Cobalt Based Alloys

Safety Data Sheet

According to REACH Regulation (EC) No 1907/2006, as retained and amended in UK law.
Issue date: 13/04/2026 Version: 1.0

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

1.1. Product identifier

Product form : Article
Trade name : Cobalt Based Alloys
Other means of identification : AMS5387, AMS5382, ANC 13, ANC 14, ASTM F75, CoCr, CoCrMo, ECY768, F75, FSX414, G-CoCr28Mo6, HAYNES25, HS21, HS25, HS31, ISO5382-4, KC24NWTA, KC25NW, KC27ND, L605, MARM509, MARM302, MSRR7122, MSRR7049, MSRR7185, MSRR7145, STELLITE 3, STELLITE 6, STELLITE 12, STELLITE 21, STELLITE 25, STELLITE 31, SUPER N, T400, TRIBALLOY 400, WI-52, X40, X45, X73, XH36

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

1.2.1. Relevant identified uses

Use of the substance/mixture : Cast ingots and billets at varying weights and dimensions. Ingots and billets are sold and distributed to downstream processors who remelt the superalloys into products used within various downstream applications.

1.2.2. Uses advised against

Restrictions on use : None known

1.3. Details of the supplier of the safety data sheet

Ross & Catherall
Forge Lane
S21 1BA Killamarsh – Sheffield
United Kingdom
T +44 0114 248 6404
rossandcatherall.com/contact

1.4. Emergency telephone number

Emergency number : +44 0114 248 6404 ext 345

Country/Area	Organisation	Emergency number
United Kingdom	National Poisons Information Service (Birmingham Centre). City Hospital. Dudley Road B18 7QH.	0344 892 0111 Only for healthcare professionals

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to GB CLP (SI 2019:720 as amended)

Acute toxicity (oral), Category 4	H302
Serious eye damage/eye irritation, Category 2	H319
Respiratory sensitisation, Category 1	H334
Skin sensitisation, Category 1	H317
Germ cell mutagenicity, Category 2	H341
Carcinogenicity, Category 1B	H350
Reproductive toxicity, Category 1B	H360F
Specific target organ toxicity – Repeated exposure, Category 1	H372
Hazardous to the aquatic environment – Chronic Hazard, Category 3	H412

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

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

2.2. Label elements

Labelling according to GB CLP (SI 2019:720 as amended)

Hazard pictograms (GB CLP) :

GHS07 GHS08

Signal word (GB CLP) : Danger

Contains : Nickel; Cobalt

Hazard statements (GB CLP) : H302 - Harmful if swallowed.
H317 - May cause an allergic skin reaction.
H319 - Causes serious eye irritation.
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341 - Suspected of causing genetic defects.
H350 - May cause cancer.
H360F - May damage fertility.
H372 - Causes damage to organs through prolonged or repeated exposure.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements (GB CLP) : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe dust.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P272 - Contaminated work clothing should not be allowed out of the workplace.

2.3. Other hazards

Other hazards which do not result in classification : This product is not hazardous in the form in which it is shipped by the manufacturer. The hazards listed above are only present during processes which generate dust (cutting, grinding, polishing, demolishing, etc). Preventative exposure and necessary precautions to airborne particulates of dust must be taken.

Results of PBT and vPvB assessment

This substance does not meet the PBT criteria of UK REACH regulation, annex XIII
This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII

Component	
Substance(s) not meeting the PBT criteria of UK REACH regulation, in accordance with Annex XIII	Nickel (7440-02-0), Chromium (7440-47-3), Molybdenum (7439-98-7), Titanium (7440-32-6), Manganese (7439-96-5), Silicon (Si) (7440-21-3), Tungsten (7440-33-7), Tantalum (7440-25-7), Vanadium (7440-62-2), Niobium (7440-03-1), Cobalt (7440-48-4), Aluminium (7429-90-5), Hafnium (7440-58-6), Iron (7439-89-6)
Substance(s) not meeting the vPvB criteria of UK REACH regulation, in accordance with Annex XIII	Nickel (7440-02-0), Chromium (7440-47-3), Molybdenum (7439-98-7), Titanium (7440-32-6), Manganese (7439-96-5), Silicon (Si) (7440-21-3), Tungsten (7440-33-7), Tantalum (7440-25-7), Vanadium (7440-62-2), Niobium (7440-03-1), Cobalt (7440-48-4), Aluminium (7429-90-5), Hafnium (7440-58-6), Iron (7439-89-6)

Results of Endocrine Disruptor assessment

The substance is not included in the list established in accordance with Article 59(1) of UK REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in GB BPR and GB PPP

Component	
Substance(s) not considered as endocrine disrupting. They are not included in the list established in accordance with Article 59(1) of UK REACH for having endocrine disrupting properties, nor identified as having endocrine disrupting properties in accordance with the criteria set out in GB BPR and GB PPP	Cobalt(7440-48-4), Nickel(7440-02-0), Chromium(7440-47-3), Molybdenum(7439-98-7), Tungsten(7440-33-7), Tantalum(7440-25-7), Iron(7439-89-6), Aluminium(7429-90-5), Titanium(7440-32-6), Silicon (Si)(7440-21-3), Manganese(7439-96-5), Niobium(7440-03-1), Vanadium(7440-62-2), Hafnium(7440-58-6)

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to GB CLP (SI 2019:720 as amended)
Cobalt	CAS-No.: 7440-48-4 EC-No.: 231-158-0	35 – 65	Acute Tox. 4 (Oral), H302 (ATE=550 mg/kg bodyweight) Eye Irrit. 2, H319 Resp. Sens. 1, H334 Skin Sens. 1, H317 Muta. 2, H341 Carc. 1B, H350 Repr. 1B, H360F STOT RE 1, H372 Aquatic Chronic 4, H413
Nickel	CAS-No.: 7440-02-0 EC-No.: 231-111-4	0.1 – 50	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372
Chromium	CAS-No.: 7440-47-3 EC-No.: 231-157-5	15 – 40	Not classified
Molybdenum	CAS-No.: 7439-98-7 EC-No.: 231-107-2	0.1 – 30	Not classified
Tungsten	CAS-No.: 7440-33-7 EC-No.: 231-143-9	0.1 – 25	Not classified
Tantalum	CAS-No.: 7440-25-7 EC-No.: 231-135-5	0.1 – 15	Not classified
Iron	CAS-No.: 7439-89-6 EC-No.: 231-096-4	0.1 – 10	Not classified
Aluminium	CAS-No.: 7429-90-5 EC-No.: 231-072-3	0.1 – 6	Aquatic Acute 1, H400 (M=1)
Titanium	CAS-No.: 7440-32-6 EC-No.: 231-142-3	0.1 – 5	Not classified
Silicon (Si)	CAS-No.: 7440-21-3 EC-No.: 231-130-8	0.1 – 5	Not classified
Manganese	CAS-No.: 7439-96-5 EC-No.: 231-105-1	0.1 – 3	Flam. Sol. 2, H228 Aquatic Chronic 2, H411
Niobium	CAS-No.: 7440-03-1 EC-No.: 231-113-5	0.1 – 3	Not classified

Name	Product identifier	%	Classification according to GB CLP (SI 2019:720 as amended)
Vanadium	CAS-No.: 7440-62-2 EC-No.: 231-171-1	0.1 – 2	Not classified
Hafnium	CAS-No.: 7440-58-6 EC-No.: 231-166-4	0.1 – 2	Not classified

Comments : The concentration ranges are provided due to batch-to-batch variability.

Full text of H- and EUH-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : In the finished material form, no special first aid measures are required. The following first aid measures must be followed during any process generating dust. First aider: Pay attention to self-protection. Never give anything by mouth to an unconscious person. IF exposed or concerned: Get medical advice/attention.

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 the victim is unconscious: Lay in a stable manner on victim's side. If experiencing respiratory symptoms: Call a poison center or a doctor.

First-aid measures after skin contact : Take off contaminated clothing. Wash skin with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

First-aid measures after eye contact : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Call a poison center or a doctor if you feel unwell.

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

Symptoms/effects after inhalation : If dust are formed : May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Symptoms/effects after skin contact : If dust are formed : May cause an allergic skin reaction. Risk of thermal burns on contact with molten product.

Symptoms/effects after eye contact : If dust are formed : Stinging, redness, itching, tears, blurred vision, swelling.

Symptoms/effects after ingestion : Harmful if swallowed. If dust are formed : Ingestion may cause nausea and vomiting, Gastrointestinal disturbances.

Chronic symptoms : Suspected of causing genetic defects. May cause cancer. May damage fertility or the unborn child. Causes damage to organs through prolonged or repeated exposure.

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

IF exposed or concerned: Get medical advice/attention.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Metal fire powder. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Fire hazard : No fire hazard.

Explosion hazard : Warning. May form explosive dust-air mixture if small particles are generated during further processing, handling, or by other means.

Hazardous decomposition products in case of fire : Toxic fumes may be released. Metallic oxides.

5.3. Advice for firefighters

Firefighting instructions	:	Fight fire from safe distance and protected location. Do not enter fire area without proper protective equipment, including respiratory protection. Move containers from fire area if it can be done without personal risk. Use extinguishing media appropriate for surrounding fire. Prevent fire fighting water from entering the environment.
Protection during firefighting	:	Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	:	Avoid all personal contact including breathing in the dust. Avoid contact with eyes, skin and clothing. Do not take actions involving personal risks. Absorb spillage to prevent material damage. Notify authorities if product enters sewers or public waters.

6.1.1. For non-emergency personnel

Protective equipment	:	Wear recommended personal protective equipment.
Emergency procedures	:	Evacuate the danger area. If outdoors, move to an area upwind of the danger area. Do not breathe fume, dust. If possible without taking personal risks, remove ignition sources, ventilate area. Prevent other non-emergency personnel from entering the danger area.

6.1.2. For emergency responders

Protective equipment	:	Wear the recommended personal protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures	:	Evacuate personnel to a safe area. Do not touch or walk on the spilled product. Stop leak if safe to do so. Ventilate spillage area.

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

For containment	:	Using a clean shovel, put the material in a dry container and cover without compressing it.
Methods for cleaning up	:	Take up mechanically (sweeping, shovelling) and collect in suitable container for disposal. Avoid creating or spreading dust. Contaminated absorbent material may pose the same hazard as the spilt product. Decontaminate surfaces and equipment with water and detergent. Until a sufficient level of dilution is achieved, the decontamination water may pose the same hazards as the product. Notify authorities if product enters sewers or public waters. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Ensure good ventilation of the work station. Wear personal protective equipment. Do not breathe dust. Avoid contact with skin, eyes and clothing. Avoid handling which leads to dust formation. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take precautionary measures against static discharge.
Hygiene measures	:	Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Contaminated work clothing should not be allowed out of the workplace. Separate working clothes from town clothes. Launder separately.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	:	Store in a cool, dry and well-ventilated area away from incompatible substances. Keep container tightly closed.

Incompatible materials	:	Strong acids. Strong bases. Strong oxidizing agents.
Packaging materials	:	Always store product in container of same material as original container.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

Nickel (7440-02-0)	
United Kingdom - Occupational Exposure Limits	
Local name	Nickel
WEL TWA (OEL TWA)	0.1 mg/m³ and its inorganic compounds (except nickel tetracarbonyl): water-soluble nickel compounds (as Ni) 0.5 mg/m³ and its inorganic compounds (except nickel tetracarbonyl): nickel and water insoluble nickel compounds (as Ni)
WEL STEL (OEL STEL)*	0.3 mg/m³
Remark	Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity), Carc (Capable of causing cancer and/or heritable genetic damage (nickel oxides and sulphides)), Sen (Capable of causing occupational asthma (nickel sulphate))
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

Chromium (7440-47-3)	
United Kingdom - Occupational Exposure Limits	
Local name	Chromium
WEL TWA (OEL TWA)	0.5 mg/m³ 0.5 mg/m³ Chromium (II) compounds (as Cr) 0.5 mg/m³ Chromium (III) compounds (as Cr)
WEL STEL (OEL STEL)*	1.5 mg/m³
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
United Kingdom - Biological limit values	
Local name	Chromium VI
BMGV	10 µmol/mol creatinine Parameter: chromium - Medium: urine - Sampling time: Post shift
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

Molybdenum (7439-98-7)	
United Kingdom - Occupational Exposure Limits	
Local name	Molybdenum
WEL TWA (OEL TWA)	10 mg/m³ insoluble compounds (as Mo) 5 mg/m³ soluble compounds (as Mo)
WEL STEL (OEL STEL)	20 mg/m³ insoluble compounds (as Mo) 10 mg/m³ soluble compounds (as Mo)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

Silicon (Si) (7440-21-3)	
United Kingdom - Occupational Exposure Limits	
Local name	Silicon
WEL TWA (OEL TWA)	10 mg/m³ inhalable dust 4 mg/m³ respirable dust
WEL STEL (OEL STEL)*	30 mg/m³
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

Tungsten (7440-33-7)	
United Kingdom - Occupational Exposure Limits	
Local name	Tungsten
WEL TWA (OEL TWA)	1 mg/m³ and compounds (as W), soluble compounds 5 mg/m³ and compounds (as W), insoluble compounds and others
WEL STEL (OEL STEL)	3 mg/m³ and compounds (as W), soluble compounds 10 mg/m³ and compounds (as W), insoluble compounds and others
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

Tantalum (7440-25-7)	
United Kingdom - Occupational Exposure Limits	
Local name	Tantalum
WEL TWA (OEL TWA)	5 mg/m³
WEL STEL (OEL STEL)	10 mg/m³
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

Cobalt (7440-48-4)	
United Kingdom - Occupational Exposure Limits	
Local name	Cobalt
WEL TWA (OEL TWA)	0.1 mg/m³ and Cobalt compounds (as Co)
WEL STEL (OEL STEL)*	0.3 mg/m³
Remark	Carc (cobalt dichloride and sulphate)(Capable of causing cancer and/or heritable genetic damage), Sen (Capable of causing occupational asthma)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

Aluminium (7429-90-5)	
United Kingdom - Occupational Exposure Limits	
Local name	Aluminium
WEL TWA (OEL TWA)	2 mg/m³ alkyl compounds 2 mg/m³ salts, soluble 10 mg/m³ metal, inhalable dust 4 mg/m³ metal, respirable dust
WEL STEL (OEL STEL)*	6 mg/m³
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

No additional information available

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:
Ensure good ventilation of the work station. Use general ventilation, local exhaust ventilation, or process enclosure to keep the airborne concentrations below the permissible exposure limits. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

8.2.2. Personal protection equipment

Personal protective equipment:
Personal protective equipment should be chosen according to national standards and in discussion with the supplier of the protective equipment. Wear recommended personal protective equipment.
Personal protective equipment symbol(s):

8.2.2.1. Eye and face protection

Eye protection:
Safety glasses with side guards should be worn to prevent injury from airborne particles and/or other eye contact with this product

8.2.2.2. Skin protection

Skin and body protection:
Wear suitable protective clothing. Body protection should be chosen depending on activity and possible exposure

Hand protection:
Hand protection should be chosen depending on activity. Wear protective gloves

8.2.2.3. Respiratory protection

Respiratory protection:
If dust are formed : Use NIOSH approved respirator if ventilation is inadequate. SCBA for emergency responders. Must be used in accordance with an OSHA compliant respiratory protection program. For limited exposure, use P95 or N95 respirator. For prolonged exposure use an air- purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirators if exposure limits are exceeded or symptoms are experienced.

8.2.2.4. Thermal hazards

Thermal hazard protection:
Use insulated gloves, impervious apron, long sleeves and other protective clothing when handling this material hot.

8.2.3. Environmental exposure controls

Environmental exposure controls:
Avoid release to the environment. Take measures to reduce or limit air emissions and releases to soil and the aquatic environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Solid
Appearance	:	Ingot.
Colour	:	Metallic Grey
Odour	:	Odourless.
Odour threshold	:	Not available
pH	:	Not available
pH solution	:	Not available
Melting point	:	1482.2222 °C / 2700 °F
Freezing point	:	Not available

Boiling point	:	Not available
Flash point	:	Not applicable
Flammability	:	Non flammable
Explosive limits	:	Not applicable
Lower explosion limit	:	Not applicable
Upper explosion limit	:	Not applicable
Vapour pressure	:	Not available
Vapour pressure at 50°C	:	Not available
Relative vapour density at 20°C	:	Not applicable
Relative density	:	Not available
Density	:	Not available
Solubility	:	Negligible. Water: < 0.1 %
Partition coefficient n-octanol/water (Log Kow)	:	Not available
Auto-ignition temperature	:	Not applicable
Decomposition temperature	:	Not available
Viscosity, kinematic	:	Not applicable
Explosive properties	:	Not available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions of use.

10.3. Possibility of hazardous reactions

Cast Ingot/billet is stable at ordinary temperature; however, caution should be taken with acids, bases, and oxidizers. Molten metal will react violently with water.

10.4. Conditions to avoid

Avoid ignition sources. Incompatible materials. Avoid dust formation.

10.5. Incompatible materials

Strong acids. Strong bases. Strong oxidizing agents.

10.6. Hazardous decomposition products

Under normal conditions, exposure to cast ingots/billets presents few health hazards in itself. Thermal cutting and melting of ingots/billets may produce fumes containing the component elements and breathing those fumes may present potentially significant health hazards.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	:	Harmful if swallowed.
Acute toxicity (dermal)	:	Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation)	:	Not classified (Based on available data, the classification criteria are not met)

Cobalt Based Alloys	
ATE UK (Oral)	846.154 mg/kg bodyweight

Nickel (7440-02-0)	
LD50 oral rat	> 9000 mg/kg bodyweight

Chromium (7440-47-3)	
LC50 Inhalation - Rat	> 5.41 mg/l air
Molybdenum (7439-98-7)	
LD50 dermal rat	> 2000 mg/kg bodyweight
Titanium (7440-32-6)	
LD50 oral rat	> 5000 mg/kg bodyweight
Manganese (7439-96-5)	
LD50 oral rat	> 2000 mg/kg bodyweight
LD50 oral	2500 mg/kg
LC50 Inhalation - Rat	> 5.14 mg/l air
Silicon (Si) (7440-21-3)	
LD50 oral rat	> 5000 mg/kg bodyweight
LD50 oral	3160 mg/kg
LD50 dermal rabbit	> 5000 mg/kg bodyweight
Tungsten (7440-33-7)	
LD50 oral rat	> 2000 mg/kg bodyweight
LD50 dermal rat	> 2000 mg/kg bodyweight
LC50 Inhalation - Rat (Dust/Mist)	> 5.4 mg/l
Tantalum (7440-25-7)	
LD50 oral rat	> 2000 mg/kg bodyweight
LC50 Inhalation - Rat	> 5.18 mg/l air
Vanadium (7440-62-2)	
LD50 oral rat	> 2000 mg/kg bodyweight
LC50 Inhalation - Rat	> 5.05 mg/l air
Niobium (7440-03-1)	
LD50 oral rat	> 2000 mg/kg bodyweight
LD50 dermal rat	> 2000 mg/kg bodyweight
Cobalt (7440-48-4)	
LD50 oral	550 mg/kg
LD50 dermal rat	> 2000 mg/kg bodyweight
Aluminium (7429-90-5)	
LD50 oral rat	> 15900 mg/kg bodyweight
LC50 Inhalation - Rat	> 0.888 mg/l air
Hafnium (7440-58-6)	
LD50 oral rat	> 5000 mg/kg bodyweight Animal: rat, Animal sex: female, Guideline: OECD Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method)
LC50 Inhalation - Rat	> 4.3 mg/l air Animal: rat, Guideline: OECD Guideline 436 (Acute Inhalation Toxicity: Acute Toxic Class Method), Guideline: EPA OPPTS 870.1300 (Acute inhalation toxicity)

Iron (7439-89-6)	
LD50 oral rat	98.6 g/kg

Skin corrosion/irritation : Not classified (Based on available data, the classification criteria are not met)

Serious eye damage/irritation : Causes serious eye irritation.

Cobalt (7440-48-4)	
Serious eye damage/irritation, rabbit	Irritating to rabbits on ocular application

Respiratory or skin sensitisation : May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.

Germ cell mutagenicity : Suspected of causing genetic defects.

Carcinogenicity : May cause cancer.

Nickel (7440-02-0)	
IARC group	2B - Possibly carcinogenic to humans

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

Cobalt (7440-48-4)	
IARC group	2A - Probably carcinogenic to humans

Reproductive toxicity : May damage fertility.

Molybdenum (7439-98-7)	
LOAEL (animal/male, F0/P)	100 mg/kg bodyweight
NOAEL (animal/male, F0/P)	42.5 mg/kg bodyweight

Silicon (Si) (7440-21-3)	
NOAEL (animal/male, F0/P)	5000 mg/kg bodyweight

Tungsten (7440-33-7)	
NOAEL (animal/male, F1)	≈ 160 mg/kg bodyweight

Aluminium (7429-90-5)	
NOAEL (animal/male, F0/P)	1000 mg/kg bodyweight

STOT-single exposure : Not classified (Based on available data, the classification criteria are not met)

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

Nickel (7440-02-0)	
LOAEC (inhalation, rat, dust/mist/fume, 90 days)	0.004 mg/l air
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

Chromium (7440-47-3)	
LOAEC (inhalation, rat, dust/mist/fume, 90 days)	≥ 0.0044 mg/l air

Molybdenum (7439-98-7)	
NOAEC (inhalation, rat, dust/mist/fume, 90 days)	> 0.1 mg/l air

Silicon (Si) (7440-21-3)	
NOAEL (oral, rat, 90 days)	> 5000 mg/kg bodyweight

Tungsten (7440-33-7)	
NOAEC (inhalation, rat, dust/mist/fume, 90 days)	> 0.652 mg/l air

Tantalum (7440-25-7)	
NOAEL (oral, rat, 90 days)	1000 mg/kg bodyweight

Vanadium (7440-62-2)	
LOAEC (inhalation, rat, dust/mist/fume, 90 days)	0.25 mg/l air
NOAEL (oral, rat, 90 days)	≥ 1000 mg/kg bodyweight
NOAEC (inhalation, rat, dust/mist/fume, 90 days)	0.022 mg/l air

Niobium (7440-03-1)	
NOAEL (oral, rat, 90 days)	> 1000 mg/kg bodyweight

Cobalt (7440-48-4)	
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

Aluminium (7429-90-5)	
LOAEC (inhalation, rat, dust/mist/fume, 90 days)	0.05 mg/l air
NOAEL (subchronic, oral, animal/male, 90 days)	1034 mg/kg bodyweight
NOAEL (subchronic, oral, animal/female, 90 days)	1087 mg/kg bodyweight

Hafnium (7440-58-6)	
NOAEL (oral, rat, 90 days)	3156 – 7085 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity Study in Rodents)

Aspiration hazard : Not classified (Based on available data, the classification criteria are not met)

Cobalt Based Alloys	
Viscosity, kinematic	Not applicable

Other information

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : In the form in which it is marketed, the product causes no danger to the environment. If the product form in the as-supplied state is changed through further processing (e.g. through grinding, polishing, electrical discharge machining, welding or melting) and dust or vapours are produced, the following hazards are associated with the product.

Hazardous to the aquatic environment, short–term (acute) : Not classified (Based on available data, the classification criteria are not met)

Hazardous to the aquatic environment, long–term (chronic) : Harmful to aquatic life with long lasting effects.

Chromium (7440-47-3)	
EC50 - Crustacea [1]	13.1 – 14.7 mg/l

Titanium (7440-32-6)	
EC50 72h - Algae [1]	> 10000 mg/l

Manganese (7439-96-5)	
LC50 - Fish [1]	> 3.6 mg/l
EC50 - Crustacea [1]	> 1.6 mg/l
EC50 72h - Algae [1]	4.5 mg/l

Manganese (7439-96-5)	
EC50 72h - Algae [2]	2.8 mg/l
ErC50 algae	4.5 mg/l
NOEC (chronic)	1.7 mg/l
Silicon (Si) (7440-21-3)	
EC50 72h - Algae [1]	≈ 250 mg/l
Tungsten (7440-33-7)	
LC50 - Fish [1]	> 181 mg/l
EC50 - Crustacea [1]	> 163 mg/l
EC50 72h - Algae [1]	> 17.7 mg/l
NOEC chronic fish	≥ 9.8 mg/l
Tantalum (7440-25-7)	
LC50 - Fish [1]	> 1.76 µg/l
Cobalt (7440-48-4)	
LC50 - Fish [1]	100 mg/l
EC50 - Crustacea [1]	> 890 µg/l
EC50 - Crustacea [2]	5.89 mg/l
Aluminium (7429-90-5)	
EC50 72h - Algae [1]	1.05 mg/l
EC50 72h - Algae [2]	0.2 mg/l
Hafnium (7440-58-6)	
LC50 - Fish [1]	> 100 mg/l Source: EHCA
EC50 - Crustacea [1]	> 100 mg/l Source: ECHA
EC50 72h - Algae [1]	> 100 mg/l Source: ECHA
Iron (7439-89-6)	
LC50 - Fish [1]	8.65 mg/l
LC50 - Other aquatic organisms [1]	106.3 mg/l
EC50 - Crustacea [1]	> 100 mg/l
EC50 - Crustacea [2]	> 10000 mg/l
EC50 72h - Algae [1]	18 mg/l

12.2. Persistence and degradability

Cobalt Based Alloys	
Persistence and degradability	Not established.
Nickel (7440-02-0)	
Persistence and degradability	Not rapidly degradable
Chromium (7440-47-3)	
Persistence and degradability	Not rapidly degradable

Molybdenum (7439-98-7)	
Persistence and degradability	Not rapidly degradable
Titanium (7440-32-6)	
Persistence and degradability	Not rapidly degradable
Manganese (7439-96-5)	
Persistence and degradability	Not rapidly degradable
Silicon (Si) (7440-21-3)	
Persistence and degradability	Not rapidly degradable
Tungsten (7440-33-7)	
Persistence and degradability	Not rapidly degradable
Tantalum (7440-25-7)	
Persistence and degradability	Not rapidly degradable
Vanadium (7440-62-2)	
Persistence and degradability	Not rapidly degradable
Niobium (7440-03-1)	
Persistence and degradability	Not rapidly degradable
Cobalt (7440-48-4)	
Persistence and degradability	Not rapidly degradable
Aluminium (7429-90-5)	
Persistence and degradability	Not rapidly degradable
Hafnium (7440-58-6)	
Persistence and degradability	Not rapidly degradable
Iron (7439-89-6)	
Persistence and degradability	Not rapidly degradable

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

Cobalt Based Alloys
This substance does not meet the PBT criteria of UK REACH regulation, annex XIII
This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII

Component	
Nickel (7440-02-0)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Chromium (7440-47-3)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII

Component	
Molybdenum (7439-98-7)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Titanium (7440-32-6)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Manganese (7439-96-5)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Silicon (Si) (7440-21-3)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Tungsten (7440-33-7)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Tantalum (7440-25-7)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Vanadium (7440-62-2)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Niobium (7440-03-1)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Cobalt (7440-48-4)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Aluminium (7429-90-5)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Hafnium (7440-58-6)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII
Iron (7439-89-6)	This substance does not meet the PBT criteria of UK REACH regulation, annex XIII This substance does not meet the vPvB criteria of UK REACH regulation, annex XIII

12.6. Other adverse effects

Ozone : Not classified (Based on available data, the classification criteria are not met)

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional waste regulation : Disposal must be done according to official regulations.

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Sewage disposal recommendations : Disposal must be done according to official regulations.

Product/Packaging disposal recommendations : Comply with applicable regulations for solid waste disposal. Disposal must be done according to official regulations. Dispose of this material and its container at hazardous or special waste collection point. Refer to all applicable national, international and local regulations or provisions.

Additional information : Do not re-use empty containers.

Ecological waste information : Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number				
Not regulated for transport				

ADR	IMDG	IATA	ADN	RID
14.2. UN proper shipping name				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
Transport document description				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.3. Transport hazard class(es)				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.4. Packing group				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.5. Environmental hazards				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
No supplementary information available				

14.6. Special precautions for user

Overland transport
Not regulated

Transport by sea
Not regulated

Air transport
Not regulated

Inland waterway transport
Not regulated

Rail transport
Not regulated

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

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

15.1.1. National regulations

UK REACH Annex XVII (Restriction List)

UK restriction list (REACH Annex XVII)

Reference code	Applicable on	Entry title or description
27.	Nickel	Nickel and its compounds

UK REACH Annex XIV (Authorisation List)

This product contains no substance(s) listed on UK REACH Annex XIV (Authorisation List) equal to or above the 0.1% level of disclosure

UK REACH Candidate List (SVHC)

This product contains no substance(s) listed on the UK REACH Candidate List (SVHC).

GB PIC Regulation (Prior Informed Consent)

This product contains no substance(s) listed on the GB PIC List equal to or above the level of SDS disclosure

POP Regulation (Persistent Organic Pollutants)

This product contains no substance(s) listed on the GB POP List equal to or above the level of SDS disclosure

Ozone Regulation (S.I. No. 168 of 2015)

This product contains no substance(s) listed on the GB Ozone Depletion List equal to or above the level of SDS disclosure

Control of Poisons and Explosives Precursors Act

This product contains no substance(s) listed as a reportable poison on the Control of Poisons and Explosives Precursors Regulations equal to or above the level of SDS disclosure
This product contains no substance(s) listed as a regulated poison on the Control of Poisons and Explosives Precursors Regulations equal to or above the level of SDS disclosure
This product contains substance(s) listed on the Control of Poisons and Explosives Precursors Regulations equal to or above the level of SDS disclosure: Aluminium powders - 7429-90-5
This substance is not listed as a regulated poison on the Control of Poisons and Explosives Precursors Regulations

Drug Precursors Regulation (EC 273/2004)

This product contains no substance(s) listed on the GB Drug Precursors List equal to or above the level of SDS disclosure

15.1.2. Other Information

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Full text of H- and EUH-statements:	
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Acute 1	Hazardous to the aquatic environment – Acute Hazard, Category 1
Aquatic Chronic 2	Hazardous to the aquatic environment – Chronic Hazard, Category 2
Aquatic Chronic 4	Hazardous to the aquatic environment – Chronic Hazard, Category 4
Carc. 1B	Carcinogenicity, Category 1B
Carc. 2	Carcinogenicity, Category 2
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Sol. 2	Flammable solids, Category 2
Muta. 2	Germ cell mutagenicity, Category 2
Repr. 1B	Reproductive toxicity, Category 1B
Resp. Sens. 1	Respiratory sensitisation, Category 1
Skin Sens. 1	Skin sensitisation, Category 1
STOT RE 1	Specific target organ toxicity – Repeated exposure, Category 1
STOT RE 2	Specific target organ toxicity – Repeated exposure, Category 2
H228	Flammable solid.
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
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.

Full text of H- and EUH-statements:	
H360F	May damage fertility.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.
H413	May cause long lasting harmful effects to aquatic life.

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:		
Acute Tox. 4 (Oral)	H302	Calculation method
Eye Irrit. 2	H319	Expert judgement
Resp. Sens. 1	H334	Calculation method
Skin Sens. 1	H317	Calculation method
Muta. 2	H341	Calculation method
Carc. 1B	H350	Calculation method
Repr. 1B	H360F	Calculation method
STOT RE 1	H372	Calculation method
Aquatic Chronic 3	H412	Calculation method

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.