

Copper(II) oxide



IDENTIFICATION

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Copper(II) oxide
Cupric oxide

ZVG No: 1990
CAS No: 1317-38-0
EC No: 215-269-1
INDEX No: 029-016-00-6

CHARACTERISATION

SUBSTANCE GROUP CODE

121110 Metal oxides
134100 Copper compounds

STATE OF AGGREGATION

The substance is solid.

PROPERTIES

amorphous or crystalline powder
black

CHEMICAL CHARACTERISATION

Non-combustible substance.
Practically insoluble in water.
Hygroscopic.

Acute or chronic health hazards result from the substance.
The substance is hazardous to the aquatic environment.
(see: chapter REGULATIONS).

[Substance information in Wikipedia](#)

FORMULA

CuO

Cu^{2+} O^{2-}

Molar mass: 79,55 g/mol

TOXICOLOGY / ECOTOXICOLOGY

ECOTOXICOLOGICAL DATA

LC50 Fish (96 hours)

Minimum: 25,4 mg/l

Maximum: 25,4 mg/l

Median: 25,4 mg/l

Study number: 1

Reference for median:

Office of Pesticide Programs 2000. Pesticide Ecotoxicity Database (Formerly: Environmental Effects Database (EEDB)). Environmental Fate and Effects Division, U.S.EPA, Washington, D.C.

Reference: [02072](#)

PHYSICAL AND CHEMICAL PROPERTIES

MELTING POINT

Melting point: 1326 °C

Reference: [00500](#)

DENSITY

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Value: 6,48 g/cm³

Temperature: 20 °C

Reference: [01211](#)

SOLUBILITY IN WATER

practically insoluble in water

Temperature: 20 °C

Reference: 01211

pH-VALUE

pH-value: ca. 7

Temperature: 20 °C

Concentration: 50 g/l

slurry

Reference: 01211

HAZARDOUS REACTIONS

Decomposition temperature: 1026 °C

Decompositon products:

Oxygen

Hazardous chemical reactions:

Risk of explosion in contact with:

potassium

aluminium powder/heat;

phthalic anhydride (heat);

hydrogen (heat)

The substance can react dangerously with:

fluorine

sodium

substances which can be oxidized

boron/heat;

dichloromethylsilane;

hydrazine;

hydroxylamine;

magnesium;

hydrogen sulphide;

strontium hydride;

titan powder

SAFE HANDLING

TECHNICAL MEASURES - HANDLING

Workplace:

Provision of good ventilation in the working area.

The floor should not have a floor drain.

Washing facility at the workplace required.

Equipment:

Use closed apparatus if possible.

If release of the substance cannot be prevented, then it should be suctioned off at the point of exit.

Consider emission limit values, a purification of waste gases if necessary.

Label containers and pipelines clearly.

Unsuitable materials:

Aluminium

Advice on safer handling:

Take care to keep workplace clean and dry.

Do not leave container open.

Sufficient ventilation must be guaranteed for refilling, transfer, or open use.

Avoid spillage.

Fill only into labelled container.

Avoid rising dust.

Use an appropriate exterior vessel when transporting in fragile containers.

Cleaning and maintenance:

Use protective equipment while cleaning if necessary.

Avoid dust formation. Dust formation that cannot be avoided must be collected regularly.

Use a tested industrial vacuum cleaner or suction device.

Do not raise dust while cleaning.

Use of a blower for cleaning is not permitted.

TECHNICAL MEASURES - STORAGE

Storage:

Do not use any food containers - risk of mistake.

Containers have to be labelled clearly and permanently.

Store in the original container as much as possible.

Keep container tightly closed.

Store in a dry place.

Keep container in a well-ventilated place.

Protect from moisture.

Substance is hygroscopic.

Conditions of collocated storage:

Storage class 10 - 13 (Other liquids and solids)

Only substances of the same storage class should be stored together.

Collocated storage with the following substances is prohibited:

- Pharmaceuticals, foods, and animal feeds including additives.
- Infectious, radioactive und explosive substances.
- Strongly oxidizing substances of storage class 5.1A.

Under certain conditions the collocated storage with the following sub-stances is permitted (For more details see [TRGS 510](#)):

- Gases.

- Flammable liquids of storage class 3.
- Other explosive substances of storage class 4.1A.
- Pyrophoric substances.
- Substances liberating flammable gases in contact with water.
- Oxidizing substances of storage class 5.1B.
- Ammonium nitrate and preparations containing ammonium nitrate.
- Organic peroxides and self reactive substances.
- Combustible and non combustible acutely toxic substances of storage classes 6.1A and 6.1B.

The substance should not be stored with substances with which hazardous chemical reactions are possible.

TECHNICAL MEASURES - FIRE AND EXPLOSION PROTECTION

Technical, constructive measures:

Substance is non-combustible. Select fire and explosion prevention measures according to the other used substances.

ORGANISATIONAL MEASURES

Instruction on the hazards and the protective measures using instruction manual ([TRGS 555](#)) are required with signature if just more than one minor hazard was detected.

Instruction must be provided before employment and then at a minimum of once per annum thereafter.

Observe the restrictions on juvenile employment as defined in the "Jugendarbeitsschutzgesetz".

PERSONAL PROTECTION

Body protection:

Wear an apron or a lab coat.

Respiratory protection:

In an emergency (e.g.: unintentional release of the substance) respiratory protection must be worn. Consider the maximum period for wear.

Respiratory protection: Particle filter P2, colour code white.

Use insulating device for concentrations above the usage limits for filter devices, for oxygen concentrations below 17% volume, or in circumstances which are unclear.

Eye protection:

Sufficient eye protection should be worn.

Wear glasses with side protection.

Hand protection:

The use of resistant protective gloves is recommended.

Skin protection cremes do not protect as effectively against the substance as protective gloves. Therefore suitable protective gloves should be preferred as far as possible.

Currently there is no information available regarding suitable glove materials.

Experience says that polychloroprene, nitrile rubber, butyl rubber, fluoro-caoutchouc, and polyvinyl chloride are suitable as glove materials for protection against un-dissolved solids.

Occupational hygiene:

Foods, beverages and other articles of consumption must not be consumed at the work areas. Suitable areas are to be designated for these purposes.

Avoid inhalation of dust.

Avoid contact with clothing. Contaminated clothes must be exchanged and cleaned carefully.

Provide washrooms with showers and if possible rooms with separate storage for street clothing and work clothing.

The skin must be washed with soap and water before breaks and at the end of work.

Apply fatty skin-care products after washing.

DISPOSAL CONSIDERATIONS

Hazardous waste according to Waste Catalogue Ordinance (AVV).

If there is no way of recycling it must be disposed of in compliance with the respective national and local regulations.

Collection of small amounts of substance:

Residues should be recycled.

Collect in container for recyclable metal residues. All metals should be collected separately.

Do not put/place waste into sink or dust bin.

Collection vessels must be clearly labelled with a systematic description of their contents. Store the vessels in a well-ventilated location. Entrust them to the appropriate authorities for disposal.

ACCIDENTAL RELEASE MEASURES

Wear respiratory protection, eye protection, hand protection and body protection (see chapter Personal Protection).

Pick up without creating dust.

Afterwards ventilate area and wash spill site.

Endangerment of water:

Severe hazard to waters. Avoid penetration into water, drainage, sewer, or the ground.

Inform the responsible authorities about penetration of even small quantities.

FIRE FIGHTING MEASURES

Instructions:

Substance is incombustible. Select fire fighting measures according to the surrounding conditions.

Do not allow runoff to get into the sewage system.

REGULATIONS

Classification:

Acute toxicity, Category 4, oral; H302

Hazardous to the aquatic environment, Acute Category 1; H400

Hazardous to the aquatic environment, Chronic Category 1; H410



Signal Word: "Warning"

Hazard Statement - H-phrases:

H302: Harmful if swallowed.

H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statement - P-phrases:

P260: Do not breathe dust..

P273: Avoid release to the environment.

Manufacturer's specification by Merck

Reference: [01211](#)

State: 2015

Checked: 2016

The substance is listed in appendix VI, table 3.1 of CLP regulation.

The given classification can deviate from the listed classification, since this classification is to be complemented concerning missing or divergent danger classes and categories for the respective substance.

Reference: [99999](#)

GHS-CLASSIFICATION OF MIXTURES

The classification of mixtures containing this substance results from Annex 1 of Regulation (EC) 1272/2008.

M-factor: M=100

Reference: [07509](#)

WORKPLACE LABELLING ACCORDING TO GERMAN [ASR A1.3](#)

Precept label:



Use safety goggles

GERMAN WATER HAZARD CLASS

Substance No: 1401

WGK 3 - severe hazard to waters

Classification according to the announcement of the list of substances hazardous to water in the Federal Register of 10.08.2017

TECHNICAL INSTRUCTIONS ON AIR QUALITY CONTROL (TA LUFT)

Chapter 5.2.2 Inorganic dusts

Class III

Also with the presence of several substances of the same class, the following values are in all not allowed to be exceeded in the exhaust gas:

Mass flow: 5 g/hr

or

Mass conc.: 1 mg/m³

Specified as Cu.

TRANSPORT REGULATIONS

UN Number: 3077

Shipping name: Environmentally hazardous substances, solid, n.o.s.

Hazard Identification Number: 90

Class: 9 (Miscellaneous items and materials)

Packing Group: III (low danger)

Danger Label: 9



Special labelling: Symbol (fish and tree)



Tunnel restrictions:

Passage forbidden through tunnels of category E.

Reference: 01211

RECOMMENDATIONS OF MAK-COMMISSION

This data is recommended by scientific experience and is not established law.

0,01 mg/m³

with reference to the alveolar fraction

Peak limitation: Excursion factor 2

Duration 15 min, mean; 4 times per shift; interval 1 hour

Category II - Substances with systemic effects

Pregnancy: Group C

There is no reason to fear a risk of damage to the developing embryo or foetus when MAK and BAT values are adhered to.

inorganic copper compounds

GERMAN BIOLOGICAL EXPOSURE INDICES

Parameter: Copper

Assay material: Urine

inorganic Copper compounds

There is at present insufficient data for the derivation of a BAT value; however, documentation for this substance has been published.

Reference: 08106

SEVESO III - Directive

Annex I Part 1 Section: E1

Hazardous to the aquatic environment, Category Acute 1 or Chronic 1

Qualifying quantity for the application of

Lower-tier requirements: 100 t

Upper-tier requirements: 200 t

FURTHER REGULATIONS

[TRGS 200](#)

Einstufung und Kennzeichnung von Stoffen, Zubereitungen und Erzeugnissen;
Ausgabe Oktober 2011

[TRGS 201](#)

Einstufung und Kennzeichnung bei Tätigkeiten mit Gefahrstoffen; Ausgabe Februar
2017

[TRGS 400](#)

Gefährdungsbeurteilung für Tätigkeiten mit Gefahrstoffen; Ausgabe Juli 2017

[TRGS 555](#)

Betriebsanweisung und Information der Beschäftigten; Ausgabe Februar 2017

[TRGS 600](#)

Substitution; Ausgabe August 2008

[TRGS 500](#)

Schutzmaßnahmen; Ausgabe Januar 2008, ergänzt Mai 2008

[TRGS 509](#)

Lagern von flüssigen und festen Gefahrstoffen in ortsfesten Behältern sowie Füll- und Entleerstellen für ortsbewegliche Behälter; Ausgabe September 2014, zuletzt berichtigt, geändert und ergänzt April 2017

[TRGS 510](#)

Lagerung von Gefahrstoffen in ortsbeweglichen Behältern; Ausgabe Januar 2013, geändert und ergänzt November 2014, berichtigt November 2015

LINKS

[International Limit Values](#)

[The MAK Collection for Occupational Health and Safety](#)

[DGUV Information 213-098: List of substances - lesson in schools \(in German only\)](#)

REFERENCES

Reference: 00001

IFA: Erfassungs- und Pflegehandbuch der GESTIS-Stoffdatenbank (nicht öffentlich)
Data acquisition and maintenance manual of the GESTIS substance database
(non-public)

Reference: 00500

RÖMPP Online ab 2003

Reference: 01010

Merck: Chemicals Database
<http://www.merckmillipore.com/DE/de>
<http://www.merckmillipore.com/DE/en>

Reference: 01211

GHS-Sicherheitsdatenblatt (GHS Material Safety Data Sheet), Merck

Reference: 02072

Ecotoxicological Data, compiled by the US Environmental Protection Agency (EPA),
selected and distributed by Technical Database Services (TDS), New York, 2009

Reference: 05000

Kühn-Birett-Gruppenmerkblätter

Reference: 05300

[TRGS 510](#) "Lagerung von Gefahrstoffen in ortsbeweglichen Behältern" Ausgabe Januar 2013, in der Fassung vom 30.11.2015

Reference: 06002

L. Roth, U. Weller "Gefährliche Chemische Reaktionen" Loseblattsammlung mit Ergänzungslieferungen ("Dangerous chemical reactions" loose-leaf collection with supplement deliveries), ecomed-Verlag

Reference: 07509

Verordnung (EU) Nr. 2016/1179 der Kommission vom 19. Juli 2016 zur Änderung der Verordnung (EG) Nr. 1272/2008 des Europäischen Parlaments und des Rates über die Einstufung, Kennzeichnung und Verpackung von Stoffen und Gemischen (EG-GHS-Verordnung, 9. Änderung).

Die harmonisierten Einstufungen gelten ab dem 1. März 2018, dürfen aber schon vorher verwendet werden.

Reference: 07580

Bekanntmachung der Liste der wassergefährdenden Stoffe im Bundesanzeiger vom 10.08.2017

Reference: 07727

L. Roth "Gefahrstoff-Entsorgung" Loseblattsammlung mit Ergänzungslieferungen, ecomed-Verlag, Landsberg

Reference: 07734

N.I. Sax, R.J. Lewis "Dangerous Properties of Industrial Materials" Volume I, II, III; 7. Auflage, Van Nostrand Reinhold, New York 1989

Reference: 07750

R. E. Lenga "The Sigma-Aldrich Library of Chemical Safety Data" 2nd edition, Sigma-Aldrich, Milwaukee 1988

Reference: 08106

DFG Deutsche Forschungsgemeinschaft: MAK- und BAT-Werte-Liste 2017, Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe, Mitteilung 53; WILEY-VCH

Reference: 99999

Angabe des Bearbeiters (Indication of the editor)

This substance datasheet was created with greatest care. Nevertheless no liability irrespective of legal basis can be accepted.