Common Name: **COPPER (Dust, Fume or Mist)**  
CAS Number: 7740-50-8  
DOT Number: None

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**HAZARD SUMMARY**

* Copper dust and fume can affect you when breathed in.
* Exposure to dust and fume can irritate the eyes, nose and throat causing coughing, wheezing, nosebleeds, ulcers and a hole in the “bone” dividing the inner nose.
* Copper fume may cause “metal fume fever.” This is a flu-like illness with symptoms of metallic taste, fever and chills, aches, chest tightness and cough.
* Copper may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
* Repeated exposure may cause thickening of the skin and a greenish color to the skin, teeth and hair.
* Repeated high exposure to Copper can affect the liver.

**IDENTIFICATION**

Copper is a reddish-brown metal. It is widely used in the electrical industry, plumbing, heating, roofing and in building construction. It is also used in chemical and pharmaceutical machinery and in intrauterine contraceptive devices for the prevention of pregnancy.

**REASON FOR CITATION**

* Copper is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, NIOSH, DEP, HHAG and EPA.
* Definitions are provided on page 5.

**HOW TO DETERMINE IF YOU ARE BEING EXPOSED**

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

**WORKPLACE EXPOSURE LIMITS**

OSHA: The legal airborne permissible exposure limit (PEL) is 1 mg/m³ for Copper dust and mist and 0.1 mg/m³ for Copper fume averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is 1 mg/m³ for Copper dust and mist and 0.1 mg/m³ for Copper fume averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is 1 mg/m³ for Copper dust and mist and 0.2 mg/m³ for Copper fume averaged over an 8-hour workshift.

* Copper may form metal fumes which present different hazards than the substance itself.

**WAYS OF REDUCING EXPOSURE**

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to Copper fume or mist and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Copper to potentially exposed workers.
This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in “hot” operations in the workplace. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated. Consult the appropriate New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheets.

HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to Copper:

* Exposure to dust and fume can irritate the eyes, nose and throat causing coughing, wheezing and nosebleeds.
* Copper fume may cause “metal fume fever.” This is a flu-like illness with symptoms of metallic taste, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last a day or two.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to Copper and can last for months or years:

Cancer Hazard
* There is evidence that workers in Copper smelters have an increased risk of lung cancer, but this is thought to be due to Arsenic Trioxide and not Copper.

Reproductive Hazard
* Copper may decrease fertility in males and females.

Other Long-Term Effects
* Repeated exposure can cause chronic irritation of the nose and may cause ulcers and a hole in the “bone” dividing the inner nose.
* Copper may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
* Repeated exposure may cause thickening of the skin and a greenish color to the skin, teeth and hair.
* Repeated high exposure to Copper can affect the liver.

MEDICAL

Medical Testing
For those with frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

* Serum and urine Copper levels.

If symptoms develop or overexposure is suspected, the following is recommended:

* Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.
* Liver function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures
* Copper metal often contains Arsenic as an impurity. Consult the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet on Arsenic if you are exposed to Copper dust or fume.

Conditions Made Worse By Exposure
* “Wilson's Disease” is a rare condition that interferes with the body’s ability to get rid of Copper. If you have this illness, consult your doctor about Copper exposure.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically transfer Copper dust or powder from drums or other storage containers to process containers.
**COPPER (Dust, Fume or Mist)**

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by Copper dust, fume or powder should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Copper dust, fume or powder.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with Copper dust, fume or powder, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted Copper dust, fume or powder whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where Copper dust or powder is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**

**PERSONAL PROTECTIVE EQUIPMENT**

**WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT.** However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

**Clothing**

* Avoid skin contact with Copper dust or powder. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

**Eye Protection**

* Wear impact resistant eye protection with side shields or goggles.
* Contact lenses should not be worn when working with this substance.

**Respiratory Protection**

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

*NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect Copper, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
* Exposure to 100 mg/m$^3$ (as Copper dust, fume or mist) is immediately dangerous to life and health. If the possibility of exposure above 100 mg/m$^3$ exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.
**QUESTIONS AND ANSWERS**

**Q:** If I have acute health effects, will I later get chronic health effects?
**A:** Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

**Q:** Can I get long-term effects without ever having short-term effects?
**A:** Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

**Q:** What are my chances of getting sick when I have been exposed to chemicals?
**A:** The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

**Q:** When are higher exposures more likely?
**A:** Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

**Q:** Is the risk of getting sick higher for workers than for community residents?
**A:** Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

**Q:** Don't all chemicals cause cancer?
**A:** No. Most chemicals tested by scientists are not cancer-causing.

**Q:** Can men as well as women be affected by chemicals that cause reproductive system damage?
**A:** Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

**Q:** Who is at the greatest risk from reproductive hazards?
**A:** Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.
DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A carcinogen is a substance that causes cancer.

The CAS number is assigned by the Chemical Abstracts Service to identify a specific chemical.

A combustible substance is a solid, liquid or gas that will burn.

A corrosive substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A fetus is an unborn human or animal.

A flammable substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The flash point is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A miscible substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A mutagen is a substance that causes mutations. A mutation is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A reactive substance is a solid, liquid or gas that releases energy under certain conditions.

A teratogen is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The vapor pressure is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.
Common Name: COPPER (Dust, Fume or Mist)
DOT Number: None
NAERG Code: No Citation
CAS Number: 7440-50-8

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COPPER FUMES RELEASED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* Extinguish fire using an agent suitable for type of surrounding fire. Copper itself does not burn.
* Powdered Copper may be combustible.
* COPPER FUMES ARE RELEASED IN FIRE.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If Copper dust or powder is spilled, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
* Remove all ignition sources.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* It may be necessary to contain and dispose of Copper dust and powder as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FIRST AID

In NJ, POISON INFORMATION 1-800-764-7661

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Consult an ophthalmologist (eye specialist) immediately.

Skin Contact

* Remove contaminated clothing. Wash contaminated skin with water.

Breathing

* Remove the person from exposure.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 1 mm Hg at 2962.4°F (1628°C)
Water Solubility: Insoluble

HANDLING AND STORAGE

* Prior to working with Copper you should be trained on its proper handling and storage.
* Store in tightly closed containers in a cool, well-ventilated area away from ACETYLENE GAS because flammable Hydrogen is produced.
* Copper (Dust, Fume, Mist or Powder) is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); CHEMICALLY ACTIVE METALS (such as POTASSIUM, SODIUM, MAGNESIUM and ZINC); ZIRCONIUM; SODIUM AZIDE; and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE).
* Use only non-sparking tools and equipment, especially when opening and closing containers of Copper powder.

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
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