Low Alloy and Tool Steels

Safety Data Sheet

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012

Date of issue: 10/19/2018 Revision date: 12/08/2025

SECTION 1: Identification

1.1. Identification

Product form : Mixture

Product name : Low Alloy and Tool Steels

Product code : AH0906N (US)

1.2. Recommended use and restrictions on use

Use of the substance/mixture : Ingots, Bar, Billet, Plate, Strip, Block, Electrode & Remelt Pig. Grindings, turnings and scrapped solids.

1.3. Supplier

Supplier

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

1.4. Emergency telephone number

Emergency number : +1 814-678-4200

SECTION 2: Hazard(s) 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

Acute Tox. 4 (Oral)	Harmful if swallowed
Resp. Sens. 1	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin Sens. 1	May cause an allergic skin reaction
Muta. 2	Suspected of causing genetic defects
Carc. 1B	May cause cancer
Repr. 1B	May damage fertility or the unborn child
STOT RE 1	Causes damage to organs through prolonged or repeated exposure

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US) :

Signal word (GHS US) : Danger

Hazard statements (GHS US) : Harmful if swallowed
May cause an allergic skin reaction
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Suspected of causing genetic defects
May cause cancer

Precautionary statements (GHS US)	:	May damage fertility or the unborn child Causes damage to organs through prolonged or repeated exposure Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Wash hands, forearms and face thoroughly after handling. Do not eat, drink or smoke when using this product. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. If exposed or concerned: Get medical advice/attention. If swallowed: Rinse mouth.Call a poison center or doctor if you feel unwell. If on skin: Wash with plenty of water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: 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 or doctor. Store locked up. Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

35% of the mixture consists of ingredient(s) of unknown acute toxicity (Oral)

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%
Iron (Iron oxide (Fe2O3))	CAS-No.: 7439-89-6	60 - 99.5
Tungsten	CAS-No.: 7440-33-7	0 - 21
Chromium[1]	CAS-No.: 7440-47-3	0 - 20
Molybdenum	CAS-No.: 7439-98-7	0 - 15
Vanadium	CAS-No.: 7440-62-2	0 - 15
Cobalt	CAS-No.: 7440-48-4	0 - 13
Nickel	CAS-No.: 7440-02-0	0 - 5
Manganese	CAS-No.: 7439-96-5	0 - 5
Aluminum	CAS-No.: 7429-90-5	0 - 5
Silicon	CAS-No.: 7440-21-3	0 - 5
Carbon	CAS-No.: 7440-44-0	0 - 4
Copper	CAS-No.: 7440-50-8	0 - 1

Name	Product identifier	%
Titanium	CAS-No.: 7440-32-6	0 - 1
Phosphorus elemental	CAS-No.: 7723-14-0	0 - 0.5
Sulfur	CAS-No.: 7704-34-9	0 - 0.5
Niobium or Columbium	CAS-No.: 7440-03-1	0 - 1

The above listing is a summary of elements used in this product. 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.

All commercial metals may contain small amounts of various elements in addition to those specified. These small quantities (less than 0.1%) frequently referred to as “trace” or “residual” elements, generally originate 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 general : IF EXPOSED OR CONCERNED: Get medical advice/attention.

First-aid measures after inhalation : IF INHALED: 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. Get medical advice/attention if you feel unwell.

First-aid measures after skin contact : IF SKIN IRRITATION OCCURS: Wash skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Obtain medical attention if irritation persists. Burns caused by molten material must be treated clinically. Do not use solvents or thinners.

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 : IF SWALLOWED: Rinse mouth. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Get medical advice/attention if you feel unwell.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : May cause irritation to the respiratory tract. May cause allergy or asthma symptoms or breathing difficulties if inhaled. 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/effects 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/effects after eye contact : May cause eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.

Symptoms/effects after ingestion : Harmful if swallowed. May cause gastrointestinal irritation, nausea, vomiting and diarrhea.

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. 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. Immediate medical attention and special treatment, if necessary

Symptoms may be delayed. In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media : Do not use water on molten metal as explosion hazard could result.

5.2. Specific hazards arising from the chemical

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. Special protective equipment and precautions for fire-fighters

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.

6.1.1. For non-emergency personnel

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

6.1.2. For emergency responders

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

6.2. Environmental precautions

Prevent entry to sewers and public waters.

6.3. 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).

Methods for cleaning up : Scoop up material and place in a disposal container. Provide ventilation.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection" and Section 13 for advice on waste disposal.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid contact with skin and eyes. Do not breathe dust, fume, gas, mist, spray, vapors. 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 container with care. Open container with care. When using do not eat, drink or smoke. Use only in well-ventilated areas. Wear appropriate PPE (see Section 8).

Hygiene measures : Take off contaminated clothing and wash it before reuse. Wash hands, forearms and face thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep out of the reach of children. Keep container tightly closed. Store in a dry, cool and well-ventilated place. Store locked up. Store in labelled containers.

Incompatible materials : Refer to Section 10 on Incompatible Materials.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Iron (7439-89-6)

ORGANIZATION	TYPE OF LIMIT	THRESHOLD
ACGIH	Not applicable	Not applicable
OSHA	Not applicable	Not applicable
NIOSH	Not applicable	Not applicable

Iron Oxide (1309-37-1)

ORGANIZATION	TYPE OF LIMIT	THRESHOLD
ACGIH	ACGIH TWA (mg/m³)	5 mg/m³ (respirable particulate matter)
OSHA	OSHA PEL (TWA) (mg/m³)	10 mg/m³ (fume) 15 mg/m³ (total dust) (Rouge) 5 mg/m³ (respirable fraction) (Rouge)
NIOSH	NIOSH REL (TWA) (mg/m³) US IDLH (mg/m³)	5 mg/m³ (dust and fume, as Fe) 2500 mg/m³ (dust and fume, as Fe)

Chromium (7440-47-3)

ORGANIZATION	TYPE OF LIMIT	THRESHOLD
ACGIH	ACGIH TWA (mg/m³)	0.5 mg/m³
OSHA	OSHA PEL (TWA) (mg/m³)	1 mg/m³
NIOSH	NIOSH REL (TWA) (mg/m³) US IDLH (mg/m³)	0.5 mg/m³ 250 mg/m³

Nickel (7440-02-0)

ORGANIZATION	TYPE OF LIMIT	THRESHOLD
ACGIH	ACGIH TWA (mg/m³)	1.5 mg/m³ (inhalable particulate matter)
OSHA	OSHA PEL (TWA) (mg/m³)	1 mg/m³
NIOSH	NIOSH REL (TWA) (mg/m³) US IDLH (mg/m³)	0.015 mg/m³ 10 mg/m³

Copper (7440-50-8)

ORGANIZATION	TYPE OF LIMIT	THRESHOLD
ACGIH	ACGIH TWA (mg/m³)	0.2 mg/m³ (fume)
OSHA	OSHA PEL (TWA) (mg/m³)	0.1 mg/m³ (fume) 1 mg/m³ (dust and mist)
NIOSH	NIOSH REL (TWA) (mg/m³) US IDLH (mg/m³)	1 mg/m³ (dust and mist) 0.1 mg/m³ (fume) 100 mg/m³ (dust, fume and mist)

Manganese (7439-96-5)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	ACGIH TWA (mg/m³)	0.02 mg/m³ (respirable particulate matter) 0.1 mg/m³ (inhalable particulate matter)
OSHA	OSHA PEL (Ceiling) (mg/m³)	5 mg/m³ (fume)
NIOSH	NIOSH REL (STEL) (mg/m³) NIOSH REL (TWA) (mg/m³) US IDLH (mg/m³)	3 mg/m³ 1 mg/m³ (fume) 500 mg/m³

Molybdenum (7439-98-7)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	ACGIH TWA (mg/m³)	10 mg/m³ (inhalable particulate matter) 3 mg/m³ (respirable particulate matter)
OSHA	Not applicable	Not applicable
NIOSH	US IDLH (mg/m³)	5000 mg/m³

Aluminum (7429-90-5)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	ACGIH TWA (mg/m³)	1 mg/m³ (respirable particulate matter)
OSHA	OSHA PEL (TWA) (mg/m³)	15 mg/m³ (total dust) 5 mg/m³ (respirable fraction)
NIOSH	NIOSH REL (TWA) (mg/m³)	10 mg/m³ (total dust) 5 mg/m³ (respirable dust)

Silicon (7440-21-3)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	Not applicable	Not applicable
OSHA	OSHA PEL (TWA) (mg/m³)	15 mg/m³ (total dust) 5 mg/m³ (respirable fraction)
NIOSH	NIOSH REL (TWA) (mg/m³)	10 mg/m³ (total dust) 5 mg/m³ (respirable dust)

Carbon (7440-44-0)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	Not applicable	Not applicable
OSHA	Not applicable	Not applicable
NIOSH	Not applicable	Not applicable

Cobalt (7440-48-4)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	ACGIH TWA (mg/m³)	0.02 mg/m³
OSHA	OSHA PEL (TWA) (mg/m³)	0.1 mg/m³ (dust and fume)
NIOSH	NIOSH REL (TWA) (mg/m³) US IDLH (mg/m³)	0.05 mg/m³ (dust and fume) 20 mg/m³ (dust and fume)

Vanadium (7440-62-2)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	Not applicable	Not applicable
OSHA	OSHA PEL (Ceiling) (mg/m³)	0.5 mg/m³ (respirable dust) 0.1 mg/m³ (fume)

Vanadium (7440-62-2)		
NIOSH	NIOSH REL (TWA) (mg/m³) NIOSH REL (STEL) (mg/m³)	1 mg/m³ 3 mg/m³

Tungsten (7440-33-7)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	ACGIH TWA (mg/m³)	3 mg/m³ (respirable particulate matter)
OSHA	Not applicable	Not applicable
NIOSH	NIOSH REL (STEL) (mg/m³) NIOSH REL (TWA) (mg/m³)	10 mg/m³ 5 mg/m³

Titanium (7440-32-6)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	Not applicable	Not applicable
OSHA	Not applicable	Not applicable
NIOSH	Not applicable	Not applicable

Phosphorus (7723-14-0) - Red		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	Not applicable	Not applicable
OSHA	Not applicable	Not applicable
NIOSH	Not applicable	Not applicable

Sulfur (7704-34-9)		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	Not applicable	Not applicable
OSHA	Not applicable	Not applicable
NIOSH	Not applicable	Not applicable

Particulate not otherwise regulated		
ORGANIZATION	**TYPE OF LIMIT**	**THRESHOLD**
ACGIH	ACGIH TWA (mg/m³)	10 mg/m³ (inhalable fraction) 3 mg/m³ (respirable fraction)
OSHA	OSHA PEL (TWA) (mg/m³)	15 mg/m³ (total dust) 5 mg/m³ (respirable fraction)
NIOSH	Not applicable	Not applicable

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station. Provide readily accessible eye wash stations and safety showers.

Environmental exposure controls : Avoid release to the environment. Maintain levels below Community environmental protection thresholds.

8.3. Individual protection measures/Personal protective equipment

Hand protection:

Wear suitable gloves resistant to chemical penetration. Consult glove manufacturer's product information on material suitability and material thickness.

Eye protection:
Safety glasses or goggles are recommended when using product.

Skin and body protection:
Wear suitable protective clothing.

Respiratory protection:
Wear respiratory protection. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. SDSs cannot provide detailed and complete respiratory protection guidelines. Selection of respiratory protection must be done by a qualified person who has assessed the work environment following requirements found in OSHA's respirator standard (29CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2).

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.
Color	:	Metallic
Odor	:	Odorless
Odor 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 (butyl acetate=1)	:	No data available
Flammability (solid, gas)	:	Not flammable Non flammable.
Vapor pressure	:	No data available
Relative vapor density at 20°C	:	No data available
Relative density	:	7.5 – 8.5 g/cm³
Solubility	:	Insoluble.
Partition coefficient n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosion limits	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	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 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 (oral) : Harmful if swallowed. (overall product)
(specific chemical details follow below)
Acute toxicity (dermal) : Not classified (overall product)
(specific chemical details follow below)
Acute toxicity (inhalation) : Not classified (overall product)
(specific chemical details follow below)

Low Alloy and Tool Steels	
ATE US (oral)	500 mg/kg body weight
Unknown acute toxicity (GHS US)	35% of the mixture consists of ingredient(s) of unknown acute toxicity (Oral)

Iron (7439-89-6)	
LD50 oral rat	30 g/kg (Source: NLM_CIP)

Chromium (7440-47-3)	
LC50 inhalation rat	> 5.41 mg/l Animal: rat, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity)

Nickel (7440-02-0)	
LD50 oral rat	> 9000 mg/kg (Source: EU_RAR)
LC50 inhalation rat	> 10.2 mg/l (Exposure time: 1 h Source: EU_RAR)

Copper (7440-50-8)	
LD50 dermal rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity), Guideline: EU Method B.3 (Acute Toxicity (Dermal)), Guideline: EPA OTS 798.1100 (Acute Dermal Toxicity), Guideline: other:

Copper (7440-50-8)	
LC50 inhalation rat	> 5.11 mg/l/4h

Manganese (7439-96-5)	
LD50 oral rat	9 g/kg (Source: NLM_CIP)
LC50 inhalation rat	> 5.14 mg/l air Animal: rat, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity), Guideline: EU Method B.2 (Acute Toxicity (Inhalation))

Molybdenum (7439-98-7)	
LD50 dermal rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LC50 inhalation rat	> 5.84 mg/l/4h

Aluminum (7429-90-5)	
LD50 oral rat	> 15900 mg/kg body weight Animal: rat, Guideline: OECD Guideline 401 (Acute Oral Toxicity)
LC50 inhalation rat	> 0.888 mg/l air Animal: rat, Animal sex: male, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity), Remarks on results: other:

Silicon (7440-21-3)	
LD50 oral rat	3160 mg/kg (Source: NLM_CIP)
LD50 dermal rabbit	> 5000 mg/kg body weight Animal: rabbit

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

Cobalt (7440-48-4)	
LD50 oral rat	6171 mg/kg (Source: NLM_CIP)
LD50 dermal rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LC50 inhalation rat	< 0.05 mg/l/4h

Vanadium (7440-62-2)	
LD50 oral rat	> 2000 mg/kg (Source: NLM_HSDB)
LC50 inhalation rat	> 5.05 mg/l air Animal: rat, Guideline: OECD Guideline 436 (Acute Inhalation Toxicity: Acute Toxic Class Method), Guideline: other:OECD Series on Testing and Assessment No. 125, Document No. ENV/JM/MONO (2010) 16, June 01, 2010

Tungsten (7440-33-7)	
LD50 oral rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 401 (Acute Oral Toxicity)
LD50 dermal rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LC50 inhalation rat	> 5.4 mg/l air Animal: rat, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity)

Titanium (7440-32-6)	
LD50 oral rat	> 5000 mg/kg body weight Animal: rat, Animal sex: female, Guideline: OECD Guideline 425 (Acute Oral Toxicity: Up-and-Down Procedure), Guideline: EPA OPPTS 870.1100 (Acute Oral Toxicity)

Phosphorus elemental (7723-14-0)	
LD50 oral rat	> 15000 mg/kg (Source: ECHA)

Sulfur (7704-34-9)	
LD50 oral rat	> 3000 mg/kg (Source: IUCLID)
LD50 dermal rat	> 2000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LD50 dermal rabbit	> 2000 mg/kg (Source: IUCLID)
LC50 inhalation rat	> 9.23 mg/l/4h

Iron oxide (Fe2O3) (1309-37-1)	
LD50 oral rat	> 10000 mg/kg (Source: IUCLID)
LD50 oral	> 5000 mg/kg body weight Animal: , Guideline: EU Method B.1 (Acute Toxicity (Oral))

Skin corrosion/irritation : Not classified (overall product)
(specific chemical details follow below)

Phosphorus elemental (7723-14-0)	
pH	≈ 3 Temp.: 37 °C Concentration: (≈)10 g/L Remarks on result: 'other:'

Serious eye damage/irritation : Not classified (overall product)
(specific chemical details follow below)

Phosphorus elemental (7723-14-0)	
pH	≈ 3 Temp.: 37 °C Concentration: (≈)10 g/L Remarks on result: 'other:'

Respiratory or skin sensitization : May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. (overall product)

Germ cell mutagenicity : Suspected of causing genetic defects. (overall product)

Carcinogenicity : May cause cancer. (overall product)
(specific chemical details follow below)

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	Reasonably anticipated to be Human Carcinogen
In OSHA Hazard Communication Carcinogen list	Yes

Cobalt (7440-48-4)	
IARC group	2A - Probably carcinogenic to humans
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen, Evidence of Carcinogenicity
In OSHA Hazard Communication Carcinogen list	Yes

Sulfur (7704-34-9)	
NOAEL (chronic,oral,animal/male,2 years)	256 mg/kg body weight Animal: rat, Animal sex: male, Guideline: OECD Guideline 453 (Combined Chronic Toxicity / Carcinogenicity Studies)
NOAEL (chronic,oral,animal/female,2 years)	284 mg/kg body weight Animal: rat, Animal sex: female, Guideline: OECD Guideline 453 (Combined Chronic Toxicity / Carcinogenicity Studies)

Iron oxide (Fe2O3) (1309-37-1)	
IARC group	3 - Not classifiable

Reproductive toxicity : May damage fertility or the unborn child. (overall product)
(specific chemical details follow below)

Aluminum (7429-90-5)	
NOAEL (animal/male, F0/P)	1000 mg/kg body weight Animal: rat, Animal sex: male, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)

Silicon (7440-21-3)	
NOAEL (animal/male, F0/P)	5000 mg/kg body weight Animal: rat, Animal sex: male, Guideline: other:OECD Guideline 478 (Genetic Toxicology: Rodent Dominant Lethal Test)

Carbon (7440-44-0)	
NOAEL (animal/male, F0/P)	≥ 859 mg/kg body weight Animal: rat, Animal sex: male, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)

STOT-single exposure : Not classified (overall product)

STOT-repeated exposure : Causes damage to organs through prolonged or repeated exposure. (overall product)

(specific chemical details follow below)

Nickel (7440-02-0)	
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

Manganese (7439-96-5)	
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

Aluminum (7429-90-5)	
LOAEC (inhalation, rat, dust/mist/fume, 90 days)	0.05 mg/l air Animal: rat, Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study)
NOAEL (subchronic,oral,animal/male,90 days)	1034 mg/kg body weight Animal: dog, Animal sex: male, Guideline: OECD Guideline 409 (Repeated Dose 90-Day Oral Toxicity Study in Non-Rodents)
NOAEL (subchronic,oral,animal/female,90 days)	1087 mg/kg body weight Animal: dog, Animal sex: female, Guideline: OECD Guideline 409 (Repeated Dose 90-Day Oral Toxicity Study in Non-Rodents)

Silicon (7440-21-3)	
NOAEL (oral,rat,90 days)	> 5000 mg/kg body weight Animal: rat, Animal sex: male

Vanadium (7440-62-2)	
LOAEC (inhalation, rat, dust/mist/fume, 90 days)	0.25 mg/l air Animal: rat, Guideline: OECD Guideline 412 (Subacute Inhalation Toxicity: 28-Day Study)
NOAEL (oral,rat,90 days)	≥ 1000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents)
NOAEC (inhalation,rat,dust/mist/fume,90 days)	0.022 mg/l air Animal: rat, Guideline: OECD Guideline 412 (Subacute Inhalation Toxicity: 28-Day Study)

Phosphorus elemental (7723-14-0)	
NOAEL (oral,rat,90 days)	1000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)

Iron oxide (Fe2O3) (1309-37-1)	
LOAEC (inhalation, rat, dust/mist/fume, 90 days)	0.2102 mg/l air Animal: rat, Animal sex: male, Guideline: OECD Guideline 412 (Subacute Inhalation Toxicity: 28-Day Study)

Iron oxide (Fe2O3) (1309-37-1)	
NOAEL (oral,rat,90 days)	> 1000 mg/kg body weight Animal: rat, Animal sex: female, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity Study in Rodents)
NOAEC (inhalation,rat,dust/mist/fume,90 days)	≥ 0.03 mg/l air Animal: rat, Animal sex: male

Reproductive Toxicity: Based on available data, the classification criteria are not met.

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
(specific chemical details follow below)

: Not classified (overall product)

Viscosity, kinematic : No data available (Solid)

Most important symptoms and effects (overall product)

Symptoms/effects after inhalation : May cause irritation to the respiratory tract. May cause allergy or asthma symptoms or breathing difficulties if inhaled. 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/effects 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/effects after eye contact : May cause eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.

Symptoms/effects after ingestion : Harmful if swallowed. May cause gastrointestinal irritation, nausea, vomiting and diarrhea.

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. 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.

Other information : Likely routes of exposure: ingestion, inhalation, skin and eye.

SECTION 12: Ecological information

12.1. Toxicity

Ecology – general : May cause long-term adverse effects in the aquatic environment. (overall product).
(specific chemical details follow below)

Iron (7439-89-6)	
EC50 - Crustacea [1]	> 100 mg/l Test organisms (species): Daphnia magna
EC50 - Crustacea [2]	> 10000 mg/l Test organisms (species): Daphnia magna

Chromium (7440-47-3)	
EC50 - Crustacea [1]	13.1 – 14.7 mg/l Test organisms (species): Daphnia magna

Nickel (7440-02-0)	
LC50 - Fish [1]	> 100 mg/l (Exposure time: 96 h - Danio rerio (previous name Brachydanio rerio) Source: IUCLID)
EC50 - Crustacea [1]	> 100 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC50 - Fish [2]	1.3 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static] Source: EPA)
EC50 - Crustacea [2]	1 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 72h - Algae [1]	0.18 mg/l (Species: Pseudokirchneriella subcapitata)
EC50 96h - Algae [1]	0.174 – 0.311 mg/l (Species: Pseudokirchneriella subcapitata [static])

Copper (7440-50-8)	
LC50 - Fish [1]	0.0068 – 0.0156 mg/l (Exposure time: 96 h - Species: Pimephales promelas Source: EPA)
EC50 - Crustacea [1]	0.03 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
LC50 - Fish [2]	< 0.3 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static] Source: EPA)
EC50 72h - Algae [1]	0.0426 – 0.0535 mg/l (Species: Pseudokirchneriella subcapitata [static])
EC50 96h - Algae [1]	0.031 – 0.054 mg/l (Species: Pseudokirchneriella subcapitata [static])

Manganese (7439-96-5)	
LC50 - Fish [1]	> 3.6 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [semi-static] Source: ECHA)
EC50 - Crustacea [1]	> 1.6 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	4.5 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
EC50 72h - Algae [2]	2.8 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
NOEC (chronic)	1.7 mg/l Test organisms (species): Ceriodaphnia dubia Duration: '8 d'

Aluminum (7429-90-5)	
EC50 72h - Algae [1]	1.05 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
EC50 72h - Algae [2]	0.2 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)

Silicon (7440-21-3)	
EC50 72h - Algae [1]	≈ 250 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)

Cobalt (7440-48-4)	
LC50 - Fish [1]	> 100 mg/l (Exposure time: 96 h - Danio rerio (previous name Brachydanio rerio) [static] Source: IUCLID)
EC50 - Crustacea [1]	> 890 µg/l Test organisms (species): Daphnia magna

Tungsten (7440-33-7)	
LC50 - Fish [1]	> 181 mg/l Test organisms (species): Danio rerio (previous name: Brachydanio rerio)

Tungsten (7440-33-7)	
EC50 - Crustacea [1]	> 163 mg/l Test organisms (species): Daphnia magna
NOEC chronic fish	≥ 9.8 mg/l Test organisms (species): Danio rerio (previous name: Brachydanio rerio) Duration: '38 d'

Titanium (7440-32-6)	
EC50 72h - Algae [1]	> 10000 mg/l Test organisms (species): Skeletonema costatum

Phosphorus elemental (7723-14-0)	
LC50 - Fish [1]	0.0017 – 0.0035 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through] Source: EPA)
EC50 - Crustacea [1]	0.03 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC50 - Fish [2]	0.001 – 0.004 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static] Source: EPA)
EC50 - Crustacea [2]	0.025 – 0.037 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 72h - Algae [1]	> 100 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)

Sulfur (7704-34-9)	
LC50 - Fish [1]	866 mg/l (Exposure time: 96 h - Danio rerio (previous name Brachydanio rerio) [static] Source: IUCLID)
EC50 - Crustacea [1]	169 mg/l Test organisms (species): Daphnia magna
EC50 - Other aquatic organisms [1]	121.7 mg/l Test organisms (species): other:
LC50 - Fish [2]	< 14 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static] Source: EPA)
NOEC (chronic)	> 100 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC chronic fish	9.3 mg/l Test organisms (species): Oncorhynchus mykiss (previous name: Salmo gairdneri) Duration: '28 d'

Iron oxide (Fe2O3) (1309-37-1)	
LC50 - Fish [1]	100000 mg/l (Exposure time: 96 h - Danio rerio (previous name Brachydanio rerio) [static] Source: ECHA)
EC50 - Crustacea [1]	> 100 mg/l Test organisms (species): Daphnia magna
EC50 - Other aquatic organisms [1]	> 100 mg/l Test organisms (species):
EC50 72h - Algae [1]	> 20 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)

12.2. Persistence and degradability

Low Alloy and Tool Steels	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Low Alloy and Tool Steels	
Bioaccumulative potential	Not established.

Cobalt (7440-48-4)	
BCF - Fish [1]	(no bioaccumulation)

Phosphorus elemental (7723-14-0)	
BCF - Fish [1]	(200 dimensionless)

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Other information : No other effects known.

SECTION 13: Disposal considerations

13.1. Disposal methods

Product/Packaging disposal recommendations : Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation. The generation of waste should be avoided or minimized wherever possible.

SECTION 14: Transport information

In accordance with DOT

14.1. UN number

As shipped, not regulated for transport.

14.2. UN proper shipping name

Proper Shipping Name (DOT) : Not applicable

14.3. Transport hazard class(es)

DOT

Transport hazard class(es) (DOT) : Not applicable

14.4. Packing group

Packing group (DOT) : Not applicable

14.5. Environmental hazards

Other information : No supplementary information available.

14.6. Special precautions for user

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

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

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.

Chromium (7440-47-3)	
Regulations	CAA, CWA, SARA 313, SDWA, CERCLA, RCRA

Cobalt (7440-48-4)	
Regulations	SARA 313

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

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

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

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

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

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. International regulations

EU REACH regulation (EC 1907/2006):

Substance	Abbreviation	Registered Tonnage Band	Registration Submission #	REACH Registration Number
Chromium (7440-47-3)	Cr	10-100	JG394596-23	01-2119485652-31-0115
Copper (7440-50-8)	Cu	1-10	PS394603-06	01-2119480154-42-0163
Iron (7439-89-6)	Fe	10-100	SJ394597-06	01-2119462838-24-0412
Manganese (7439-96-5)	Mn	1-10	RL394604-16	01-2119449803-34-0148
Molybdenum (7439-98-7)	Mo	1-10	HE394594-33	01-2119472304-43-0068
Nickel (7440-02-0)	Ni	1-10	FT394601-18	01-2119438727-29-0129
Silicon (7440-21-3)	Si	NA	NA	NA

15.3. US State of California Regulations

WARNING: This product can expose you to Nickel, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

SECTION 16: Other information

according to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012.

Issue date : 10/19/2018
Revision date : 12/08/2025
Version : N
Other information : None.

Full text of hazard classes and H-statements	
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Carc. 1B	Carcinogenicity Category 1B
Muta. 2	Germ cell mutagenicity Category 2
Repr. 1B	Reproductive toxicity Category 1B
Resp. Sens. 1	Respiratory sensitization, Category 1
Skin Sens. 1	Skin sensitization, Category 1
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1

Indication of changes:
SDS update.

Safety Data Sheet (SDS), USA

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