

ROUTES OF ENTRY:

Eye and skin contact; ingestion; inhalation of dust or fumes.

ACUTE EFFECTS:

Inhalation of fumes or dust may result in irritation to eyes, nose and respiratory system. Inhalation of copper oxide fumes may produce metal fume fever. Ingestion may produce nausea, vomiting, abdominal pain, diarrhea, and hemolysis. Symptoms of metal fume fever include metallic taste, dryness and irritation of throat, fatigue and fever.

CHRONIC EFFECTS:

Repeated or prolonged contact may result in sensitization of target organs. Minor irritation effects can occur from exposure to dust at ambient temperature. The International Agency for Research on Cancer (IARC) has classified this one or more of the components as a Group 1 (known) carcinogen.

PREVENTIVE MEASURES:

Avoid breathing of dust; wear a NIOSH-approved or equivalent respirator, long-sleeved shirt, gloves and suitable eye protection if working in dusty conditions.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

Although available data do not indicate any medical conditions as being aggravated by exposure to this substance, it is nevertheless advised that persons with pre-existing disorders of eyes, nose, throat, lungs or skin avoid prolonged contact with or exposure to dust from this product.

4. FIRST AID MEASURES**INHALATION:**

Remove immediately from contaminated atmosphere into fresh air. If breathing is difficult, give artificial respiration or administer oxygen.

SKIN CONTACT:

Wash with soap and water immediately after exposure.

EYE CONTACT:

Flush eyes thoroughly with water for at least 15 minutes. Get medical attention.

INGESTION:

Rinse mouth and then drink plenty of water. Induce vomiting unless victim is unconscious or having convulsions. Get medical attention.

NOTE TO PHYSICIAN:

Symptomatic treatment (decontamination, vital functions), administer chelate formers.

5. FIRE-FIGHTING MEASURES**FLAMMABILITY:**

Does not ignite.

EXTINGUISHING MEDIA:

Use media suitable for surrounding environment (water; dry extinguishing media; foam; carbon dioxide).

HAZARDS DURING FIRE-FIGHTING: No particular hazards known.

NFPA Hazard Codes:

Health: 2 Fire: 0 Reactivity: 0 Special:

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTION: Avoid breathing of dust and creation of dust; use respiratory protection if exposed to dust or fines from this product.

ENVIRONMENTAL PRECAUTIONS:

Discharge into the environment must be avoided.

CLEAN-UP OF SPILLS:

Spills should be swept up and placed in appropriate containers for disposal.

7. HANDLING AND STORAGE**HANDLING:**

This product is not combustible or explosive. No special handling precautions are needed. Use of Personal Protective Equipment (dust mask, eye protection, etc.) to avoid breathing of dust and contact with eyes and skin is advised.

STORAGE:

Suitable for storage in general chemical storage area. Containers should be kept tightly sealed, and stored in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**COMPONENTS WITH WORKPLACE CONTROL PARAMETERS**

Aluminum oxide	OSHA	PEL 5 mg/m3 Respirable fraction
		PEL 15 mg/m3 Total particulate
	ACGIH	TWA 1 mg/m3 Respirable fraction
Cobalt oxide (Co ₃ O ₄)	ACGIH	TWA 0.02 mg/m3 (Co)
Nickel monoxide	OSHA	PEL 1 mg/m3 (Ni)
	ACGIH	TWA 0.2 mg/m3 Inhalable (Ni)
Copper oxide	OSHA	PEL 1 mg/m3 Dust and mist (Cu)

PERSONAL PROTECTIVE EQUIPMENT:

- Respiratory – wear a NIOSH-certified (or equivalent) respirator.
- Hand protection – chemical-resistant protective gloves.
- Eye protection – chemical safety goggles.
- Body protection – suitable protective clothing to prevent skin contact.

GENERAL SAFETY & HYGIENE:

- Eye wash fountains and safety showers must be easily accessible. Avoid inhalation of dust. Wear protective clothing to minimize skin contact. Employees should shower at the end of the shift. Soiled clothes should be washed after each use.

9. PHYSICAL AND CHEMICAL PROPERTIES

- FORM: Solid; spherical particles.
- ODOR: Odorless
- COLOR: Dark green to black
- pH VALUE: approx. 8
- BULK DENSITY: approx. 800 to 850 kg/m³
- SOLUBILITY IN WATER: Insoluble

10. STABILITY AND REACTIVITY**CONDITIONS TO AVOID:**

- Formation of dust.

SUBSTANCES TO AVOID:

- No substances known that should be avoided.

HAZARDOUS REACTIONS:

- The product is chemically stable.

DECOMPOSITION PRODUCTS:

- No hazardous decomposition products known.

THERMAL DECOMPOSITION:

- No decomposition if correctly stored and handled.

CORROSION TO METALS:

- No corrosive effect on metal.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Information on: Cobalt oxide (Co₃O₄)

Assessment of acute toxicity:

Virtually nontoxic after a single ingestion. Virtually nontoxic after a single skin contact. Of moderate toxicity after short-term inhalation.

ORAL

Information on: Nickel monoxide

Type of value: LD₅₀

Species: rat

Value: > 5,000 mg/kg (OECD Guideline 401)

Information on: Aluminum oxide

Type of value: LD₅₀

Species: rat

Value: > 10,000 mg/kg (similar to OECD Guideline 401)

The data refer to a preparation of the substance.

No mortality was observed. No systemic toxicity.

Information on: Copper oxide

Type of value: LD₅₀

Species: rat

Value: > 2,500 mg/kg (OECD Guideline 423)

Information on: Cobalt oxide (Co₃O₄)

Type of value: LD₅₀

Species: rat

Value: > 5,000 mg/kg (OECD Guideline 401)

INHALATION

Information on: Nickel monoxide

Type of value: LC₅₀

Species: rat

Value: > 5.08 mg/l (OECD Guideline 403)

Exposure time: 4 h

Information on: Aluminum oxide

Type of value: LC₅₀

Species: rat

Value: > 2.3 mg/l (similar to OECD Guideline 403)

Exposure time: 4 h

Tested as dust aerosol.

No mortality was observed.

Information on: Cobalt oxide (Co₃O₄)

Type of value: LC50

Species: rat

Value: > 5.06 mg/l (other)

Exposure time: 4 h

Tested as dust aerosol.

DERMAL

Information on: Copper oxide

Type of value: LD50

Species: rat

Value: > 2,000 mg/kg (OECD Guideline 402)

Information on: Cobalt oxide (Co₃O₄)

Type of value: LD50

Species: rat

Value: > 2,000 mg/kg (OECD Guideline 402)

IRRITATION/CORROSION

Information on: Aluminum oxide

Not irritating to the skin. May cause slight irritation to the eyes.

SENSITIZATION

Information on: Nickel monoxide

Caused sensitization in humans.

Information on: Cobalt oxide (Co₃O₄)

Skin sensitization effects were not observed in animal studies. The substance may cause sensitization of the respiratory tract.

REPEATED DOSE TOXICITY

Information on: Cobalt oxide (Co₃O₄)

The substance may cause damage to the lung after repeated inhalation.

Information on: Nickel monoxide

Repeated exposure to small quantities may affect certain organs.

Information on: Copper oxide

The substance may cause damage to the liver after repeated ingestion of high doses, as shown in animal studies. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

May affect the liver and kidneys as shown in animal studies.

GENETIC TOXICITY

Information on: Nickel monoxide

Mutagenic properties cannot be excluded on the basis of experimental data.

Information on: Cobalt oxide (Co₃O₄)

The substance was not mutagenic in mammalian cell culture. The substance was not mutagenic in a test with mammals. However, some structurally related substances have shown a mutagenic effect.

CARCINOGENICITY

Information on: Nickel monoxide

The International Agency for Research on Cancer (IARC) has classified this substance as a Group 1 (known) human carcinogen.

Information on: Cobalt oxide (Co₃O₄)

No data available on carcinogenic effects. IARC has classified this substance as Group 2B (possibly carcinogenic to humans).

OTHER INFORMATION

The product has not been tested. These statements have been derived from the properties of the individual components on the basis of the available data. Some data gaps exist for individual components. According to our present knowledge and experience, dangers which are not covered by the current labeling are not to be expected.

12. ECOLOGICAL INFORMATION

AQUATIC TOXICITY

Information on: Nickel monoxide

No toxic effects occur within the range of solubility.

Information on: Aluminum oxide

No toxic effects occur within the range of solubility.

FISH

Information on: Nickel monoxide

Acute: LC50 (96 h) = 0.32 – 320 mg Ni /L

Information on: Aluminum oxide

Acute (semistatic): pimephales promelas/LC50 (96 h): > 218.64 mg/L

Information on: Copper oxide

Acute: OECD Guideline 203; Oncorhynchus mykiss/LC50 (96 h): 0.0366 mg/L

Information on: Cobalt oxide (Co3O4)

Acute (flow through test): Oncorhynchus mykiss/LC50 (96 h): 1.4 mg/L

The product has not been tested. These statements have been derived from the properties of the individual components on the basis of the available data. The statement of toxic effect relates to the analytically determined concentration. The LC50 is higher than the solubility limit.

AQUATIC PLANTS

Information on: Nickel monoxide

Algae: no observed effect at concentrations of to 425 microgram Ni /L

Information on: Aluminum oxide

OECD Guideline 201 static: green algae, no effect at concentrations > 100 mg/L

Tested above maximum solubility

Information on: Copper oxide

OECD Guideline 201, green algae, EC50 (72 h): 0.134 mg/L

Information on: Cobalt oxide (Co3O4)

Algal growth inhibition test static: green algae EC50 (96 h): 0.56 mg/L

The product has not been tested. These statements have been derived from the properties of the individual components on the basis of the available data. The toxic effects relate to the nominal concentration. The LC50 is higher than the solubility limit.

MICROORGANISMS

Information on: Copper oxide

Aerobic/activated sludge, domestic:

no observed effect at concentration (30 d) of 0.288 mg/L

Information on: Nickel monoxide

DIN EN ISO 8192 aquatic:

Activated sludge EC50 (30 min): 33 mg/L

Information on: Cobalt oxide (Co₃O₄)

DIN 38412 Part 8 aquatic:

Bacterium EC10 (17 h): 10.2 mg/L

The product has not been tested. These statements have been derived from the properties of the individual components on the basis of the available data. Some data gaps exist for individual components. According to our current knowledge and experience, dangers which are not covered by current labeling are not to be expected.

13. DISPOSAL CONSIDERATIONS

Used catalysts may have different hazardous characteristics than the original products. Do not discharge into sewers or waterways. Disposal must be carried out in accordance with applicable federal, state and local regulations.

Empty containers should be cleaned and/or recycled if possible; but if disposed of, then disposal of containers must also be carried out in accordance with applicable federal, state and local regulations.

14. TRANSPORT INFORMATION

Land transport

USDOT

Not classified as dangerous good under transport regulations.

Sea transport

IMDG

Not classified as dangerous good under transport regulations.

Air transport

IATA/CAO

Not classified as dangerous good under transport regulations.

15. REGULATORY INFORMATION

Federal Regulations

OSHA: Chronic target organ effects reported. Skin and/or eye irritant. OSHA PEL and ACGIH TLV established. Chronic target organ effects reported, IARC 1, 2A or 2B carcinogen. NTP listed carcinogen. Sensitizer.

TSCA:

This material or all of its components are released & listed on the Inventory of Existing Chemical Substances under the Toxic Substances Control Act (TSCA).

SARA Hazard Categories (EPCRA 311/312): Acute, Chronic

EPCRA 313:

<u>CAS Number</u>	<u>Chemical Name</u>
1317-38-0	Copper oxide
1308-06-1	Cobalt oxide (Co ₃ O ₄)
1313-99-1	Nickel monoxide

State Regulations

State RTK

<u>CAS Number</u>	<u>Chemical Name</u>	<u>State</u>
1344-28-1	Aluminum oxide	MA, NJ, PA
1308-06-1	Cobalt oxide (Co ₃ O ₄)	NJ

Ca Prop. 65: this product contains a chemical known to the state of California to cause cancer.

WHMIS

This MSDS has been prepared in keeping with criteria for hazardous classification according to the Controlled Products Regulations (CPR) and includes all information required by those regulations.

16. OTHER INFORMATION

Recommended for industrial, laboratory or research use only.

HMIS III RATINGS:

Health:	2
Flammability:	0
Physical Hazard:	0

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DISCLAIMER:

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