section VIII at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.
Air release	Ventilate the area by opening doors/windows and/or running fans and blowers.
Water release	Retain all contaminated water for treatment
Land spills	Avoid runoff into storm sewers and ditches that lead to waterways.

SECTION VII HANDLING AND STORAGE

Handling	Harmful or irritating. Avoid overexposure to the material. Use only in a well ventilated area. As with all chemicals, good industrial hygiene practices should be followed when handling this material. Do not get in eyes, on skin or clothing. Use spark-proof tools and explosion proof equipment. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material.
Storage	Store in a cool dry place. Isolate from incompatible materials. Keep container closed when not in use. Keep away from food and drinking water. Keep away from heat, sparks and flame.

SECTION VIII ENGINEERING CONTROLS, PERSONAL PROTECTIVE EQUIPMENT, AND EXPOSURE LIMITS

Engineering Controls	Local exhaust ventilation, process enclosures, or other engineering controls are necessary when handling or using this product to avoid overexposure, and control airborne levels below recommended exposure limits. Explosion proof exhaust ventilation should be used. Facilities storing or using this material should be equipped with eye wash and safety shower. Vapor concentrations should be monitored and controlled in accordance with 29 CFR 1910.1000
Protective equipment	
Respiratory tract	If exhaust ventilation is not available or sufficient to reduce exposure below acceptable levels, then respiratory protection is required to avoid overexposure when handling this product.
Eyes	Wear safety glasses with side shields when handling this product. Do not wear contact lenses. Wear chemical splash goggles if splashing or high-pressure system is used.
Skin	Wear protective gloves. Inspect gloves for chemical break-through and repeat at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work.
Protective clothing	Wear chemically resistant gloves and apron.

CHEMICAL NAME	CAS #	ACGHI TLV	OSHA PEL	IDLH
Water	7732-18-5	No TLV	No PEL established	Not determined
Copper	7440-50-8	fume: 0.2 mg/m ³ TWA; dusts and mists, as Cu: 1 mg/m ³ TWA	0.1 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dusts & mists)	dusts and mists as Cu: 100 mg/m ³ IDLH
Titanium Dioxide	13463-67-7	10 mg/m ³ TWA	15 mg/m ³ TWA (total dust)	5000 mg/m ³ IDLH
Silver	7440-22-4	metal: 0.1 mg/m ³ TWA	0.01 mg/m ³ TWA	as Ag: 10 mg/m ³ IDLH
Carbon Black	1333-86-4	3.5 mg/m ³ TWA	3.5 mg/m ³ TWA.	1750 mg/m ³ IDLH
Cyclic Amine	872-50-4	No TLV	No PEL established	Not determined

IX PHYSICAL DATA

Appearance	Beige liquid
Color	Beige
pH	N/A
Octanol/Water coefficient	Not determined
Solubility in water	partial
Vapor density	Heavier than air. Vapors that evolve from this product will tend to settle and accumulate near the floor.
Evaporation rate	Slower than n-Butyl Acetate
Specific Gravity/Density	1.318 / 11.00 lbs/gal
V.O.C.	0.7 lbs/gal less water and exempt solvent 84 g/l less water and exempt solvent 0.3 lbs/gal as packed

The VOC content is determined by using a percent solids basis, less water and exempt solvents.

Initial boiling point	100°C; 212°F
Initial freezing point	0°C; 32°F

SECTION X STABILITY AND REACTIVITY

Stability Information	Stable under normal conditions
Conditions to avoid	Temperatures above flash point in combination with sparks, open flames or other sources of ignition. Contamination. Do not freeze.
Chemical incompatibility	Chlorine, strong oxidizing agents, Ammonia, peroxides, acids, chlorinated compounds
Hazardous decomposition products	Carbon dioxide, carbon monoxide, metal fumes, nitrogen containing gases

SECTION XI TOXICOLOGICAL INFORMATION

Chemical name	LD50/LC50
Carbon black	Oral LD50 Rat: >15400 mg/kg; dermal LD50 Rabbit: >3 gm/kg
2-pyrrolidinone, 1-methyl	Oral LD50 Rat: 3914 mg/kg; Oral LD%) Mouse: 5130 mg/kg; dermal: LD50 Rabbit: 8mg/kg

SECTION XII ECOLOGICAL INFORMATION

Overview	Care should be taken to minimize release of any industrial chemicals into the environment
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SECTION XIII DISPOSAL CONSIDERATIONS

Waste disposal of spent product	spent or discarded material is probably a hazardous waste
Disposal methods	Information in this MSDS is provided only as a guide. Consult with competent authority to determine proper waste disposal procedures. Clean up and dispose of waste and clean-up materials in accordance with all federal, state and local environmental regulations
Potential EPS Waste Codes	Not determined

Some components possibly subjected to USEPA land disposal restrictions: When disposing of unused products or waste, the preferred options are to send to a licensed reclaimer or to permitted incinerators. There may be some other ingredients subject to LDR categories. Silver 7440-22-4

SECTION XIV TRANSPORTATION INFORMATION

Agency	Basic description and label
DOT	Not regulated per DOT
Hazardous substance	
Copper	final RQ - 5000 pounds (no reporting of releases of this hazardous substance is required is the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches).
Silver	final RQ - 1000 pounds (no reporting of releases of this hazardous substance is required is the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches).

XV REGULATORY INFORMATION

Regulation	
SARA 313 Reportable	Copper, Silver, N-Methyl-2-pyrrolidinone
TSCA Inventory	All components of this product are listed in, or exempt from the TSCA 8(b) Inventory
California Proposition 65	The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986 Proposition 65: "WARNING This product contains chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm."

THE INFORMATION CONTAINED HEREIN IS BASED ON INFORMATION RECEIVED FROM OUR RAW MATERIAL SUPPLIERS AND OTHER SOURCES AND IS BELIEVED TO BE RELIABLE. THIS INFORMATION IS NOT TO BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH LESS EMF INC. ASSUMES LEGAL RESPONSIBILITY. INFORMATION ON THIS FORM IS TO BE USED TO COMPLY WITH OSHA AND HEALTH REGULATIONS ONLY AND MAY NOT BE USED OR DISSEMINATED FOR OTHER PURPOSES.