1 Identification

Product identifier

Product name: Cobalt(II,III) oxide

Stock number: 10695
CAS Number: 1308-06-1
EC number: 215-157-2

Relevant identified uses of the substance or mixture and uses advised against.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier: Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number: During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

GHS08 Health hazard
Carc. 2 H351 Suspected of causing cancer.

GHS07 Skin Sens. 1 H317 May cause an allergic skin reaction.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms

GHS07 GHS08

Signal word Warning

Hazard statements

H317 May cause an allergic skin reaction.
H351 Suspected of causing cancer.

Precautionary statements

P201 Obtain special instructions before use.
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P903 Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313 If exposed or concerned: Get medical advice/attention.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

D2A - Very toxic material causing other toxic effects

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description: 1308-06-1 Cobalt(II,III) oxide
Concentration: 100%
Identification number(s): EC number: 215-157-2

4 First-aid measures

Description of first aid measures

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

(Contd. on page 2)
44.0

Seek immediate medical advice.

After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing
Seek medical treatment.

Information for doctor
Most important symptoms and effects, both acute and delayed
Suspected of causing cancer.
May cause an allergic skin reaction.
Indication of any immediate medical attention and special treatment needed
No further relevant information available.

5 Fire-fighting measures

Extinguishing media
Product is not flammable. Use fire-fighting measures that suit the surrounding fire.

Suitable extinguishing agents
If this product is involved in a fire, the following can be released:

Advice for firefighters

Special hazards arising from the substance or mixture

Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.

Environmental precautions:
Do not allow product to reach sewage system or any water course.

Methods and material for containment and cleaning up:
Dispose of contaminated material as waste according to section 13.

Prevention of secondary hazards:
No special measures required.

Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

Protective Action Criteria for Chemicals

PAC-1: 0.082 mg/m³
PAC-2: 4.5 mg/m³
PAC-3: 27 mg/m³

7 Handling and storage

Handling

Precautions for safe handling
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.

Information about protection against explosions and fires:
The product is not flammable

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles:
No special requirements.

Information about storage in one common storage facility:
Store away from oxidizing agents.

Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

Specific end use(s)
No further relevant information available.

8 Exposure controls/personal protection

Exposure controls

Personal protective equipment

General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.

General protective and hygienic measures

Protective equipment

Protective equipment

General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.

Protective equipment

Wear self-contained respirator.
Wear fully protective impervious suit.

Additional information about design of technical systems:

Property operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt(II,III) oxide</td>
<td>0.05 mg/m³</td>
</tr>
<tr>
<td>Cobalt (background)</td>
<td>0.02 mg/m³</td>
</tr>
</tbody>
</table>

Ingredients with biological limit values:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt(II,III) oxide</td>
<td>15 µg/L</td>
</tr>
<tr>
<td>Cobalt (background)</td>
<td>1 µg/L</td>
</tr>
</tbody>
</table>

Additional information:
No data
Manufacturer: Cobalt(II,III) oxide

44.0

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Recommended filter device for short term use: Use a respirator with type H95 (USA) or FFP (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards.

Protection of hands: Impervious gloves

Check protective gloves prior to each use for their proper condition. The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Material of gloves: Nitrile rubber. NBR

Penetration time of glove material (in minutes): 480

Glove thickness: 0.11 mm

Eye protection: Safety glasses with side shields / NIOSH (US) or EN 166 (EU)

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance: Powder

Odor: Not determined

Odor threshold: Not determined

pH-value: Not applicable

Change in condition

Melting point/Melting range: 900 °C (1652 °F) (dec)

Boiling point/Boiling range: Not determined

Sublimation temperature / start: Not determined

Flammability (solid, gaseous): Not determined

Ignition temperature: Not determined

Decomposition temperature: Not determined

Auto igniting: Not determined

Danger of explosion: Not determined

Explosion limits:

Lower: Not determined

Upper: Not determined

Vapor pressure: Not applicable

Density at 20 °C (68 °F): 6.11 g/cm³ (50.988 lbs/gal)

Relative density: Not determined

Vapor density: Not applicable

Evaporation rate: Not applicable

Solubility in / Miscibility with:

Water: Insoluble

Partition coefficient (n-octanol/water): Not determined

Viscosity:

dynamic: Not applicable

kinematic: Not applicable

Other information: No further relevant information available.

10 Stability and reactivity

Reactivity: No information known.

Chemical stability: Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions: Reacts with strong oxidizing agents

Conditions to avoid: No further relevant information available.

Incompatible materials: Oxidizing agents

11 Toxicological information

Information on toxicological effects

Acute toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.

LD/LC50 values that are relevant for classification: No data

Skin irritation or corrosion: May cause irritation

Eye irritation or corrosion: May cause irritation

Sensitization: May cause an allergic skin reaction.

Germ cell mutagenicity: No effects known.

Carcinogenicity: Suspected of causing cancer.

ACGIH A3: Animal carcinogen: Agent is carcinogenic in experimental animals at relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) not considered relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals.

Reproductive toxicity: No effects known.

Specific target organ system toxicity - repeated exposure: No effects known.

Specific target organ system toxicity - single exposure: No effects known.

Aspiration hazard: No effects known.

Subacute to chronic toxicity: No effects known.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information

Toxicity: No further relevant information available.

Aquatic toxicity: No further relevant information available.

Persistence and degradability: No further relevant information available.

Bioaccumulative potential: No further relevant information available.

Mobility in soil: No further relevant information available.
Safety Data Sheet
acc. to OSHA HCS

Product name: Cobalt(II,III) oxide

(Contd. of page 3)

Ecotoxicological effects:
Remark: Very toxic for aquatic organisms
Additional ecological information:
General notes:
Do not allow product to reach ground water, water course or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
Also poisonous for fish and plankton in water bodies.
May cause long lasting harmful effects to aquatic life.
Avoid transfer into the environment.
Very toxic for aquatic organisms

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects: No further relevant information available.

13 Disposal considerations
Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

<table>
<thead>
<tr>
<th>UN-Number</th>
<th>UN3077</th>
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<tbody>
<tr>
<td>DOT, IMDG, IATA</td>
<td></td>
</tr>
<tr>
<td>UN proper shipping name DOT</td>
<td>Environmentally hazardous substances, solid, n.o.s. (Cobalt(II,III) oxide)</td>
</tr>
<tr>
<td>ADR</td>
<td>3077 Environmentally hazardous substances, solid, n.o.s. (Cobalt(II,III) oxide)</td>
</tr>
<tr>
<td>IMDG, IATA</td>
<td>ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt(II,III) oxide)</td>
</tr>
</tbody>
</table>

Transport hazard class(es)

<table>
<thead>
<tr>
<th>DOT, IMDG</th>
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<tbody>
<tr>
<td>Class</td>
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<tr>
<td>Label</td>
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<table>
<thead>
<tr>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>Label</td>
</tr>
</tbody>
</table>

Packing group

<table>
<thead>
<tr>
<th>DOT, ADR, IMDG, IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
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</tbody>
</table>

Environmental hazards:
Special marking (ADR): Symbol (fish and tree)
Special marking (IATA): Symbol (fish and tree)
Special precautions for user
EMS Number: F-A,S-F
Stowage Category A
Stowage Code SW23 When transported in BK3 bulk container, see 7.6.2.12 and 7.7.3.9.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

Transport/Additional information:

<table>
<thead>
<tr>
<th>DOT</th>
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<tbody>
<tr>
<td>Quantity limitations: On passenger aircraft/hail: No limit On cargo aircraft only: No limit</td>
</tr>
<tr>
<td>IMDG</td>
</tr>
<tr>
<td>Limited quantities (LQ) Code: E1</td>
</tr>
<tr>
<td>Exempted quantities (EQ) Maximum net quantity per inner packaging: 30 g Maximum net quantity per outer packaging: 1000 g</td>
</tr>
</tbody>
</table>

UN "Model Regulation":
UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (COBALT(II,III) OXIDE), 9, III

15 Regulatory information
Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements: The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms:

GHS07 GHS08

(Contd. on page 5)
**Product name:** Cobalt(II,III) oxide

**Signal word** Warning

**Hazard statements**
- H317 May cause an allergic skin reaction.
- H351 Suspected of causing cancer.

**Precautionary statements**
- P201 Obtain special instructions before use.
- P261 Avoid breathing dust/fume/gas/mist/vapors/spray
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P308+P313 IF exposed or concerned: Get medical advice/attention.
- P405 Store locked up.
- P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

**National regulations**
- All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
- All components of this product are listed on the Canadian Domestic Substances List (DSL).

**SARA Section 313 (specific toxic chemical listings)**
- 1308-06-1 Cobalt(II,III) oxide

**California Proposition 65**
- Prop 65 - Chemicals known to cause cancer Substance is not listed.
- Prop 65 - Developmental toxicity Substance is not listed.
- Prop 65 - Developmental toxicity, female Substance is not listed.
- Prop 65 - Developmental toxicity, male Substance is not listed.

**Information about limitation of use:** For use only by technically qualified individuals.

**Other regulations, limitations and prohibitive regulations**
- Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.
- The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed. Substance is not listed.
- Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

**Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

**Other information**

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Department issuing SDS:** Global Marketing Department

**Date of preparation/Revision:** Print date, revision date and version number are in the header of each page.

**Abbreviations and acronyms:**
- ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- IMDG: International Maritime Code for Dangerous Goods
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- EINECS: European Inventory of Existing Commercial Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- HWRIS: Workplace Hazardous Materials Information System (Canada)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
- PBT: Persistent, Bioaccumulative and Toxic
- SVHC: Substances of Very High Concern
- H228: Flammable liquid, metal
- H290: Irritating to eyes and skin
- ACGIH: American Conference of Governmental Industrial Hygienists (USA)
- OSHA: Occupational Safety and Health Administration (USA)
- NTP: National Toxicology Program (USA)
- IARC: International Agency for Research on Cancer
- EPA: Environmental Protection Agency (USA)
- Skin Sens. 1: Skin sensitisation – Category 1
- Skin Sens. 2: Skin sensitisation – Category 2
- Carc. 2: Carcinogenicity – Category 2