

Safety Data Sheet

Material Name: All Steel Grades

SDS ID: CIL-001EU

*** Section 1 - Identification of the Substance/Preparation and of the Company/Undertaking***

Chemical Name: Mixture

Product Use: High Speed Steel, Tool Steel, 300 Stainless Steel, 400 Stainless Steel, and Valve Steel

Manufacturer Information

Crucible Industries LLC

Phone: (315) 487-4111

575 State Fair Blvd

Solvay, NY 13209

Emergency # 1-800-365-1180

Mfg Contact: Quality Assurance Dept., (315) 487-4111 ext. 5310

General Comments:

THIS SDS APPLIES TO ALL ESTABLISHED STEEL GRADES MANUFACTURED AT CRUCIBLE INDUSTRIES LLC. SPECIFIC PERCENT COMPONENTS FOR EACH ELEMENT CAN BE OBTAINED FROM THE CERTIFICATE OF TEST.

Use of the Substance/Preparation:

Steel to be used in the manufacturing of various products.

Substance Registration Number(s):

None identified.

*** Section 2 - Hazards Identification ***

Substance/Preparation Classification

As sold, this product is not hazardous according to the criteria specified in European Union Directives 67/548/EEC and 1999/45/EC. However, if processing of this material produces dusts and/or fumes, the following classification applies:

T; R48/23

Xn; R42/43

Carc.Cat.3; R40

Classification of Substance or Mixture



GHS03 Exclamation Mark

Signal Word: Warning

Hazard Statement

Product is a solid iron alloy. As supplied, this product does not present a physical or health hazard. Processing of the product for some final uses can include formation of dusts, particulates or fumes which may present certain health hazards. Dusts from this product may pose a dust explosion hazard. Contact of molten product with water can cause an explosion hazard. Firefighters should wear a positive pressure self-contained breathing apparatus with full face piece.

Precautionary Statements

Potential Health Effects: Eyes

Dust or powder may be irritating to the eyes. Rubbing may cause abrasion of the cornea.

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Potential Health Effects: Skin

Dust or powder may irritate the skin. Rubbing may increase mechanical irritation to the skin. Product contains chromium and nickel, which may cause an allergic skin reaction. No components of this product are known to be absorbed through the skin.

Potential Health Effects: Ingestion

Dusts or powders may cause temporary irritation of the throat, stomach and gastrointestinal tract.

Potential Health Effects: Inhalation

Dusts and powders from this product may cause irritation to the nasal passages and respiratory tract. When inhaled in very large amounts, damage to the lung may occur. Dusts, particulates or fumes that may be produced may contain metals that cause metal fume fever, a transitory condition including fever, chills, aches, cough and general malaise. Repeated exposure may lead to respiratory sensitization reactions, producing an asthma-like condition.

Human and Environmental Hazards

Toxic: danger of serious damage to health by prolonged exposure through inhalation.

May cause sensitization by inhalation and skin contact.

Limited evidence of a carcinogenic effect.

*** Section 3 - Composition/Information on Ingredients ***

EC #	Component	Percent	Symbols	Risks
231-096-4	Iron 7439-89-6	60-90	-	-
231-111-4	Nickel 7440-02-0	1-37	Carc.Cat.3 T	R:40-48/23-43
231-157-5	Chromium 7440-47-3	5-26	-	-
231-143-9	Tungsten 7440-33-7	0.5-19	-	-
231-171-1	Vanadium 7440-62-2	0.2-18	-	-
231-158-0	Cobalt 7440-48-4	0.5-15	Xn	R:42/43-53
231-105-1	Manganese 7439-96-5	1-13	-	-
231-107-2	Molybdenum 7439-98-7	1-11	-	-
231-130-8	Silicon 7440-21-3	1-5	-	-
231-159-6	Copper 7440-50-8	0.5-5	-	-
231-153-3	Carbon 7440-44-0	0.5-3.5	-	-
231-142-3	Titanium 7440-32-6	0.1-3.2	-	-
231-113-5	Niobium 7440-03-1	0.1-3	-	-
231-072-3	Aluminum 7429-90-5	0.1-2.2	F	R:11-15
231-957-4	Selenium 7782-49-2	0.1-0.5	T	R:23/25-33-53

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Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Iron compounds, Nickel compounds, Chromium compounds, Tungsten compounds, n.o.s., Vanadium compounds, Cobalt compounds, Manganese compounds, n.o.s., Molybdenum compounds, n.o.s., Copper compounds, n.o.s., Titanium compounds, Aluminum, welding fumes, Selenium compounds.

Component Information/Information on Non-Hazardous Components

This product has been evaluated using criteria specified in European Union Directives 67/548/EEC and 1999/45/EC.

Substance Registration Number(s):

None identified.

*** Section 4 - First Aid Measures ***

First Aid: Eyes

For contact with dusts or particulates, flush eyes with water for 15 minutes. Eye injuries from solid particles should be treated by a physician immediately.

First Aid: Skin

For skin contact with dusts or powders, wash immediately with soap and water. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.

First Aid: Ingestion

No need for first aid is anticipated if material is swallowed, however if symptoms develop, seek medical attention.

First Aid: Inhalation

If large amounts of dusts, fumes or particulates are generated, move person to fresh air. If symptoms develop, seek medical attention.

First Aid: Notes to Physician

Respiratory disorders may be aggravated by exposure to metallic dusts or fumes.

*** Section 5 - Fire-Fighting Measures ***

General Fire Hazards

This material will not burn. Fine dusts of this material mixed with oxygen and a suitable source of ignition may pose an explosion hazard.

Suitable Extinguishing Media

Use methods for the surrounding fire. Use a Class D extinguisher for metal powder fires.

Unsuitable Extinguishing Media

Water may react with metal dust or powder and release flammable hydrogen gas.

Hazardous Combustion Products

Material will begin softening at approximately 2600 °F (1425 °C), will proceed to a liquid and will form irritating and toxic gaseous metallic oxides at extremely high temperatures.

Fire Fighting Equipment/Instructions

Firefighters should wear full-face, self contained breathing apparatus and impervious protective clothing.

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Containment of this material should not be necessary. If dusts or particulates are generated, eliminate sources of ignition.

Clean-Up Procedures

Small pieces of this product may be collected with a broom and shovel. Dusts and particulates may be collected by using a vacuum with a HEPA filter. If sweeping of a contaminated area is necessary, use a dust suppressant agent. Place collected material in a closed container.

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Evacuation Procedures

Isolate area. Keep unnecessary personnel away.

Personal Precautions

Wear appropriate protective equipment and clothing during clean-up.

Environmental Precautions

Block any potential routes to water systems.

Special Measures

None necessary.

*** Section 7 - Handling and Storage ***

Handling Procedures

Avoid generating dusts or particulates. Avoid inhalation of dusts, particulates or fumes. Avoid contact of dusts or particulates with eyes or skin. Wash thoroughly after handling.

Storage Procedures

Store in a dry area.

Specific Use

Steel to be used in the manufacturing of various products.

*** Section 8 - Exposure Controls/Personal Protection ***

Exposure Guidelines

A: General Product Information

Follow all applicable exposure limits.

B: Substance Exposure Limits

Nickel (7440-02-0)

ACGIH:	1.5 mg/m3 TWA (inhalable fraction)
Belgium:	1 mg/m3 TWA
Denmark:	0.05 mg/m3 TWA (dust and powder)
Finland:	1 mg/m3 TWA
France:	1 mg/m3 VME; 1 mg/m3 VME (metal gratings)
Greece:	1 mg/m3 TWA
Ireland:	0.5 mg/m3 TWA
Portugal:	1.5 mg/m3 TWA (inhalable fraction)
Spain:	1 mg/m3 VLA-ED sensitizer
Sweden:	0.5 mg/m3 LLV (total dust)
United Kingdom:	Potential for cutaneous absorption
	1.5 mg/m3 STEL
	0.5 mg/m3 TWA

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Chromium (7440-47-3)

EU: 2 mg/m3 TWA
ACGIH: 0.5 mg/m3 TWA
Austria: 2 mg/m3 MAK
Belgium: 0.5 mg/m3 TWA
Denmark: 0.5 mg/m3 TWA (dust)
Finland: 0.5 mg/m3 TWA
France: 2 mg/m3 VME (indicative limit)
Germany: 2 mg/m3 TWA (exposure factor 1, inhalable fraction)
Greece: 1 mg/m3 TWA
Ireland: 0.5 mg/m3 TWA
Netherlands: 0.5 mg/m3 TWA
Portugal: 0.5 mg/m3 TWA
Spain: 2 mg/m3 VLA-ED (indicative limit value, total dust)
Sweden: 0.005 mg/m3 LLV (total dust)
United Kingdom: 1.5 mg/m3 STEL
Kingdom: 0.5 mg/m3 TWA

Tungsten (7440-33-7)

ACGIH: 10 mg/m3 STEL
5 mg/m3 TWA
Austria: 10 mg/m3 STEL (inhalable fraction, 4 X 15 min)
5 mg/m3 MAK (inhalable fraction)
Denmark: 5 mg/m3 TWA (dust and powder)
Finland: 5 mg/m3 TWA
Ireland: 10 mg/m3 STEL
5 mg/m3 TWA
Portugal: 5 mg/m3 TWA
Spain: 5 mg/m3 VLA-ED
Sweden: 5 mg/m3 LLV (total dust)
United Kingdom: 10 mg/m3 STEL
Kingdom: 5 mg/m3 TWA

Vanadium (7440-62-2)

Austria: 1 mg/m3 STEL (inhalable fraction, 4 X 15 min)
0.5 mg/m3 MAK (inhalable fraction)
Ireland: Under review (HSE)

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Cobalt (7440-48-4)

ACGIH: 0.02 mg/m3 TWA
Belgium: 0.02 mg/m3 TWA (dust and fume)
Denmark: 0.01 mg/m3 TWA (dust, fume and powder)
Finland: 0.05 mg/m3 TWA
Greece: 0.1 mg/m3 TWA (dust and fume)
Ireland: 0.1 mg/m3 TWA
Sensitizer
Netherlands: 0.02 mg/m3 TWA (dust and smoke, as Co)
Portugal: 0.02 mg/m3 TWA
Spain: 0.02 mg/m3 VLA-ED
sensitizer
Sweden: 0.05 mg/m3 LLV (total dust)
United Kingdom: Capable of causing occupational asthma
Kingdom: 0.3 mg/m3 STEL
0.1 mg/m3 TWA

Manganese (7439-96-5)

ACGIH: 0.2 mg/m3 TWA
Austria: 2 mg/m3 STEL (inhalable fraction, 4 X 15 min)
0.5 mg/m3 MAK (inhalable fraction)
Belgium: 0.2 mg/m3 TWA
Denmark: 0.2 mg/m3 TWA (dust, fume and powder); 0.1 mg/m3 TWA (respirable)
Finland: 0.2 mg/m3 TWA; 0.1 mg/m3 TWA
France: 1 mg/m3 VME (fume, as Mn)
Germany: 0.5 mg/m3 TWA (inhalable fraction)
20 µg/L; Parameter = manganese; Material = whole blood; Sampling time = end of exposure/shift, after several shifts (for long-term exposures)
0.5 mg/m3 MAK (inhalable fraction)
0.5 mg/m3 Peak (inhalable fraction)
Greece: 5 mg/m3 TWA (as Mn) (related to Manganese compounds)
Ireland: 3 mg/m3 STEL (fume, as Mn)
1 mg/m3 TWA (fume, as Mn); 0.2 mg/m3 TWA
Under review (ACGIH); HSE adopted limit of 0.5 mg/m3
Portugal: 0.2 mg/m3 TWA
Spain: 0.2 mg/m3 VLA-ED
Sweden: 0.2 mg/m3 LLV (total dust); 0.1 mg/m3 LLV (respirable dust)
United Kingdom: 1.5 mg/m3 STEL
Kingdom: 0.5 mg/m3 TWA (as Mn)

Molybdenum (7439-98-7)

ACGIH: 10 mg/m3 TWA (inhalable fraction); 3 mg/m3 TWA (respirable fraction)
Austria: 20 mg/m3 STEL (inhalable fraction, 2 X 60 min)
10 mg/m3 MAK (inhalable fraction)
Finland: 0.5 mg/m3 TWA
Ireland: Under review (ACGIH)
Portugal: 10 mg/m3 TWA (inhalable fraction); 3 mg/m3 TWA (respirable fraction)
Sweden: 10 mg/m3 LLV (total dust); 5 mg/m3 LLV (respirable dust)

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Silicon (7440-21-3)

Belgium: 10 mg/m3 TWA
Denmark: 10 mg/m3 TWA
France: 10 mg/m3 VME
Greece: 10 mg/m3 TWA (inhalable fraction); 5 mg/m3 TWA (respirable fraction)
Ireland: 10 mg/m3 TWA (total inhalable dust); 4 mg/m3 TWA (respirable dust)
Spain: 10 mg/m3 VLA-ED (inhalable fraction); 4 mg/m3 VLA-ED (respirable fraction)
United Kingdom: 30 ppm STEL (inhalable dust); 12 mg/m3 STEL (respirable dust)
Kingdom: 10 mg/m3 TWA (inhalable dust); 4 mg/m3 TWA (respirable dust)

Copper (7440-50-8)

ACGIH: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist, as Cu)
Austria: 4 mg/m3 STEL (inhalable fraction); 0.4 mg/m3 STEL (respirable fraction)
1 mg/m3 MAK (inhalable fraction); 0.1 mg/m3 MAK (respirable fraction, smoke)
Belgium: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist)
Denmark: 1.0 mg/m3 TWA (dust and powder); 0.1 mg/m3 TWA (fume, as Cu)
Finland: 1 mg/m3 TWA; 0.1 mg/m3 TWA (respirable dust and fume, as Cu)
France: 2 mg/m3 VLCT (dust, as Cu)
0.2 mg/m3 VME (fume); 1 mg/m3 VME (dust, as Cu)
Germany: 0.1 mg/m3 MAK (inhalable fraction)
0.2 mg/m3 Peak (inhalable fraction)
Greece: 2 mg/m3 STEL (dust)
0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dust)
Ireland: 2 mg/m3 STEL (dust and mist)
0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist)
Netherlands: 0.1 mg/m3 TWA (inhalable fraction)
Portugal: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist, as Cu)
Spain: 0.2 mg/m3 VLA-ED (fume); 1 mg/m3 VLA-ED (dust and mist, as Cu)
Sweden: 1 mg/m3 LLV (total dust); 0.2 mg/m3 LLV (respirable dust)
United Kingdom: 0.6 mg/m3 STEL (fume); 2 mg/m3 STEL (dust and mist)
Kingdom: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist)

Carbon (7440-44-0)

Austria: 10 mg/m3 STEL (alveolar dust with <1% quartz, respirable fraction, 2 X 60 min)
5 mg/m3 MAK (alveolar dust with <1% quartz, respirable fraction)
Ireland: 10 mg/m3 TWA (total inhalable dust); 4 mg/m3 TWA (respirable dust)
Sweden: 3 mg/m3 LLV (total dust)

Niobium (7440-03-1)

Austria: 10 mg/m3 STEL (inhalable fraction, smoke, 4 X 15 min); 1 mg/m3 STEL (respirable fraction, smoke, 4 X 15 min)
5 mg/m3 MAK (inhalable fraction); 0.5 mg/m3 MAK (respirable fraction, smoke)
Denmark: 5 mg/m3 TWA (dust and powder); 0.5 mg/m3 TWA (fume)

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Aluminum (7429-90-5)

- ACGIH: 1 mg/m³ TWA (respirable fraction)
Austria: 20 mg/m³ STEL (inhalable fraction, 2 X 60 min)
10 mg/m³ MAK (inhalable fraction)
Belgium: 10 mg/m³ TWA
Denmark: 5 mg/m³ TWA (total dust, fume and powder); 2 mg/m³ TWA (respirable dust and powder)
Finland: 1.5 mg/m³ TWA (as Al) (related to Aluminum, welding fumes)
France: 10 mg/m³ VME (metal); 5 mg/m³ VME (dust)
Germany: 200 µg/L; Parameter = aluminium; Material = urine; Sampling time = end of exposure/shift
4 mg/m³ MAK (dust, inhalable fraction); 1.5 mg/m³ MAK (dust, respirable fraction)
Greece: 10 mg/m³ TWA (inhalable fraction); 5 mg/m³ TWA (respirable fraction)
Ireland: 10 mg/m³ TWA (total inhalable dust); 4 mg/m³ TWA (respirable dust)
Portugal: 10 mg/m³ TWA (metal dust)
Spain: 10 mg/m³ VLA-ED (dust)
Sweden: 5 mg/m³ LLV (total dust); 2 mg/m³ LLV (respirable dust)
United Kingdom: 30 mg/m³ STEL (inhalable dust); 12 mg/m³ STEL (respirable dust)
Kingdom: 10 mg/m³ TWA (inhalable dust); 4 mg/m³ TWA (respirable dust)

Selenium (7782-49-2)

- ACGIH: 0.2 mg/m³ TWA
Austria: 0.3 mg/m³ STEL (inhalable fraction, 4 X 15 min)
0.1 mg/m³ MAK (inhalable fraction)
Belgium: 0.2 mg/m³ TWA
Denmark: 0.1 mg/m³ TWA
Finland: 0.3 mg/m³ STEL
0.1 mg/m³ TWA
Germany: 0.05 mg/m³ TWA (exposure factor 1, inhalable fraction)
0.05 mg/m³ MAK (inhalable fraction)
0.20 mg/m³ Peak (inhalable fraction)
Greece: 0.2 mg/m³ TWA
Ireland: 0.1 mg/m³ TWA
Portugal: 0.2 mg/m³ TWA
Spain: 0.1 mg/m³ VLA-ED
Sweden: 0.1 mg/m³ LLV (total dust)
United Kingdom: 0.3 mg/m³ STEL
Kingdom: 0.1 mg/m³ TWA

Occupational Exposure Controls

Whenever dusts, particulates or fumes are generated, use appropriate local exhaust ventilation to keep exposures below the regulated limits.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses with side shields.

Personal Protective Equipment: Skin

Work clothing sufficient to prevent all skin contact should be worn, such as coveralls and long sleeves.

Personal Protective Equipment: Hands

Wear leather or other appropriate gloves, if necessary for the type of operation.

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Personal Protective Equipment: Respiratory

Wear European Standard EN141 and/or EN 405 approved respiratory equipment whenever exposure to dusts or fumes generated during processing exceed the exposure limit(s) of any chemical substance listed in this SDS. Use respirator in accordance with manufacturer's use limitations and the applicable European Standard.

Personal Protective Equipment: General

Use good industrial hygiene practices in handling this material.

Environmental Exposure Controls

Do not allow the spilled product to enter public drainage system or open water courses.

*** Section 9 - Physical and Chemical Properties ***

Appearance:	Metallic color	Odor:	None
Physical State:	Solid	pH:	Not applicable
Vapor Pressure:	Not applicable	Vapor Density:	Not applicable
Boiling Point:	Not available	Melting Point:	2600 - 2800 °F (1425 - 1540 °C)
Solubility (H2O):	Insoluble	Specific Gravity:	7.4 - 8.7 (water=1)
Softening Point:	2600 °F (1425 °C)	Flash Point	Not applicable
Flash Point Method	Not applicable	LFL	Not applicable
UFL	Not applicable		

*** Section 10 - Stability and Reactivity ***

Chemical Stability

Product is stable.

Conditions to Avoid

Avoid exposure to generated dust and/or fume.

Materials to Avoid

Product reacts with strong acids to generate hydrogen gas.

Hazardous Decomposition Products

Material will begin softening at approximately 2600 °F (1425 °C), will proceed to a liquid and will form irritating and toxic gaseous metallic oxides at extremely high temperatures.

Hazardous Polymerization

Will not occur.

*** Section 11 - Toxicological Information ***

Acute Toxicity

A: General Product Information

The product as shipped, does not present a health hazard. Operations which supply sufficient energy to the product (i.e. welding, high speed grinding or melting) can release dust or fumes which may make components of the product biologically available.

Exposure to dusts or fumes from some metals including iron, manganese, chromium, and copper can produce a condition known as metal fume fever, a flu-like illness with nausea, vomiting, chest tightness, muscle aches and weakness. The symptoms come on a few hours after excessive exposures and usually last from 12 to 48 hours. Long-term effects from metal fume fever have not been noted.

ALUMINUM: Excessive exposures to aluminum metal fumes and dust have been associated with scarring of the lung tissue and respiratory irritation, but this effect may be due to simultaneous silica exposure.

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CARBON: Elemental carbon, as it exists in this product, is of very low toxicity. Health hazard data presented here is based on exposures to carbon black, not carbon as it is found in this product. Chronic inhalation exposure to carbon black may result in temporary or permanent damage to lungs and heart. Pneumoconiosis has been found in workers engaged in the production of carbon black. Skin conditions such as inflammation of the hair follicles, and oral mucosal lesions have also been reported from skin exposure.

CHROMIUM: The health hazards associated with exposure to chromium are dependent on its oxidation state. The metal form (chromium as it exists in this product) is of very low toxicity. Welding fumes, generated from high chromium stainless steel, may contain hexavalent chromium. This water-soluble hexavalent form is considerably more toxic. Adverse effects of the hexavalent form on the skin may include ulcerations, dermatitis, and allergic skin reactions. Inhalation of hexavalent chromium compounds can result in ulceration and perforation of the mucous membranes of the nasal septum, irritation of the pharynx and larynx, asthmatic bronchitis, bronchospasm and edema. Respiratory symptoms may include coughing and wheezing, shortness of breath, and nasal itch. Eye irritation or inflammation may also result. The NTP lists hexavalent chromium as a known human carcinogen. Chromium metal is listed as not classifiable as to carcinogenic to humans.

COBALT: Inhalation of cobalt metal fumes and dust causes irritation of the nose and throat. Cobalt dust may cause an asthma-like disease with symptoms ranging from cough, chronic bronchitis, shortness of breath and labored breathing, to decreased pulmonary function, nodular scarring of the lung tissue, permanent disability, and death. Exposure to cobalt may cause weight loss, dermatitis (inflammation of the skin) and respiratory hypersensitivity. Although cobalt is not listed by NTP or OSHA as a carcinogen, some data suggests that cobalt is an experimental carcinogen in laboratory animals. The author finds that the current OSHA limit of 0.1 mg/m³ is not protective of worker health.

COLUMBIUM (NIOBIUM): Columbium, when inhaled, is retained mainly in the lungs, and secondarily in bones. It interferes with calcium as an activator of enzyme systems. In laboratory animals, inhalation of niobium nitride and/or pentoxide leads to scarring of the lungs at exposure levels of 40 mg/m³. Columbium is a moderate eye irritant and a powerful skin irritant in laboratory animals.

COPPER: Industrial exposure to copper fumes, dusts and/or mists results in metal fume fever, nausea, irritation of upper respiratory tract, and irritation of nasal mucous membranes. Chronic poisoning could aggravate individuals who suffer from Wilson's disease, a genetic condition characterized by liver cirrhosis, brain damage, nerve damage, kidney disease, and copper deposition in the cornea (eye).

IRON: Iron oxide can be generated during arc welding of this product. Chronic inhalation of excessive concentrations of iron oxide fumes and dusts may result in development of a benign pneumoconiosis called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of iron oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Acute exposure to the eyes may result in mild conjunctivitis.

MANGANESE: Chronic exposure to high concentrations of manganese fumes and dusts may increase the incidence of pneumonia and lung damage and may adversely affect the central nervous system with symptoms including sleepiness, weakness, emotional disturbances, spastic walk, mask-like facial expression, and paralysis.

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MOLYBDENUM: Dust of metallic molybdenum has caused difficulty breathing, general weakness, dizziness, chest pain, expectoration, fatigue, headache, anorexia, and joint and muscle pain. Molybdenum has caused anemia and poor growth in experimental animals. Molybdenum may also cause pneumoconiosis and irritation to the lungs and eyes. In rats, dusts of metallic molybdenum have caused growth, depression and thickening of intra-alveolar septa, which contained connective tissue fibers.

NICKEL: Nickel fumes are respiratory irritants and have been a known cause of asthma, pneumonia, pulmonary edema and pulmonary fibrosis in welders using nickel alloys. Airborne nickel-contaminated dusts are regarded as capable of producing lung cancer. The risk is higher for workers at primary nickel smelters and refineries than for workers exposed to nickel alloys. Skin contact may cause an allergic rash. Nickel itch is the dermatitis resulting from sensitization to nickel. Itching can occur up to seven days before skin eruption occurs. The primary skin eruption is reddening or infection of the hair follicles, which may be followed by skin ulceration. Nickel sensitivity, once acquired, is apparently not lost.

SELENIUM: Overexposure of selenium fumes may produce accumulation of fluid in the lungs, garlic breath, bronchitis, pneumonitis, bronchial asthma, nausea, chills, fever, headache, sore throat, shortness of breath, conjunctivitis, vomiting, abdominal pain, diarrhea, and enlarged liver. Selenium is an eye and upper respiratory irritant and a sensitizer. Overexposure may result in red staining of the nails, teeth, and hair. Selenium dioxide reacts with moisture to form selenious acid, which is corrosive to the skin and eyes.

SILICON: Elementary silicon is an inert material. Slight pulmonary lesions have been reported in laboratory animals from injections of silicon dust within the trachea. Silicon dust has little adverse effect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under the TLV. Silicon may cause chronic respiratory effects if repeated overexposure occurs.

TITANIUM: Elemental titanium is an inert material. Titanium dioxide may be generated in welding fumes from this product. At extremely high concentrations, titanium dioxide has induced lung cancer in rats. Titanium dioxide dust is a mild pulmonary, eye and skin irritant: Rats exposed to titanium dioxide developed small focal areas of emphysema which were attributable to large deposits of dust. Excessive exposure in humans may result in slight changes in the lungs. The dusts of titanium dioxide can be placed in the nuisance category.

TUNGSTEN: Chronic exposure to tungsten dust has been reported to cause pulmonary fibrosis characterized by cough, labored breathing and wheezing. Dermatitis (inflammation of the skin), primarily on the sides of the neck, inner forearm, and the backs of the hands, was also reported. Dusts of tungsten pose a hazard considered to be somewhat greater than that of nuisance dust.

VANADIUM: The health hazards associated with exposure to vanadium are dependent on its oxidation state. This product contains elemental vanadium. Elemental vanadium could be oxidized to vanadium pentoxide during welding. The pentoxide form is more toxic than the elemental form. Chronic exposure to vanadium pentoxide dust and fumes may cause severe irritation of the eyes, skin, upper respiratory tract, persistent inflammation of the trachea and bronchi, pulmonary edema, and systemic poisoning. Signs and symptoms of overexposure include: conjunctivitis, nasopharyngitis, cough, labored breathing, rapid heartbeat, lung changes, chronic bronchitis, skin pal, greenish-black tongue, and an allergic skin rash.

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B: Component Analysis - LD50/LC50

Iron (7439-89-6)

Oral LD50 Rat: 984 mg/kg

Nickel (7440-02-0)

Oral LD50 Rat: >9000 mg/kg

Cobalt (7440-48-4)

Inhalation LC50 Rat: >10 mg/L/1H; Oral LD50 Rat: 6170 mg/kg

Manganese (7439-96-5)

Oral LD50 Rat: 9 g/kg

Silicon (7440-21-3)

Oral LD50 Rat: 3160 mg/kg

Carbon (7440-44-0)

Oral LD50 Rat: >10000 mg/kg

Selenium (7782-49-2)

Oral LD50 Rat: 6700 mg/kg

Skin Effects

Dust or powder may irritate the skin. Rubbing may increase mechanical irritation to the skin. Product contains chromium and nickel, which may cause an allergic skin reaction. No components of this product are known to be absorbed through the skin.

Eye Effects

Dust or powder may be irritating to the eyes. Rubbing may cause abrasion of the cornea.

Ingestion Effects

Dusts or powders may cause temporary irritation of the throat, stomach and gastrointestinal tract.

Inhalation Effects

Dusts and powders from this product may cause irritation to the nasal passages and respiratory tract. When inhaled in very large amounts, damage to the lung may occur. Dusts, particulates or fumes that may be produced may contain metals that cause metal fume fever, a transitory condition including fever, chills, aches, cough and general malaise. Repeated exposure may lead to respiratory sensitization reactions, producing an asthma-like condition.

Carcinogenicity

A: General Product Information

No information available for the product.

Occupational exposure to nickel dusts or fumes increases the risk of respiratory cancers.

Chronic exposure to chromium (VI) has been associated with an increased risk of cancer.

Copper has caused cancer when implanted in experimental animals.

Safety Data Sheet

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B: Component Carcinogenicity

Nickel (7440-02-0)

IARC: Monograph 49 [1990] (evaluated as a group) (related to Nickel compounds) (Group 1 (carcinogenic to humans))
Monograph 49 [1990], Supplement 7 [1987] (Group 2B (possibly carcinogenic to humans))

German DFG: Category 1 (causes cancer in man)

Chromium (7440-47-3)

IARC: Monograph 49 [1990] (listed under Chromium and Chromium compounds), Supplement 7 [1987] (Group 3 (not classifiable))

Vanadium (7440-62-2)

German DFG: Category 2 (considered to be carcinogenic for man)

Cobalt (7440-48-4)

IARC: Monograph 86 [2006] (without tungsten carbide), Monograph 52 [1991] (Group 2B (possibly carcinogenic to humans))

German DFG: Category 2 (considered to be carcinogenic for man)

Selenium (7782-49-2)

IARC: Supplement 7 [1987], Monograph 9 [1975] (Group 3 (not classifiable))

German DFG: Category 3B (could be carcinogenic for man)

Mutagenicity

No information available for the product.

Manganese and chromium (VI) have been shown to cause mutations in experimental systems.

Aluminum has been shown to increase the number of sister chromatid exchanges.

Copper can induce DNA structural transformations and chromosomal aberrations.

Nickel inhibited DNA repair and induced transformation in experimental assays.

Teratogenicity

No information available for the product.

Manganese, chromium and aluminum have been shown to have teratogenic effects.

Manganese, chromium, copper and nickel have been reported to have adverse reproductive effects in experimental animals.

Chromium, copper and nickel have been shown to be fetotoxic in experimental animals.

Neurotoxicity

No information available for the product.

Chronic exposure to manganese can lead to the neurological condition of parkinsonism and to diminished fine motor coordination.

Occupational exposure to aluminum has been associated with increased adverse effects on the central nervous system.

Epidemiology

No information available for the product.

Other Toxicological Information

None identified.

Safety Data Sheet

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*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

No information available for the product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Iron (7439-89-6)

Test & Species

96 Hr LC50 *Morone saxatilis* 13.6 mg/L [static]

Conditions

Nickel (7440-02-0)

Test & Species

96 Hr LC50 *Brachydanio rerio* >100 mg/L
72 Hr EC50 freshwater algae (4 species) 0.1 mg/L
72 Hr EC50 *Selenastrum capricornutum* 0.18 mg/L
96 Hr EC50 water flea 510 µg/L

Conditions

Cobalt (7440-48-4)

Test & Species

96 Hr LC50 *Brachydanio rerio* >100 mg/L [static]

Conditions

Copper (7440-50-8)

Test & Species

96 Hr LC50 *Pimephales promelas* 23 µg/L
96 Hr LC50 *Oncorhynchus mykiss* 13.8 µg/L
96 Hr LC50 *Lepomis macrochirus* 236 µg/L
72 Hr EC50 *Scenedesmus subspicatus* 120 µg/L
96 Hr EC50 water flea 10 µg/L
96 Hr EC50 water flea 200 µg/L

Conditions

Mobility

No information available for the product.

Persistence & Degradation

No information available for the product.

Bioaccumulative Potential

No information available for the product.

Other Adverse Effects

No information available for the product.

Environmental Fate

No information available for the product.

*** Section 13 - Disposal Considerations ***

Waste Disposal Instructions

Avoid disposal, attempt to use preparation completely. Disposal by incineration recommended; however, prior to disposal of unused preparation, consult an approved waste disposal operative to ensure compliance with Directive 91/689/EEC.

Safety Data Sheet

Material Name: All Steel Grades

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Disposal of Contaminated Packaging

Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.

* * * Section 14 - Transportation Information * * *

International Transportation Regulations

Not regulated as dangerous goods.

IATA Information

Shipping Name: Not regulated as dangerous goods.

ICAO Information

Shipping Name: Not regulated as dangerous goods.

IMDG Information

Shipping Name: Not regulated as dangerous goods.

ADR Information

Shipping Name: Not regulated as dangerous goods.

RID Information

Shipping Name: Not regulated as dangerous goods.

* * * Section 15 - Regulatory Information * * *

EU MARKING AND LABELLING:

Symbol(s):

As sold, this product is not hazardous according to the criteria specified in European Union Directives 67/548/EEC and 1999/45/EC. However, if processing of this material produces dusts and/or fumes, the following classification applies:

T-Toxic

Xn – Harmful

Risk Phrases

R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.

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

R40 Limited evidence of a carcinogenic effect.

Safety Phrases

S 24/25 Avoid contact with skin and eyes.

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

S 38 In case of insufficient ventilation, wear suitable respiratory equipment.

S 22 Do not breathe dust.

S 23 Do not breathe gas/fumes/vapour/spray.

Chemical Safety Assessment Information

None Identified.

Other Information

A: General Product Information

None identified.

Safety Data Sheet

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B: Substance Analysis - Inventory

Component/CAS	EC #	EEC	CAN	TSCA
Iron 7439-89-6	231-096-4	EINECS	DSL	Yes
Nickel 7440-02-0	231-111-4	EINECS	DSL	Yes
Chromium 7440-47-3	231-157-5	EINECS	DSL	Yes
Tungsten 7440-33-7	231-143-9	EINECS	DSL	Yes
Vanadium 7440-62-2	231-171-1	EINECS	DSL	Yes
Cobalt 7440-48-4	231-158-0	EINECS	DSL	Yes
Manganese 7439-96-5	231-105-1	EINECS	DSL	Yes
Molybdenum 7439-98-7	231-107-2	EINECS	DSL	Yes
Silicon 7440-21-3	231-130-8	EINECS	DSL	Yes
Copper 7440-50-8	231-159-6	EINECS	DSL	Yes
Carbon 7440-44-0	231-153-3	EINECS	DSL	Yes
Titanium 7440-32-6	231-142-3	EINECS	DSL	Yes
Niobium 7440-03-1	231-113-5	EINECS	DSL	Yes
Aluminum 7429-90-5	231-072-3	EINECS	DSL	Yes
Selenium 7782-49-2	231-957-4	EINECS	DSL	Yes

*** Section 16 - Other Information ***

Full text of all Risk Phrases in Sections 2 & 3

R11 Highly flammable.

R15 Contact with water liberates extremely flammable gases.

R23/25 Toxic by inhalation and if swallowed.

R33 Danger of cumulative effects.

R40 Limited evidence of a carcinogenic effect.

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

R43 May cause sensitization by skin contact.

R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.

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

Safety Data Sheet

Material Name: All Steel Grades

SDS ID: CIL-001EU

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Revision History

This SDS is a new document.

Other Information

Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use.

Coatings may be applied to the product for protective purposes. The possible presence of coatings should be recognized and considered when evaluating potential employee hazards and exposures during dust- and fume-generating activities. Applicable coating SDSs are available upon request.

This is the end of SDS # CIL-001EU