SAFETY DATA SHEET

Cobalt Chrome

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name

Cobalt Chrome

▼Other names / Synonyms

Document No.: H-5800-0917-02-B_EN

Product no.

A-5771-0404

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

Relevant identified uses of the substance or mixture

Metal powder for additive layer manufacture

Uses advised against

None known.

1.3. Details of the supplier of the safety data sheet

Company and address

Renishaw plc
New Mills
Wotton-under-Edge,
GL12 8JR, Gloucestershire,
United Kingdom
+44 (0) 1453 524524
www.renishaw.com

E-mail

msds@renishaw.com

Revision

27/01/2023

SDS Version

1.1

Date of previous version

27/10/2022 (1.0)

1.4. Emergency telephone number

The National Poisons Information Centre (NPIC)
Public: +353 (0) 1 809 2166 (7 days a week, 8am- 10pm)
Healthcare professionals: +353 (0) 1 809 2566 (24 h service)
See also section 4 “First aid measures”
Emergency contact from supplier: +44 (0) 1453 524524 (UK office hours 08:00 to 17:00 UTC Monday to Thursday, 08:00 to 16:00 Friday)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Skin Sens. 1; H317, May cause an allergic skin reaction.
Resp. Sens. 1; H334, May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Muta. 2; H341, Suspected of causing genetic defects.
Carc. 1B; H350, May cause cancer.
Repr. 1B; H360F, May damage fertility.
STOT RE 1; H372, Causes damage to organs through prolonged or repeated exposure.
Aquatic Chronic 4; H413, May cause long lasting harmful effects to aquatic life.

2.2. Label elements

Hazard pictogram(s)

Signal word

Danger

Hazard statement(s)

May cause an allergic skin reaction. (H317)
May cause allergy or asthma symptoms or breathing difficulties if inhaled. (H334)
Suspected of causing genetic defects. (H341)
May cause cancer. (H350)
May damage fertility. (H360F)
Causes damage to organs through prolonged or repeated exposure. (H372)
May cause long lasting harmful effects to aquatic life. (H413)

Safety statement(s)

General

-

Prevention

Obtain special instructions before use. (P201)
Do not breathe dust. (P260)
Wear eye protection/protective gloves/protective clothing. (P280)

Response

IF exposed or concerned: Get medical advice/attention. (P308+P313)
Get medical advice/attention if you feel unwell. (P314)

Storage

-

▼Disposal

Dispose of contents/container in accordance with local regulation. (P501)

Hazardous substances

Cobalt
Nickel

Additional labelling

Restricted to professional users.

2.3. Other hazards

Additional warnings

May form combustible dust concentrations in air.
This mixture/product does not contain any substances considered to meet the criteria classifying them as PBT and/or vPvB.
This product does not contain any substances considered to be endocrine disruptors in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

SECTION 3: Composition/information on ingredients

3.1. ▼Substances

Not applicable. This product is a mixture.

3.2. Mixtures

Product/substance	Identifiers	% w/w	Classification	Note
Cobalt	CAS No.: 7440-48-4 EC No.: 231-158-0 REACH: Index No.: 027-001-00-9	62.2-66.5%	Skin Sens. 1, H317 Resp. Sens. 1, H334 Muta. 2, H341 Carc. 1B, H350 Repr. 1B, H360F Aquatic Chronic 4, H413	
Chromium	CAS No.: 7440-47-3 EC No.: 231-157-5 REACH: Index No.:	27-29%	Aquatic Chronic 4, H413	
Molybdenum	CAS No.: 7439-98-7 EC No.: 231-107-2 REACH: 01-2119472304-43-XXXX	5.4-6.2%		

	Index No.:			
Iron	CAS No.: 7439-89-6 EC No.: 231-096-4 REACH: 01-2119462838-24-XXXX Index No.:	0.2%		
Nickel	CAS No.: 7440-02-0 EC No.: 231-111-4 REACH: Index No.: 028-002-01-4	0.1%	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372 Aquatic Chronic 3, H412	[1], [3]

See full text of H-phrases in section 16. Occupational exposure limits are listed in section 8, if these are available.

Other information

[1] European occupational exposure limit.
[3] According to REACH, Annex XVII, the substance is subject to restrictions.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

In the case of accident: Contact a doctor or casualty department – take the label or this safety data sheet. Contact a doctor if in doubt about the injured person's condition or if the symptoms persist. Never give an unconscious person water or other drink.

Inhalation

Upon breathing difficulties or irritation of the respiratory tract: Bring the injured person into fresh air. Make sure the injured person is continuously monitored. Prevent shock by keeping the injured person warm and calm. If breathing ceases, give mouth-to-mouth resuscitation. If unconscious, roll the injured person into recovery position. Call an ambulance.

Skin contact

Remove contaminated clothing and shoes immediately. Ensure to wash exposed skin thoroughly with water and soap. Skin cleanser can be used. DO NOT use solvents or thinners.
If skin irritation occurs: Get medical advice/attention.

Eye contact

Upon irritation of the eye: Remove contact lenses and open eyes widely. Flush eyes with water or saline water (20-30 °C) for at least 5 minutes. Seek medical assistance and continue flushing during transport.

▼Ingestion

Provide plenty of water for the person to drink and stay with him/her. In case of malaise, seek medical advice immediately and bring the safety data sheet or label from the product. Do not induce vomiting, unless recommended by the doctor. Have the person lean forward with head down to avoid inhalation of or choking on vomited material.

Burns

Not applicable.

4.2. ▼Most important symptoms and effects, both acute and delayed

Sensitisation: This product contains substances, which may trigger allergic reaction upon dermal contact.
Manifestation of allergic reactions typically takes place within 12-72 hours after exposure.

4.3. Indication of any immediate medical attention and special treatment needed

IF exposed or concerned:
Get immediate medical advice/attention.
If skin irritation or rash occurs: Get medical advice/attention.

Information to medics

Bring this safety data sheet or the label from this product.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Use class D extinguishing agents on dust, fines or molten metal.
Unsuitable extinguishing media: Water, foam, halogenated extinguishing agents.

5.2. Special hazards arising from the substance or mixture

Fire will result in dense smoke. Exposure to combustion products may harm your health. Closed containers, which are exposed to fire, should be cooled with water. Do not allow fire-extinguishing water to enter the sewage system and

nearby surface waters.

5.3. Advice for firefighters

Wear self-contained breathing apparatus and protective clothing to prevent contact. Upon direct exposure contact the National Poisons Information Centre (NPIC) on +353 (0) 1 809 256 (24 h service) in order to obtain further advice.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.
Avoid direct contact with spilled substances.
Evacuate surrounding areas.
Eliminate all ignition sources.
Ventilate the area.
Wear appropriate personal protective equipment (see section 8).

6.2. Environmental precautions

Avoid discharge to lakes, streams, sewers, etc. In the event of leakage to the surroundings, contact local environmental authorities.

6.3. Methods and material for containment and cleaning up

Collect spills carefully. Moist the material with water in order to prevent the formation and propagation of dust.
Wherever possible cleaning should be performed with normal cleaning agents. Avoid use of solvents.
Use spark-proof tools and explosion-proof equipment.
Avoid dust generation.
Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labelled container.

6.4. Reference to other sections

See section 13 “Disposal considerations” on handling of waste.
See section 8 "Exposure controls/personal protection" for protective measures.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces.
It is recommended to install waste collection trays in order to prevent emissions to the waste water system and surrounding environment.
Avoid direct contact with the product.
Smoking, drinking and consumption of food is not allowed in the work area.
See section 8 "Exposure controls/personal protection" for information on personal protection.
Take precautionary measures against static discharges.

7.2. Conditions for safe storage, including any incompatibilities

Containers that have been opened must be carefully resealed and kept upright to prevent leakage.
Powder trickling out onto the floor or onto other containers must be prevented.
Avoid the suspension of dust in the air.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Use non-sparking tools.

Recommended storage material

Always store in containers of the same material as the original container.

Storage temperature

Store in tightly closed original container in a dry, cool and well-ventilated place.
Store in accordance with local regulations.

Incompatible materials

Strong acids, strong bases, strong oxidizing agents, and strong reducing agents.

7.3. ▼Specific end use(s)

This product should only be used for applications quoted in section 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Cobalt
Long term exposure limit (8 hours) (mg/m³): 0.02
Annotations:

Sen = Chemical agent which following exposure may cause sensitisation of the respiratory tract and lead to asthma, rhinitis or extrinsic allergic alveolitis.

Chromium
Long term exposure limit (8 hours) (mg/m³): 2
Annotations:
IOELV = Indicative Occupational Exposure Limit Values are health based limits set under the Chemical Agents Directive (98/24/EC).

Molybdenum
Long term exposure limit (8 hours) (mg/m³): as Mo; 0,5(Respirable Fraction)/soluble compounds: 10(inhalable Fraction)/ insoluble compounds: 3 (Respirable Fraction)

Nickel
Long term exposure limit (8 hours) (mg/m³): 0.5

2021 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations (2001-2015) and the Safety, Health and Welfare at Work (Carcinogens) Regulations (2001-2019).

DNEL
No data available.

PNEC
No data available.

8.2. Exposure controls
Compliance with the given occupational exposure limits values should be controlled on a regular basis.
Where necessary use lighting and electrical equipment designed for use in atmospheres where flammable vapours or dusts are present, and which can direct static electricity by grounding equipment.

General recommendations
When transferring the materials, dust clouds should be kept at an absolute minimum. Handling should be slow and deliberate. The materials should be transferred from one container to another using a non-sparking, conductive metal scoop.
When mixing the material with other dry ingredients, frictional heat should be avoided. The best type of mixer for a dry mixing operation is one that contains no moving parts, but rather affects a tumbling action, such as a conical blender. Introduction of an inert atmosphere in the blender is highly recommended since dust clouds are generated. All equipment must be well grounded.
Smoking, drinking and consumption of food is not allowed in the work area.

Exposure scenarios
There are no exposure scenarios implemented for this product.

Exposure limits
Professional users are subjected to the legally set maximum concentrations for occupational exposure. See occupational hygiene limit values above.

Appropriate technical measures
Do not recirculate outlet air that contain the substances.

Hygiene measures
In between use of the product and at the end of the working day all exposed areas of the body must be washed thoroughly. Always wash hands, forearms and face.

Measures to avoid environmental exposure
Keep damming materials near the workplace. If possible, collect spillage during work.

8.3. Individual protection measures, such as personal protective equipment

Generally
Use only CE marked protective equipment.

Respiratory Equipment

Type	Class	Colour	Standards
SL	P3	White	EN149

Skin protection

Recommended	Type/Category	Standards	
Dedicated work clothing should be worn. Wear a protective suit in the event of prolonged periods of work with the product.	-	-	
Safety shoes		EN ISO 20345	

Hand protection

Material	Glove thickness (mm)	Breakthrough time (min.)	Standards	
Butyl	0,3	> 480	EN374-2, EN374-3, EN388	

Eye protection

Type	Standards	
Safety glasses with side shields.	EN166	

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state
Powder

Colour
Gray

Odour / Odour threshold
None

pH
Not applicable - product is a solid

Density (g/cm³)
No information available as testing has not been completed.

Relative density
No information available as testing has not been completed.

Kinematic viscosity
Not applicable - product is a solid

Particle characteristics
Particle size: < 1.0 mm

Phase changes

Melting point/Freezing point (°C)
No information available as testing has not been completed.

Softening point/range (waxes and pastes) (°C)
Does not apply to solids.

Boiling point (°C)
No information available as testing has not been completed.

Vapour pressure
Not applicable - product is a solid

Relative vapour density
Does not apply to solids.

Decomposition temperature (°C)
No information available as testing has not been completed.

Data on fire and explosion hazards

Flash point (°C)

Does not apply to solids.

Auto-Ignition (°C)

Testing not relevant or not possible due to nature of the product.

Flammability (°C)

Testing not relevant or not possible due to nature of the product.

Lower and upper explosion limit (% v/v)

Does not apply to solids.

Solubility

Solubility in water

Insoluble

n-octanol/water coefficient

No information available as testing has not been completed.

Solubility in fat (g/L)

No information available as testing has not been completed.

9.2. Other information

Formation of explosible dust/air mixtures

Yes

Evaporation rate (n-butylacetate = 100)

Not applicable - product is a solid

Other physical and chemical parameters

No data available.

SECTION 10: Stability and reactivity

10.1. Reactivity

No data available.

10.2. Chemical stability

The product is stable under the conditions, noted in section 7 “Handling and storage”.

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

Avoid the suspension of dust in the air.

10.5. Incompatible materials

Strong acids, strong bases, strong oxidizing agents, and strong reducing agents.

10.6. Hazardous decomposition products

The product is not degraded when used as specified in section 1.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

Product/substance	Cobalt
Test method	
Species	Rat
Route of exposure	Oral
Test	LD50
Result	6171 mg/kg
Other information	

Product/substance	Chromium
Test method	
Species	Rat
Route of exposure	
Test	ED50
Result	> 3400 mg/kg
Other information	

Product/substance	Iron
Test method	
Species	Rat
Route of exposure	Oral
Test	LD50

Result	30000 mg/kg
Other information	

Product/substance	Nickel
Test method	
Species	Rat
Route of exposure	Oral
Test	LC50
Result	>5000 mg/kg
Other information	

Skin corrosion/irritation
Based on available data, the classification criteria are not met.

Serious eye damage/irritation
Based on available data, the classification criteria are not met.

Respiratory sensitisation
May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin sensitisation
May cause an allergic skin reaction.

Germ cell mutagenicity
Suspected of causing genetic defects.

Carcinogenicity
May cause cancer.

Reproductive toxicity
May damage fertility.

STOT-single exposure
Based on available data, the classification criteria are not met.

STOT-repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
Based on available data, the classification criteria are not met.

11.2. Information on other hazards

Long term effects
Carcinogenic effects: This product contains substances considered or proven to be carcinogenic. The carcinogenic effects may be triggered subsequent to exposure through inhalation, skin contact or ingestion.
Reproductive toxicity: This product contains reprotoxic substances, which may harm the reproductive capacity. Adverse effects include: sterility, effects on the sexual function, lowered effective fertility and dysfunctional menstrual cycle.

Endocrine disrupting properties
None known.

Other information
Cobalt has been classified by IARC as a group 2B / 2A (Cobalt metal with tungsten carbide) carcinogen.
Chromium has been classified by IARC as a group 1 carcinogen.
Nickel has been classified by IARC as a group 2B carcinogen.
Exposure to metal dusts and oxides may cause metal fume fever. Metal fume fever is a temporary flu-like condition characterized by chills, fever, muscle aches and pains, nausea, and vomiting. Typically, the symptoms appear within a few hours after exposure and subside within 2-3 days with no permanent effects.

SECTION 12: Ecological information

12.1. Toxicity

Product/substance	Cobalt
Test method	
Species	Fish, Brachydanio rerio
Compartment	
Duration	96 hours
Test	
Result	>100 mg/L
Other information	

Product/substance	Cobalt
Test method	
Species	Daphnia, Daphnia magna
Compartment	

Duration	48 hours
Test	
Result	3.2 mg/L
Other information	

Product/substance	Cobalt
Test method	
Species	Algae, Selenastrum capricornutum
Compartment	
Duration	72 hours
Test	
Result	0.05 - 0.26 mg/L
Other information	

Product/substance	Iron
Test method	
Species	Fish
Compartment	
Duration	96 hours
Test	LC50
Result	13.6 mg/L
Other information	

Product/substance	Nickel
Test method	
Species	Fish, Oncorhynchus mykiss
Compartment	
Duration	96 hours
Test	LC50
Result	31.7 mg/L
Other information	

Product/substance	Nickel
Test method	
Species	Fish, Pimephales promelas
Compartment	
Duration	96 hours
Test	LC50
Result	3.1 mg/L
Other information	

Product/substance	Nickel
Test method	
Species	Fish, Brachydanio rerio
Compartment	
Duration	96 hours
Test	LC50
Result	>100 mg/L
Other information	

Product/substance	Nickel
Test method	
Species	Algae, Selenastrum capricornutum
Compartment	
Duration	72 hours
Test	EC50
Result	0.18 mg/L
Other information	

Product/substance	Nickel
Test method	
Species	Daphnia
Compartment	
Duration	96 hours
Test	EC50
Result	510 µg/L
Other information	

12.2. Persistence and degradability
No data available.

12.3. Bioaccumulative potential
No data available.

12.4. Mobility in soil
No data available.

12.5. Results of PBT and vPvB assessment
This mixture/product does not contain any substances considered to meet the criteria classifying them as PBT and/or vPvB.

12.6. Endocrine disrupting properties
None known.

12.7. Other adverse effects
This product contains substances, which may cause adverse long-term effects to the aquatic environment.

SECTION 13: Disposal considerations

Waste treatment methods
Product is covered by the regulations on hazardous waste.
HP 5 - Specific Target Organ Toxicity (STOT)/Aspiration Toxicity
HP 7 – Carcinogenic
HP 10 – Toxic for reproduction
HP 11 – Mutagenic
HP 13 – Sensitising
HP 14 – Ecotoxic
Dispose of contents/container to an approved waste disposal plant.
Commission Regulation (EU) No 1357/2014 of 18 December 2014 on waste.

EWC code
Not applicable.

Specific labelling
Not applicable.

Contaminated packing
Packaging containing residues of the product must be disposed of similarly to the product.

SECTION 14: Transport information

	14.1 UN / ID	14.2 UN proper shipping name	14.3 Hazard class(es)	14.4 PG*	14.5 Env**	Other information
ADR	-	-	-	-	-	-
IMDG	-	-	-	-	-	-
IATA	-	-	-	-	-	-

* Packing group
** Environmental hazards

Additional information
Not dangerous goods according to ADR, IATA and IMDG.

14.6. Special precautions for user
Not applicable.

14.7. Maritime transport in bulk according to IMO instruments
No data available.

SECTION 15: Regulatory information

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

Restrictions for application
Restricted to professional users.
People under the age of 18 shall not be exposed to this product.
Pregnant women and women breastfeeding must not be exposed to this product. The risk, and possible technical precautions or design of the workplace needed to eliminate exposure, must be considered.

Demands for specific education
No specific requirements.

SEVESO - Categories / dangerous substances
Nickel

REACH, Annex XVII
Nickel is subject to REACH restrictions, REACH annex XVII (entry 27).

Additional information
Not applicable.

Sources
Protection of Young Persons (Employment) Act, 1996
Maternity Protection Act 1994 (34/1994) with later amendments.
SI No 209 of 2015 Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015.
Commission Regulation (EU) No 1357/2014 of 18 December 2014 on waste.
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (CLP).
Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

15.2. Chemical safety assessment
No

SECTION 16: Other information

Full text of H-phrases as mentioned in section 3
H317, May cause an allergic skin reaction.
H334, May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341, Suspected of causing genetic defects.
H350, May cause cancer.
H351, Suspected of causing cancer.
H360F, May damage fertility.
H372, Causes damage to organs through prolonged or repeated exposure.
H412, Harmful to aquatic life with long lasting effects.
H413, May cause long lasting harmful effects to aquatic life.

Abbreviations and acronyms
ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway
ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
CAS = Chemical Abstracts Service
CE = Conformité Européenne
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
CSA = Chemical Safety Assessment
CSR = Chemical Safety Report
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EINECS = European Inventory of Existing Commercial chemical Substances
ES = Exposure Scenario
EUH statement = CLP-specific Hazard statement
EWC = European Waste Catalogue
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IARC = International Agency for Research on Cancer (IARC)
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
OECD = Organisation for Economic Co-operation and Development
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail
RRN = REACH Registration Number
SCL = A specific concentration limit

SVHC = Substances of Very High Concern
STOT-RE = Specific Target Organ Toxicity - Repeated Exposure
STOT-SE = Specific Target Organ Toxicity - Single Exposure
TWA = Time weighted average
UN = United Nations
UVBC = Unknown or variable composition, complex reaction products or of biological materials
VOC = Volatile Organic Compound
vPvB = Very Persistent and Very Bioaccumulative

Additional information

The classification of the mixture in regard of health hazards are in accordance with the calculation methods given by Regulation (EC) No. 1272/2008 (CLP).
The classification of the substance/mixture in regard of environmental hazards are in accordance with the calculation methods given by Regulation (EC) No. 1272/2008 (CLP).

▼The safety data sheet is validated by

EcoOnline

Other

A change (in proportion to the last essential change (first cipher in SDS version, see section 1)) is marked with a blue triangle.
The information in this safety data sheet applies only to this specific product (mentioned in section 1) and is not necessarily correct for use with other chemicals/products.
It is recommended to hand over this safety data sheet to the actual user of the product. Information in this safety data sheet cannot be used as a product specification.
Country-language: IE-en