



Cobalt Base Alloys

Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012
Date of issue: 01/29/2016 Revision date: 01/29/2016



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

1.1. Product identifier

Product name : Cobalt Base Alloys
Product code : AH0902K (US)

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

Use of the substance/mixture : Ingots, Bar, Billet, Plate, Strip, Block, Electrode & Remelt Pig

1.3. Details of the supplier of the safety data sheet

Electralloy
175 Main Street
Oil City, PA 16301
T 814-678-4100

1.4. Emergency telephone number

Emergency number : 814-678-4200

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This product, as sold, has little or no immediate health or fire hazards. Under OSHA 29 CFR 1910.1200 Hazardous Communication Standard, steel products are considered mixtures since in solution, the two or more substances do not react. If product is welded, burned, sawed, brazed, ground, etc. potentially hazardous airborne particulate matter and fumes may be generated. Such activities should be performed in well-ventilated areas with appropriate PPE, as per PPE assessments for tasks involved. The classification given below pertains to the product during processing:

GHS-US classification

Respiratory Sensitization 1
Skin Sensitization 1
Carcinogenicity 2
Reproductive Toxicity 2
Specific Target Organ Toxicity – Repeated Exposure 1

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :



GHS08

Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. Suspected of causing cancer. Suspected of damaging fertility or the unborn child. Causes damage to organs through prolonged or repeated exposure.

Precautionary statements (GHS-US) :

Do not breathe dust/fume/gas/mist/vapors/spray. In case of inadequate ventilation wear respiratory protection. Contaminated work clothing must not be allowed out of the workplace, but left there for cleaning. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. If exposed or concerned: Get medical advice/attention. If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a poison center/doctor. If on skin: Wash with plenty of water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical advice/attention. Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3. Other hazards

No additional information available.

2.4. Unknown acute toxicity (GHS-US)

Not applicable.



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SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable.

3.2. Mixture

Name	Product identifier	%	GHS-US classification
Cobalt	(CAS No) 7440-48-4	35 - 80	Resp. Sens. 1 Skin Sens. 1 Carc. 2 Repr. 2
Iron (iron oxide)	(CAS No) 7439-89-6 (1309-37-1)	0 - 50	Not classified.
Chromium ¹	(CAS No) 7440-47-3	0 - 40	Not classified.
Nickel	(CAS No) 7440-02-0	0 - 30	Skin Sens. 1 Carc. 2 STOT RE 1
Molybdenum	(CAS No) 7439-98-7	0 - 20	Combustible Dust
Tungsten	(CAS No) 7440-33-7	0 - 20	Flam. Sol. 1 Self-heat. 2
Copper	(CAS No) 7440-50-8	0 - 20	Not classified.
Vanadium	(CAS No) 7440-62-2	0 - 15	Not classified.
Manganese	(CAS No) 7439-96-5	0 - 10	STOT RE 2
Aluminum	(CAS No) 7429-90-5	0 - 5	Not classified.
Titanium	(CAS No) 7440-32-6	0 - 5	Not classified.
Silicon	(CAS No) 7440-21-3	0 - 5	Not classified.
Carbon	(CAS No) 7440-44-0	0 - 1	Not classified.
Sulfur	(CAS No) 7704-34-9	0-0.5	Flam Sol 2
Phosphorus	(CAS No) 7723-14-0	0-0.5	Pyr. Sol. 1 Acute Tox. 1 oral Acute Tox. 4 inhalation Skin Corr. 1A STOT RE 1

The above listing is a summary of elements used in alloying cobalt. Various grades will contain different combinations of these elements. Products of combustion may include, and are not limited to: oxides of various alloying elements and toxic metallic fumes.

The metal may contain small amounts of other elements in addition to those above. These elements generally originate in small quantities in the raw material used. These elements may include, but are not limited to the following: Boron, Calcium, Tin and Zirconium.

¹ Welding, torch cutting, brazing, or grinding of chromium metal present in this product may generate airborne concentrations of hexavalent chromium.

SECTION 4: First aid measures

4.1. Description of first aid measures

- First-aid measures after inhalation : 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 center or a doctor.
- First-aid measures after skin contact : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician if irritation develops and persists. Burns caused by molten material must be treated clinically. Do not use solvents or thinners.
- First-aid measures after eye contact : In case of contact, immediately flush eyes with plenty of water. Remove contact lenses, if worn. If irritation persists, get medical attention.
- First-aid measures after ingestion : If swallowed, do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical advice/attention.

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

- Symptoms/injuries after inhalation : May cause allergy or asthma symptoms or breathing difficulties if inhaled. Dust and fumes may cause respiratory tract irritation. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath. Welding, torch cutting, brazing, or grinding of chromium metal present in this product may generate airborne concentrations of hexavalent chromium.
- Symptoms/injuries after skin contact : May cause skin irritation. Symptoms may include redness, drying, defatting and cracking of the skin. May cause sensitization by skin contact. Risk of thermal burns on contact with molten product.
- Symptoms/injuries after eye contact : May cause eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.
- Symptoms/injuries after ingestion : May be harmful if swallowed. May cause stomach distress, nausea or vomiting.



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Symptoms after chronic exposure : Excessive and repeated overexposure of nickel and chromium can cause various forms of dermatitis, inflammation and/or ulceration of upper respiratory tract. Both chromium and nickel have been associated with upper respiratory cancer. Excessive and repeated overexposure of iron fumes can cause siderosis. Excessive and prolonged inhalation of manganese fumes can cause bronchitis, pneumonitis, and lack of coordination.

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

Symptoms may not appear immediately. In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Treat for surrounding material.
Unsuitable extinguishing media : Do not use water on molten metal as explosion hazard could result.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Products of combustion may include, and are not limited to: oxides of various alloying elements and toxic metallic fumes.
Explosion hazard : May be flammable and explosive when in dust cloud, depending on the concentration of the powder in a given area and the particle size of the powder.

5.3. Advice for firefighters

Protection during firefighting : Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

6.2. Methods and material for containment and cleaning up

For containment : Contain spill, then place in a suitable container. Minimize dust generation. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment (PPE). Do not use solvents or thinners.
Methods for cleaning up : Scoop up material and place in a disposal container. Provide ventilation.

6.3. Reference to other sections

See section 8 for further information on protective clothing and equipment and section 13 for advice on waste disposal.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid contact with skin and eyes. Avoid breathing dust, mist, gas, fume, vapors, spray. Do not swallow. Minimize generation of dust. Good housekeeping is important to prevent accumulation of dust. The use of compressed air for cleaning clothing, equipment, etc, is not recommended. Handle and open container with care. When using do not eat, drink or smoke. Use only in well-ventilated areas.
Hygiene measures : Wash hands before eating, drinking, or smoking. Launder contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep out of the reach of children. Keep container tightly closed, dry and in a well-ventilated place.

7.3. Specific end use(s)

Not available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Cobalt (7440-48-4)		
ACGIH	ACGIH TWA (mg/m ³)	0.02 mg/m ³
OSHA	OSHA PEL (TWA) (mg/m ³)	0.1 mg/m ³ (dust and fume)
Iron (7439-89-6)		
ACGIH	ACGIH TWA (mg/m ³)	5 mg/m ³
OSHA	OSHA PEL (TWA) (mg/m ³)	10 mg/m ³



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Iron Oxide (1309-37-1)		
ACGIH	ACGIH TWA (mg/m ³)	5 mg/m ³ (respirable fraction)
OSHA	OSHA PEL (TWA) (mg/m ³)	10 mg/m ³ (fume); 15 mg/m ³ (total dust); 5 mg/m ³ (respirable fraction)
Chromium (7440-47-3)		
ACGIH	ACGIH TWA (mg/m ³)	0.5 mg/m ³ 0.5 mg/m ³ (as chromium III)
OSHA	OSHA PEL (TWA) (mg/m ³)	1 mg/m ³ 0.5 mg/m ³ (as chromium III) 5 µg/m ³ (as hexavalent chromium)
Nickel (7440-02-0)		
ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ (inhalable fraction) 0.2 mg/m ³ (as nickel oxide)
OSHA	OSHA PEL (TWA) (mg/m ³)	1 mg/m ³ 1 mg/m ³ (as nickel oxide)
Molybdenum (7439-98-7)		
ACGIH	ACGIH TWA (mg/m ³)	10 mg/m ³ (inhalable fraction) 3 mg/m ³ (respirable fraction)
OSHA	Not applicable	
Tungsten (7440-33-7)		
ACGIH	ACGIH TWA (mg/m ³)	5 mg/m ³
ACGIH	ACGIH STEL (mg/m ³)	10 mg/m ³
OSHA	Not applicable	
Copper (7440-50-8)		
ACGIH	ACGIH TWA (mg/m ³)	0.2 mg/m ³ (fume)
OSHA	OSHA PEL (TWA) (mg/m ³)	0.1 mg/m ³ (fume) 1 mg/m ³ (dust and mist)
Vanadium (7440-62-2)		
ACGIH	Not applicable	
OSHA	Not applicable	
Manganese (7439-96-5)		
ACGIH	ACGIH TWA (mg/m ³)	0.02 mg/m ³ (respirable fraction) 0.1 mg/m ³ (inhalable fraction)
OSHA	OSHA PEL (Ceiling) (mg/m ³)	5 mg/m ³ (fume)
Aluminum (7429-90-5)		
ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³ (respirable fraction)
OSHA	OSHA PEL (TWA) (mg/m ³)	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)
Titanium (7440-32-6)		
ACGIH	Not applicable	
OSHA	Not applicable	
Silicon (7440-21-3)		
ACGIH	Not applicable	
OSHA	OSHA PEL (TWA) (mg/m ³)	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)



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Carbon (7440-44-0)		
ACGIH	Not applicable	
OSHA	Not applicable	
Sulfur (7704-34-9)		
ACGIH	Not applicable	
OSHA	Not applicable	
Phosphorus (7723-14-0)		
ACGIH	Not applicable	
OSHA	OSHA PEL (TWA) (mg/m ³)	0.1 mg/m ³ (Phosphorus - yellow)
Particulate not otherwise regulated		
ACGIH	ACGIH TWA (mg/m ³)	10 mg/m ³ (inhalable fraction) 3 mg/m ³ (respirable fraction)
OSHA	OSHA PEL (TWA) (mg/m ³)	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)

8.2. Exposure controls

Appropriate engineering controls	: Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, etc.) below recommended exposure limits.
Hand protection	: Wear chemically resistant protective gloves.
Eye protection	: Safety glasses or goggles are recommended when using product.
Skin and body protection	: Wear suitable protective clothing.
Respiratory protection	: When dust and fumes are present from processing, a NIOSH approved dust mask or filtering facepiece is recommended in poorly ventilated areas or when permissible exposure limits may be exceeded. Respirators should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2).
Environmental exposure controls	: Maintain levels below Community environmental protection thresholds.
Other information	: Do not eat, smoke or drink where material is handled, processed or stored. Wash hands carefully before eating or smoking. Handle according to established industrial hygiene and safety practices.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: No data available
Colour	: Metallic
Odour	: Odorless
Odour threshold	: No data available
pH	: No data available
Melting point	: 1427-1538 °C (2600-2800 °F)
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Flammability (solid, gas)	: Not flammable
Explosive limits	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Vapour pressure	: No data available
Relative density	: 7.5-8.5
Relative vapour density at 20 °C	: No data available



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Solubility	: Insoluble
Partition coefficient: n-octanol/water	: No data available
Log Kow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available

9.2. Other information

No additional information available.

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reaction known under conditions of normal use.

10.2. Chemical stability

Stable under normal storage conditions.

10.3. Possibility of hazardous reactions

No dangerous reaction known under conditions of normal use.

10.4. Conditions to avoid

Heat. Incompatible materials.

10.5. Incompatible materials

Strong acids. Oxidizers.

10.6. Hazardous decomposition products

May include, and are not limited to: oxides of various alloying elements and toxic metallic fumes.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified.

Cobalt Base Alloys	
LD50 oral rat	> 2000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat	> 5 mg/l/4h
Cobalt (7440-48-4)	
LD50 oral rat	6170 mg/kg
Iron (7439-89-6)	
LD50 oral rat	> 5000 mg/kg
Iron Oxide (1309-37-1)	
LD50 oral rat	> 10000 mg/kg
Chromium (7440-47-3)	
LD50 oral rat	> 3400 mg/kg
LC50 inhalation rat	> 5.41 mg/l/4h
Nickel (7440-02-0)	
LD50 oral rat	> 9000 mg/kg
Molybdenum (7439-98-7)	
LD50 oral rat	> 2000 mg/kg
LD50 dermal rat	> 2000 mg/kg
LC50 inhalation rat	> 5.0 mg/l/4h
Copper (7440-50-8)	
LD50 dermal rat	> 2000 mg/kg
LC50 inhalation rat	> 5.11 mg/l/4h



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Manganese (7439-96-5)	
LD50 oral rat	>2000 mg/kg
LC50 inhalation rat	> 5.14 mg/l/4h

Aluminum (7429-90-5)	
LD50 oral rat	> 10000 mg/kg

Titanium (7440-32-6)	
LD50 oral rat	> 5000 mg/kg

Silicon (7440-21-3)	
LD50 oral rat	3160 mg/kg
LD50 dermal rabbit	> 5000 mg/kg

Carbon (7440-44-0)	
LD50 oral rat	> 10000 mg/kg

Sulfur (7704-34-9)	
LD50 oral rat	> 3000 mg/kg
LD50 dermal rat	> 2000 mg/kg
LC50 inhalation rat	>9.23 mg/l/4h

Phosphorus (7723-14-0)	
LD50 oral rat	3.03 mg/kg
LD50 dermal rat	100 mg/kg
LC50 inhalation rat	4.3 mg/l/1h

- 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 or skin sensitization : May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.
- Germ cell mutagenicity : Based on available data, the classification criteria are not met.
- Carcinogenicity : Suspected of causing cancer.

Cobalt (7440-48-4)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	1 - Evidence of Carcinogenicity

Chromium (7440-47-3)	
IARC group	3 - Not classifiable

Nickel (7440-02-0)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	3 - Reasonably anticipated to be Human Carcinogen

- Reproductive toxicity : Suspected of damaging fertility or the unborn child.
- Specific target organ toxicity (single exposure) : Based on available data, the classification criteria are not met.
- Specific target organ toxicity (repeated exposure) : Causes damage to organs through prolonged or repeated exposure.
- Aspiration hazard : Based on available data, the classification criteria are not met.
- Symptoms/injuries after inhalation : May cause allergy or asthma symptoms or breathing difficulties if inhaled. Dust and fumes may cause respiratory tract irritation. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath. Welding, torch cutting, brazing, or grinding of chromium metal present in this product may generate airborne concentrations of hexavalent chromium.
- Symptoms/injuries after skin contact : May cause skin irritation. Symptoms may include redness, drying, defatting and cracking of the skin. May cause sensitization by skin contact. Risk of thermal burns on contact with molten product.
- Symptoms/injuries after eye contact : May cause eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.
- Symptoms/injuries after ingestion : May be harmful if swallowed. May cause stomach distress, nausea or vomiting.



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Symptoms after chronic exposure : Excessive and repeated overexposure of nickel and chromium can cause various forms of dermatitis, inflammation and/or ulceration of upper respiratory tract. Both chromium and nickel have been associated with upper respiratory cancer. Excessive and repeated overexposure of iron fumes can cause siderosis. Excessive and prolonged inhalation of manganese fumes can cause bronchitis, pneumonitis, and lack of coordination.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : May cause long-term adverse effects in the aquatic environment.

12.2. Persistence and degradability

Cobalt Base Alloys

Persistence and degradability	Not established.
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12.3. Bioaccumulative potential

Cobalt Base Alloys

Bioaccumulative potential	Not established.
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12.4. Mobility in soil

No additional information available.

12.5. Other adverse effects

Effect on the global warming : No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : This material must be disposed of in accordance with all local, state, provincial, and federal regulations. The generation of waste should be avoided or minimized wherever possible.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT.

As shipped, not regulated for transport.

Additional information

Other information : No supplementary information available.

Special transport precautions : Do not handle until all safety precautions have been read and understood.

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory.

Cobalt (7440-48-4)

Regulations	SARA 313
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Chromium (7440-47-3)

Regulations	CAA, CWA, SARA 313, SDWA, CERCLA, RCRA
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Nickel (7440-02-0)

Regulations	CAA, CWA, SARA 313, CERCLA, SDWA, RCRA
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Copper (7440-50-8)

Regulations	CWA, CERCLA, SDWA, SARA 313
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Vanadium (7440-62-2)

Regulations	SARA 313, CERCLA, SDWA, RCRA
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Manganese (7439-96-5)

Regulations	SARA 313, CAA, CERCLA, SDWA
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Aluminum (7429-90-5)

Regulations	SWDA, SARA 313
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Phosphorus (7723-14-0)	
Regulations	CAA, CWA, SARA 313, CERCLA, SDWA

Regulations Key - SARA Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard	
CAA	Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06])
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (42 USC secs. 9601 (14), 9603(a); 40 CFR Sec. 302.4, Table 302.4 and App. A)
CWA	Clean Water Act (33 USC Secs. 1311; 1314(b), (c), (e), (g); 136(b), (c); 137(b), (c) [as of 8/2/06])
RCRA	Resource Conservation Recovery Act (42 USC Sec. 6921; 40 CFR Part 261 App VIII)
SARA	Superfund Amendments and Reauthorization Title III Section 302 Extremely Hazardous Substances (42 USC secs. 11023, 13106; 40 CFR Sec. 372.65) and Section 313 Toxic Chemicals (42 USC secs. 11023, 13106; 40 CFR sec. 372.65 [as of 6/30/05])
SDWA	Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. [1974])
TSCA	Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976])

15.2. US State regulations

Cobalt Base Alloys	
State or local regulations	This product contains chemicals known to the State of California to cause cancer.

SECTION 16: Other information

Date of issue : 01/29/2016
 Revision date : 01/29/2016
 Version : K
 Other information : None

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