

Cobalt

(ACCORDING TO EC-REGULATION 1907/2006 (REACH) & 1272/2008 (CLP))

1. Identification of the Substance and Company

1.1 Product Identification:

Product Name: Cobalt Metal

Synonyms: Cobalt rounds

Chemical Family: Metal

Chemical Formula: Co

EC No: 231-158-0

CAS No: 7440-48-4

REACH Registration number: see Section 3

1.2 Uses

Identified Uses:

- Use of cobalt in the manufacture of inorganic cobalt substances
- Use of cobalt in the manufacture of cobalt carboxylates and resins
- Manufacture of cobalt in the catalyst industry
- Industrial use of cobalt as catalyst
- Manufacture and industrial use of cobalt containing alloys, steels and tools
- Industrial use of cobalt in surface treatment processes
- Manufacture and industrial use of batteries using cobalt
- Industrial use of cobalt in the manufacture of inorganic pigments & frits, glass, ceramic ware, varistors and magnets (calcination/sintering processes)
- Manufacture and industrial use of coatings and inks using cobalt as drier and/or pigment
- Industrial use of cobalt in the production of diamond tools
- Welding in industrial and/or professional settings
- Professional use of dental alloys containing cobalt
- Professional use of diamond tools and other cobalt-containing tools
- Service life of articles containing cobalt encapsulated in the internal part of the product
- Service life of dental alloys
- Handling of heat and wear resistant vehicle parts
- Consumer use of cutting tools other than hard metal

Uses Advised Against: None known

Exposure Scenarios: See Annex 1

1.3 Company Identification

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2. Hazards Identification

2.1 Classification of the Substance:

2.1.1 Classification according Regulation (EC) No. 1272/2008

Respiratory Sensitization – Category 1

Skin Sensitization – Category 1;

Aquatic Chronic – Category 4

Hazard Pictograms: GHS08 - Health Hazard

Signal Word: Danger

Hazard Statements:

H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H317 - May cause an allergic skin reaction.

H413 - May cause long lasting harmful effects to aquatic life

Precautionary Statements:

P261, P272, P273, P280, P285, P363, P302+P352, P304+P341, P333+P313, P342+P311

2.1.2. Classification according to Directive 67/548/EEC

Xn;

R42/43

R53

2.2: Label elements

Labeling according to Regulation (EC) No 1272/2008

Product identifier: Cobalt
CAS #: 7440-48-4
Symbols: GHS08 - Health Hazard



Signal Word: Danger

Hazard Statements: H317, H334, H413

Precautionary Statements P261, P273, P280, P285, P302+P352, P501

(NOTE: P-statements has been reduced as per CLP regulation, the full list can be found in Section 15).

For full text of R-Statements and Precautionary, statements see section 15.

3. Composition

Substance Mixture

Hazardous ingredient(s)	Typical Composition	CAS No.	EC No.
Cobalt	>99	7440-48-4	231-158-0

REACH Registration #:
01-2119517392-44-0001

4. First Aid Measures

<i>Ingestion:</i>	If swallowed, rinse mouth with water (only if the person is conscious). If symptoms persist, obtain medical attention.
<i>Inhalation:</i>	IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTRE or doctor/physician.
<i>Skin:</i>	IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical advice/attention.
<i>Eyes:</i>	Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. If eye irritation persists: Get medical advice/attention.
<i>Most important symptoms and affects, both acute and delayed</i>	Inhalation: Cough, Sore throat, Wheezing, Increased difficulty in breathing. Ingestion: Abdominal pain, Vomiting. Eye Contact: Redness.
<i>Indication of immediate medical attention and special treatment needed</i>	No special requirements

5. Fire Fighting Measures

<i>Suitable extinguishing media:</i>	As appropriate for surrounding fire. Extinguish with dry chemical, carbon dioxide or halones.
<i>Special risks:</i>	Decomposes in a fire giving off toxic fumes: Cobalt oxide dust, Acrid smoke, Metal fumes.
<i>Special protective equipment for fire fighting:</i>	Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Dike fire control water for later disposal. Do not allow to enter drains, sewers or watercourses.

6. Accidental Release Measures

<i>Person related precautionary measures:</i>	Ensure adequate ventilation. Avoid breathing dust. Wear appropriate personal protective equipment, avoid direct contact.
<i>Environmental Protection measures:</i>	Spillages or uncontrolled discharges into watercourses must be alerted to the appropriate regulatory body.
<i>Procedures for cleaning/absorption:</i>	Sweep spilled substances into containers if appropriate moisten first to prevent dusting. Use vacuum equipment for collecting spilt materials, where practicable. Transfer to a lidded container for disposal or recovery.

7. Handling And Storage

<i>7.1 Precautions for Safe Handling:</i>	Provide adequate ventilation. Avoid breathing dust. Contaminated work clothing should not be allowed out of the workplace. In case of inadequate ventilation, wear respiratory protection. Wear protective gloves/protective clothing/eye protection/face protection.
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7.2 *Conditions for Safe Storage* Stable under normal storage conditions. Incompatible with acids, and strong oxidizing agents.

8. Exposure Controls / Personal Protection

8.1.1 Exposure Limits:

Cobalt Metal (Co) – CAS 7440-48-4	Exposure Limit (mg/m ³)
ACGIH TLV-TWA ¹	0.02
UK WEL ²	0.1
NOHSC, Australia	0.05

8.1.2 Environmental Limits:

PNEC's

	PNEC
Aquatic Compartment	0.51 µg/l (Fresh water).
Marine Compartment	2.36 µg Co/L
Aquatic Compartment - sediment	11.2 mg Co/kg sediment dry wt
Aquatic Compartment – sediment, Added Risk Approach	9.5 mg Co/kg sediment dry wt
Marine Compartment - sediment	9.5 mg Co/kg sediment dry wt
Terrestrial Compartment	7.9 mg/kg Soil dw.
Sewage Treatment Plant - microorganisms	0.373 µg Co/L
Atmospheric Compartment	-

DNEL

DNEL	Oral	Inhalation	Dermal
Industry - Long Term – Local effects	-	40 µg/m ³	-
Industry - Long Term - Systemic effects	-	-	-
Industry - Short term - Local effects	-	-	-
Industry - Short term - Systemic effects	-	-	-
Consumer - Long Term - Local effects	-	6.3 µg/m ³	-
Consumer - Long Term - Systemic effects	9.5 µg/kg bw/day	-	-
Consumer - Short term - Local effects	-	-	-
Consumer - Short term - Systemic effects	-	-	-

8.2.1 Occupational exposure controls:

Provide adequate ventilation.

PPE

Eye/face protection

Wear eye protection with side protection (EN166).

Skin protection (Hand protection/ Other)

Wear protective clothing and gloves: Butyl rubber, Neoprene, PVC.

Respiratory protection

A suitable dust mask or dust respirator with filter type P (EN143 or EN405) may be appropriate.

Thermal hazards

Not applicable.

9. Physical And Chemical Properties

Silver-grey odourless metal.

Physical state at 20°C and 101.3 kPa	solid
pH (Value)	Not applicable.
Melting Point (°C)	1494°C @1013hPa.
Boiling point/boiling range (°C):	2927°C @1013hPa.
Flash Point (°C)	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Non-flammable.
Explosive limit ranges.	Not available.
Vapour Pressure (mm Hg)	Not applicable.
Vapour Density (Air=1)	Not applicable.
Relative Density	8.89 @ 20°C.
Solubility (Water)	2.94mg/l @ 20°C.
Solubility (Other)	Not available.
Partition Coefficient (n-Octanol/water)	Not available.
Auto Ignition Temperature (°C)	Not applicable.
Decomposition Temperature (°C)	Not available.
Viscosity (mPa.s)	Not applicable.
Explosive properties	Not applicable.
Oxidising properties	Not oxidising.

10. Stability And Reactivity

10.1	Reactivity	Stable under normal conditions.
10.2	Chemical stability	Stable under normal conditions.
10.3	Possibility of hazardous reactions	Stable under normal conditions.
10.4	Conditions to avoid	Heat
10.5	Incompatible materials	Acids, Strong oxidising agents.
10.6	Hazardous Decomposition Product(s)	Cobalt oxide dust, Acrid smoke, Metal fumes

11. Toxicological Information ³

Cobalt

Acute Toxicity:

- a) Oral: Non toxic - LD₅₀ ORAL RAT 7510 mg/kg
- b) Inhalation: Low acute toxicity. Main Symptoms: Cough, Sore throat, Wheezing, Increased difficulty in breathing.
- c) Dermal: LD50(Dermal) >2000mg/kg. Low acute toxicity.

Corrosivity/Irritation:

- a) Respiratory Tract: None
- b) Skin: No data. Not classified. See sensitization section.
- c) Eyes: Low acute toxicity. Main Symptoms: Redness. Mechanical irritation may be expected.

Sensitization:

- a) *Respiratory tract:* Resp. Sens. 1; May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- b) *Skin:* Skin Sens. 1; May cause an allergic skin reaction. Repeated contact with metallic cobalt can cause cobalt sensitivity and allergic skin rashes.
- c) *Preexisting conditions:* Sensitized individuals may experience an allergic skin rash or asthma.

Chronic toxicity:

- a) *Oral:* No information available
- b) *Inhalation:* No information available
- c) *Dermal:* No information available

Mutagenicity /

Reproductive toxicity: No data. Not classified.

Carcinogenicity:

- a) *Ingestion:* No data. Not classified.
- b) *Inhalation:* No data. Not classified.

12. Ecological Information

Toxicity	Aquatic Chronic 4. May cause long lasting harmful effects to aquatic life. By analogy with similar materials: Cobalt dichloride. Fish: LC50 = 1.5µg/l (Fresh water) Aquatic invertebrates: LC50 = 0.61 mg/l (Fresh water) ; 2.32 mg/l (Sea water) EC10 (Fresh water Fish) = 351.4 mg/l. NOEC Aquatic invertebrates: = 5.47 µg/l (Fresh water) ; 206 µg/l (Sea water) Algae: LC50 = 144 µg/l (Fresh water) ; 24.1 µg/l (Sea water) NOEC Algae = 4.9 µg/l (Fresh water) ; 1.23 µg/l (Sea water).
Persistence and degradability	The methods for determining the biological degradability are not applicable to inorganic substances.
Bioaccumulative potential	Aquatic plants: Bioconcentration factor (BCF) : >100 – 5000. Aquatic invertebrates: BCF <300. Fresh water, Fish: BCF/ BAF <10. Marine, Fish: BCF/ BAF <10. The substance has low potential for bioaccumulation.
Mobility in soil	The substance is essentially insoluble in water.
Results of PBT and vPvB assessment	Not classified as PBT or vPvB.
Other adverse effects	None anticipated.

13. Disposal Considerations

Waste treatment methods	Recover or recycle if possible. Dispose of contents/container to: Licensed recycler. Dispose of contents in accordance with local, state or national legislation.
Additional Information	No information available.

14. Transport Information

International Maritime Dangerous Goods Code	Not regulated.
International Civil Aviation Organization Technical Instructions for the Carriage of Dangerous Goods by Air	Not regulated.
U.S. Dept. of Transportation Regulations	Not regulated.
Canadian Transportation of Dangerous Goods Act	Not regulated.
European Agreement Concerning the International Carriage of Dangerous Goods by Road	Not regulated.

15. Regulatory Information

Europe:

Classification according to Dangerous Substance Directive 67/548/EEC

Xn - Harmful

R42/43 - May cause sensitization by inhalation and skin contact

R53 - May cause long-term adverse effects in the aquatic environment

S22 - Do not breathe dust

S24 - Avoid contact with skin

S37 - Wear suitable gloves

S61 - Avoid release to the environment. Refer to special instructions/Safety data sheets.

All components are listed on EINECS. (European Inventory of Existing Chemical Substances)

Classification according to Part 3 of Annex VI of EU Regulation No. 1272/2008

Respiratory Sensitization – Category 1

Skin Sensitization – Category 1;

Aquatic Chronic – Category 4

Symbols: GHS08 - Health Hazard



Signal Word: Danger

Hazard Statements:

H317 - May cause an allergic skin reaction.

H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled

H413 – May cause long lasting harmful effects to aquatic life.

Precautionary Statements:

Prevention:

P261 - Avoid breathing dust or fume

P272 - Contaminated work clothing should not be allowed out of the workplace.

P273 - Avoid release to the environment.

P280 - Wear protective gloves and protective clothing

P285 - In case in inadequate ventilation, wear approved respiratory protection

Response:

P302+P352 - If on skin: Wash with plenty of soap and water.

P304+P341 - IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in position comfortable for breathing

P321 - See Safety Data Sheet for specific treatment

P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.

P342+P311 - If experiencing respiratory symptoms: CALL a POISON CENTER or doctor/physician.

P363 - Wash contaminated clothes before reuse

Disposal:

P501 - Dispose of contents/container in accordance to local/regional/national/international regulations

16. Other Information

The following acronyms may be found in this document:

ACGIH	American Conference of Governmental Industrial Hygienists
DNEL	Derived No Effect Level
LTEL	Long Term Exposure Limit
LR	Lead Registrant
MMAD	Mass Median Aerodynamic Diameter
NIOSH	National Institute of Occupational Safety and Health
NOHSC	National Occupational Health & Safety Commission
OEL	Occupational Exposure Limits
OR	Only Representative
OSHA	Occupational Safety and Health Administration
PBT	PBT: Persistent, Bioaccumulative and Toxic
PNEC	Predicted No Effect Concentration
STEL	Short Term Exposure Limit
STOT	Specific Target Organ Toxicity
TLV-TWA	Threshold Limit Value – Time Weighted Average
vPvB	very Persistent and very Bioaccumulative
WEL	Workplace Exposure Limit (UK HSE EH40)

Safety Data Sheet prepared by:

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Note:

Vale Canada believes that the information in this Material Safety Data Sheet is accurate. However, Vale Canada makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

1. Threshold Limit Values of the American Conference of Governmental Industrial Hygienists. 2008.
2. Maximum Exposure Limit of the Health and Safety Executive in the U.K. in EH40/00.
3. Describes possible health hazards of the product supplied. If user operations change it to other chemical forms, whether as end products, intermediates or fugitive emissions, the possible health hazards of such forms must be determined by the user.

ANNEX 1 – Exposure Scenarios

Exposure Scenarios can be obtained by clicking on the following link: [Vale Cobalt Exposure Scenarios](#). Exposure Scenarios are listed on the page according to GES # and by language.

If you are unable to retrieve the document or have difficulties, please contact one of the following email addresses for assistance: REACH@vale.com or msds@vale.com

- GES 2 - Use of cobalt in the manufacture of inorganic cobalt substances
- GES 3 - Use of cobalt in the manufacture of cobalt carboxylates and resinates
- GES 4 - Manufacture of cobalt in the catalyst industry
- GES 5 - Industrial use of cobalt as catalyst
- GES 6 - Manufacture and industrial use of cobalt containing alloys, steels and tools
- GES 7 - Industrial use of cobalt in surface treatment processes
- GES 8 - Manufacture and industrial use of batteries using cobalt
- GES 9 - Industrial use of cobalt in the manufacture of inorganic pigments & frits, glass, ceramic ware, varistors and magnets (calcination/sintering processes)
- GES 10 - Manufacture and industrial use of coatings and inks using cobalt as drier and/or pigment
- GES 11 - Industrial use of cobalt in the production of diamond tools
- GES 12 - Welding in industrial and/or professional settings
- GES 13 - Professional use of dental alloys containing cobalt
- GES 14 - Professional use of diamond tools and other cobalt-containing tools
- GES 15 - Service life of articles containing cobalt encapsulated in the internal part of the product
- GES 16 - Service life of dental alloys
- GES 17 - Handling of heat and wear resistant vehicle parts
- GES 18 - Consumer use of cutting tools other than hard metal