

COPPER (-63, -65) POWDER

Chemwatch: 10072
 Version No: 5.1.1.1
 Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: 01/01/2013
 Print Date: 5/11/2016
 Initial Date: **Not Available**
 S.GHS.USA.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	Copper
Chemical Name	Copper
Synonyms	Copper
Proper shipping name	Not Applicable
Chemical formula	Cu
Other means of identification	Not Available
CAS number	7440-50-8

Relevant identified uses of the substance

	Research and medical applications
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Details of the manufacturer

Registered company name	Oak Ridge National Laboratory
Address	P.O. Box 2008 Oak Ridge, Tennessee 37831-6158
Telephone	(865) 574-6984
Fax	(865) 574-6986
Website	http://isotopes.gov/
Email	isotopes@ornl.gov

Emergency telephone number

Association / Organization	Oak Ridge National Laboratory
Emergency telephone numbers	(865) 574-6606
Other emergency telephone numbers	CHEMTREC: 1-800-424-9300

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	3	3
Toxicity	2	2
Body Contact	2	2
Reactivity	2	2
Chronic	2	2

0 = Minimum
 1 = Low
 2 = Moderate
 3 = High
 4 = Extreme



Flammable Solid Category 1, Skin/Irritation Category 2, Eye Irritation Category 2A, Skin Sensitizer Category 1, Carcinogen Category 2, STOT - SE (Resp. Irr.) Category 3, Acute Aquatic Hazard Category 3

Category

Label elements



Hazard statement(s)

COPPER

H228	Flammable solid
H315 + H319	Causes skin and eye irritation
H402	Harmful to aquatic life
H317	May cause an allergic skin reaction
H335	May cause respiratory irritation

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/attention.
P370+P378	In case of fire: Use extinguishing media for surround materials.
P302+P352	IF ON SKIN: Wash with plenty of water and soap
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Precautionary statement(s) Storage

P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s): Disposal

	Dispose of contents/container to authorized chemical landfill or if organic to high temperature incineration
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

CAS No	%[weight]	Name
7440-50-8	100	copper

Mixtures

See section above for composition of Substances

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ■ Wash out immediately with fresh running water. ■ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ■ Seek medical attention without delay; if pain persists or recurs seek medical attention. ■ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. ■ DO NOT attempt to remove particles attached to or embedded in eye. ■ Lay victim down, on stretcher if available and pad both eyes, make sure dressing does not press on the injured eye by placing thick pads under dressing, above and below the eye. ■ Seek urgent medical assistance, or transport to hospital.
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ■ Immediately remove all contaminated clothing, including footwear. ■ Flush skin and hair with running water (and soap if available). ■ Seek medical attention in event of irritation. <p>In case of burns:</p> <ul style="list-style-type: none"> ■ Immediately apply cold water to burn either by immersion or wrapping with saturated clean cloth. ■ DO NOT remove or cut away clothing over burnt areas. Do not pull away clothing which has adhered to the skin as this can cause further injury. ■ DO NOT break blister or remove solidified material. <p>Quickly cover wound with dressing or clean cloth to help prevent infection and to ease pain. For large burns, sheets, towels or pillow slips are ideal; leave holes for eyes, nose and mouth. DO NOT apply ointments, oils, butter, etc. to a burn under any circumstances.</p> <p>Water may be given in small quantities if the person is conscious. Alcohol is not to be given under any circumstances. Reassure. Treat for shock by keeping the person warm and in a lying position. Seek medical aid and advise medical personnel in advance of the cause and extent of the injury and the estimated time of arrival of the patient.</p>
Inhalation	<p>If fumes or combustion products are inhaled remove from contaminated area. Lay patient down. Keep warm and rested. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. Transport to hospital, or doctor.</p>
Ingestion	<p>Immediately give a glass of water. First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.</p>

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Indication of any immediate medical attention and special treatment needed

for copper intoxication:

- Unless extensive vomiting has occurred empty the stomach by lavage with water, milk, sodium bicarbonate solution or a 0.1% solution of potassium ferrocyanide (the resulting copper ferrocyanide is insoluble).
 - Administer egg white and other demulcents.
 - Maintain electrolyte and fluid balances.
 - Morphine or meperidine (Demerol) may be necessary for control of pain.
 - If symptoms persist or intensify (especially circulatory collapse or cerebral disturbances, try BAL intramuscularly or penicillamine in accordance with the supplier's recommendations.
 - Treat shock vigorously with blood transfusions and perhaps vasopressor amines.
 - If intravascular hemolysis becomes evident protect the kidneys by maintaining a diuresis with mannitol and perhaps by alkalizing the urine with sodium bicarbonate. It is unlikely that methylene blue would be effective against the occasional methemoglobinemia and it might exacerbate the subsequent hemolytic episode.
 - Institute measures for impending renal and hepatic failure.
- [GOSSELIN, SMITH & HODGE: Commercial Toxicology of Commercial Products] A role for activated charcoal or emesis is, as yet, unproven.
- In severe poisoning CaNa2EDTA has been proposed.
- [ELLENHORN & BARCELOUX: Medical Toxicology]

Copper, magnesium, aluminum, antimony, iron, manganese, nickel, zinc (and their compounds) in welding, brazing, galvanizing or smelting operations all give rise to thermally produced particulates of smaller dimension than may be produced if the metals are divided mechanically. Where insufficient ventilation or respiratory protection is available these particulates may produce "metal fume fever" in workers from an acute or long term exposure.

- Onset occurs in 4-6 hours generally on the evening following exposure. Tolerance develops in workers but may be lost over the weekend. (Monday Morning Fever)
- Pulmonary function tests may indicate reduced lung volumes, small airway obstruction and decreased carbon monoxide diffusing capacity but these abnormalities resolve after several months.
- Although mildly elevated urinary levels of heavy metal may occur they do not correlate with clinical effects.
- The general approach to treatment is recognition of the disease, supportive care and prevention of exposure.
- Seriously symptomatic patients should receive chest x-rays, have arterial blood gases determined and be observed for the development of tracheobronchitis and pulmonary edema.

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- **Do NOT direct a solid stream of water or foam into burning molten material; this may cause spattering and spread the fire.**
- Metal dust fires need to be smothered with sand, inert dry powders.
- DO NOT USE WATER, CO2 or FOAM.**
- Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1 or Met L-X to smother fire.

Special hazards arising from the substrate or mixture

- Reacts with acids producing flammable / explosive hydrogen (H2) gas
- None known.

Advice for firefighters

Fire Fighting

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves in the event of a fire.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use firefighting procedures suitable for surrounding area.

Fire/Explosion Hazard

- **DO NOT disturb burning dust. Explosion may result if dust is stirred into a cloud, by providing oxygen to a large surface of hot metal.**
- **DO NOT use water or foam as generation of explosive hydrogen may result.**

With the exception of the metals that burn in contact with air or water (for example, sodium), masses of combustible metals do not represent unusual fire risks because they have the ability to conduct heat away from hot spots so efficiently that the heat of combustion cannot be maintained - this means that it will require a lot of heat to ignite a mass of combustible metal.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact with the substance, by using protective equipment.

Major Spills

- Moderate hazard.
- **CAUTION:** Advise personnel in area.
 - Alert Emergency Services and tell them location and nature of hazard.
 - Control personal contact by wearing protective clothing.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.

Other information

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry area protected from environmental extremes.
- Store away from incompatible materials and foodstuff containers.

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Conditions for safe storage, including any incompatibilities

Suitable container	<p>Bulk bags: Reinforced bags required for dense materials.</p> <ul style="list-style-type: none"> ■ CARE: Packing of high density product in light weight metal or plastic packages may result in container collapse with product release ■ Heavy gauge metal packages / Heavy gauge metal drums ■ Polyethylene or polypropylene container. ■ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	<p>The material is described as an electropositive metal.</p> <p>The activity or electromotive series of metals is a listing of the metals in decreasing order of their reactivity with hydrogen-ion sources such as water and acids. In the reaction with a hydrogen-ion source, the metal is oxidized to a metal ion, and the hydrogen ion is reduced to H₂. The ordering of the activity series can be related to the standard reduction potential of a metal cation.</p> <p>[Avoid contact with acetylene, ammonium nitrate, barium bromate, chlorates and iodates, bromates, phosphorus, potassium chlorate, potassium iodate, potassium peroxide, sodium azide, sodium chlorate and iodate, sodium peroxide, sulfur and chlorates.]The powder forms friction- heat, or shock-sensitive detonator, copper acetylide, with acetylene and acetylene compounds. Potentially violent reactions may occur when finely dispersed powder come in contact with strong oxidizers, alkynes, azides, bromine vapor, calcium carbide, chlorine, ethylene oxide, hydrazine mononitrate, hydrogen peroxide, hydrogen sulfide, finely divided iodine, lead azide, potassium peroxide, sodium peroxide, sulfuric acid. Incompatible with acids, anhydrous ammonia.</p>

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Levels (PELs) - Table Z1	copper	Copper - Fume / Copper	0.1 mg/m ³ / 1 mg/m ³	Not Available	Not Available	(as Cu) / (as Cu);Dusts and mists
US OSHA Permissible Exposure Levels (PELs) - Table Z3	copper	Inert or Nuisance Dust	5 mg/m ³ / 15 mg/m ³ / 15 mppcf / 50 mppcf	Not Available	Not Available	Respirable fraction; All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1. / Total dust; All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1.
US ACGIH Threshold Limit Values (TLV)	copper	Copper - Fume, as Cu / Copper - Dusts and mists, as Cu	0.2 mg/m ³ / 1 mg/m ³	Not Available	Not Available	TLV® Basis: Irr; GI; metal fume fever; BEI
US NIOSH Recommended Exposure Limits (RELs)	copper	Copper metal dusts, Copper metal fumes	1 mg/m ³	Not Available	Not Available	[*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.]

EMERGENCY LIMITS

Ingredient	TEEL-0	TEEL-1	TEEL-2	TEEL-3
COPPER	Not Available	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
copper	N.E. mg/m ³ / N.E. ppm	100 mg/m ³

Exposure controls

Appropriate engineering controls	<p>Metal dusts must be collected at the source of generation as they are potentially explosive.</p> <ul style="list-style-type: none"> ■ Avoid ignition sources. ■ Good housekeeping practices must be maintained. ■ Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions.
Personal protection	
Eye and face protection	<p>Safety glasses with side shields.</p> <p>Chemical goggles.</p> <p>Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.</p>
Skin protection	See Hand protection below
Hands/feet protection	<p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Suitability and durability of glove type is dependent on usage.</p>
Body protection	See Other protection below
Other protection	<p>When handling hot or molten liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.</p> <p>Usually handled as molten liquid which requires worker thermal protection and increases hazard of vapor exposure.</p> <p>CAUTION: Vapors may be irritating.</p> <p>Overalls.</p>

Continued...

COPPER

Thermal hazards	Not Available
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Recommended material(s)**GLOVE SELECTION INDEX**

Glove selection is based on a modified presentation of the:

Porsberg Clothing Performance Index.

The effect(s) of the following substance(s) are taken into account in the computer generated selection:

COPPER Not Available

Material	CPI

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:000 & 149:001, ANSI Z88 or national equivalent)

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	P1 Air-line*	-	PAPR-P1 -
up to 50 x ES	Air-line**	P2	PAPR-P2
up to 100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapors, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia (NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds (below 65 deg)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES**Information on basic physical and chemical properties**

COPPER

	Reddish metallic powder		
Physical state	Solid	Relative density (Water = 1)	8.94
Odor	Not Available	Partition coefficient n-octanol / water	Not Available
Odor threshold	Not Available	Auto-ignition temperature (°C)	Not Applicable
pH (as supplied)	Not Applicable	Decomposition temperature	Not Applicable
Melting point / freezing point (°C)	1083	Viscosity (cSt)	Not Applicable
Initial boiling point and boiling range (°C)	2324	Molecular weight (g/mol)	63.5
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Applicable	Explosive properties	Not Available
Flammability	Not Applicable	Oxidizing properties	Not Available
Upper Explosive Limit (%)	Not available.	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Negligible
Vapor pressure (kPa)	0.13 @ 1628 C	Gas group	Not Available
Solubility in water (g/L)	Immiscible	pH as a solution(1%)	Not Applicable
Vapor density (Air = 1)	Not Applicable	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ■ Unstable in the presence of incompatible materials. ■ Product is considered stable. ■ Hazardous polymerization will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	<p>Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralizing the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>§Nasal ulcerations with resultant nose-bleed may occur following inhalation of fine dusts.</p>
Ingestion	<p>Although ingestion is not thought to produce harmful effects (as classified under EC Directives), the material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.</p> <p>§If vomiting does not occur immediately, systemic copper poisoning may occur; capillary damage, headache, cold sweat, weak pulse, kidney and liver damage may be the result of poisoning.</p>
Skin Contact	<p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterized by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>§Contact with surface film of lubricant may cause reactions.</p>
Eye	<p>Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterized by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p> <p>Contact with the eye, by metal dusts, may produce mechanical abrasion or foreign body penetration of the eyeball.</p> <p>Copper salts, in contact with the eye, may produce conjunctivitis or even ulceration and turbidity of the cornea.</p>

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Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Chronic copper poisoning is rarely recognized in man although in one instance, at least, symptoms more commonly associated with exposures to mercury, namely infantile acrolynia (pink disease), have been described. Tissue damage of mucous membranes may follow chronic dust exposure. A hazardous situation is exposure of a worker with the rare hereditary condition (Wilson's disease or hereditary hepatolenticular degeneration) to copper exposure which may cause liver, kidney, CNS, bone and sight damage and is potentially lethal.

Chronic exposure to copper dusts may result in runny nose, irritation of mucous membranes and atrophic changes with resultant dementia. Pre-existing skin, kidney, liver and pulmonary disorders may be aggravated by acute exposure.

Oral (rat) LD50: 5800 mg/kg	Nil Reported
Not Available	Not Available

* Value obtained from manufacturer's MSDs

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances

for copper and its compounds (typically copper chloride):

Acute toxicity: There are no reliable acute oral toxicity results available. In an acute dermal toxicity study (OECD TG 402), one group of 5 male rats and 5 groups of 5 female rats received doses of 1000, 1500 and 2000 mg/kg bw via dermal application for 24 hours. The LD50 values of copper monochloride were 2,000 mg/kg bw or greater for male (no deaths observed) and 1,224 mg/kg bw for female. Four females died at both 1500 and 2000 mg/kg bw, and one at 1,000 mg/kg bw.

WARNING: Inhalation of high concentrations of copper fume may cause "metal fume fever", an acute industrial disease of short duration. Symptoms are tiredness, influenza like respiratory tract irritation with fever.

Acute Toxicity	☒	Carcinogenicity	☒
Skin Irritation/Corrosion	☒	Reproductivity	☒
Serious Eye Damage/Irritation	☒	STOT - Single Exposure	☒
Respiratory or Skin sensitization	☒	STOT - Repeated Exposure	☒
Mutagenicity	☒	Aspiration Hazard	☒

Legend:
✔ - Data required to make classification available
✘ - Data available but does not fill the criteria for classification
☒ - Data Not Available to make classification

CMR STATUS

CARCINOGEN	copper	US Environmental Defense Scorecard Suspected Carcinogens	P65-MC
RESPIRATORY	copper	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Respiratory US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) - Respiratory	X

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Harmful to aquatic organisms.

Metal-containing inorganic substances generally have negligible vapor pressure and are not expected to partition to air. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. Environmental processes (such as oxidation and the presence of acids or bases) may transform insoluble metals to more soluble ionic forms.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled, if unused, or if it has not been contaminated so as to make it unsuitable for its intended use.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO

Land transport (DOT)

UN number	3089
Packing group	II
UN proper shipping name	Metal powders, flammable, n.o.s.
Environmental hazard	No relevant data
Transport hazard class(es)	Class : 4.1
Special precautions for user	Special provisions : IB8, IP2, IP4, T3, TP33

Air transport (ICAO-IATA / DGR)

UN number	3089
Packing group	II
UN proper shipping name	Metal powder, flammable, n.o.s.
Environmental hazard	No relevant data
Transport hazard class(es)	ICAO/IATA Class : 4.1 ICAO / IATA Subrisk : Not Applicable ERG Code : 3L
Special precautions for user	Special provisions : A3 Cargo Only Packing Instructions : 448 Cargo Only Maximum Qty / Pack : 50 kg Passenger and Cargo Packing Instructions : 445 Passenger and Cargo Maximum Qty / Pack : 15 kg Passenger and Cargo Limited Quantity Packing Instructions : Y441 Passenger and Cargo Limited Maximum Qty / Pack : 5 kg

Sea transport (IMDG-Code / GGVSee)

UN number	3089
Packing group	II
UN proper shipping name	METAL POWDER, FLAMMABLE, N.O.S.
Environmental hazard	No relevant data
Transport hazard class(es)	IMDG Class : 4.1 IMDG Subrisk : Not Applicable
Special precautions for user	EMS Number : F-G , S-G Special provisions : Not Applicable Limited Quantities : 1 kg

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

	"US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - California Permissible Exposure Limits for Chemical Contaminants","International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","US - Michigan Exposure Limits for Air Contaminants","US EPA Carcinogens Listing","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Oregon Permissible Exposure Limits (Z-1)","US OSHA Permissible Exposure Levels (PELs) - Table Z3","US - Alaska Limits for Air Contaminants","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US NIOSH Recommended Exposure Limits (RELs)","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Washington Permissible exposure limits of air contaminants","US - Minnesota Permissible Exposure Limits (PELs)","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US OSHA Permissible Exposure Levels (PELs) - Table Z1"
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SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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