

Safety Data Sheet

According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

Initial preparation date: 03.05.2021

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Aluminum/Silicon Alloy (5% to 11% silicon) - Coated Carbon Steel Sheet

SECTION 1: Identification

Product identifier

Product name: Aluminum/Silicon Alloy (5% to 11% silicon) - Coated Carbon Steel Sheet

Additional information: This product is not hazardous as supplied, shipped or sold. However, if subjected to further processing (such as welding, soldering, smelting, grinding or polishing) hazardous substances may be released and made available for exposure. The Hazard Classification and corresponding label elements are applicable to this product in such a scenario. Consideration should also be given to the generation of hazardous oxides of the metals in this product and health hazards associated with those oxides.

Recommended use of the product and restriction on use

Relevant identified uses: Steel fabricated parts

Uses advised against: Any use other than recommended above.

Reasons why uses advised against: Not determined or not applicable.

Manufacturer or supplier details

Manufacturer:

United States

Steel Dynamics, Inc. Flat Roll Group
Columbus Division
1945 Airport Road
Columbus, MS 39701
(622) 245-4200

Emergency telephone number:

United States

CHEMTREC

(800) 424-9300 (24 hours)

SECTION 2: Hazard(s) identification

GHS classification:

Skin sensitization, category 1

Respiratory sensitization, category 1

Carcinogenicity, category 2

Label elements

Hazard pictograms:



Signal word: Danger

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Hazard statements:

H317 May cause an allergic skin reaction

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

H351 Suspected of causing cancer

Precautionary statements:

P201 Obtain special instructions before use

P202 Do not handle until all safety precautions have been read and understood

P261 Avoid breathing dust/fume/gas/mist/vapors/spray

P272 Contaminated work clothing must not be allowed out of the workplace

P280 Wear protective gloves/protective clothing/eye protection/face protection

P284 Wear respiratory protection

P302+P352 IF ON SKIN: Wash with plenty of soap and water

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

P321 Specific treatment (see Sections 4 - 8 of this SDS and any supplemental information on the product label)

P363 Wash contaminated clothing before reuse

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

P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician

P308+P313 IF exposed or concerned: Get medical advice/attention

P405 Store locked up

P501 Dispose of contents/container in accordance with local, regional, state and federal regulations.

Hazards not otherwise classified:

METAL FUME FEVER: Excessive inhalation of metal fumes may cause a flu-like illness called "Metal Fume Fever". Symptoms include: headache, fever, chills, muscle aches, thirst, nausea, vomiting, chest soreness, fatigue, gastrointestinal pain and weakness. The symptoms usually start several hours after exposure; the attack may last 6 to 24 hours. Complete recovery generally occurs without intervention within 24 to 48 hours. Metal Fume Fever is more likely to occur after a period away from the job (after weekends or vacations) and usually last from 12 to 48 hours.

If this product is subjected to "hot work" (such as soldering, welding, brazing, smelting) hazardous by-products will be formed as oxides of the metal(s) in this product. Such metal oxides may pose additional health hazards.

This product may be passivated with chromic acid, leaving a residual coating of chromium III or VI compounds. The Threshold Limit Value (TLV) for occupational exposure to hexavalent chromium is low enough (ACGIH - 0.2 µg/m³) that overexposure may be possible with inadequate ventilation. Chromium VI and compounds are recognized carcinogens under IARC and NTP, posing a risk of lung and sinus cancer. Please observe the occupational exposure limits for hexavalent chromium included in Section 8 of this SDS.

SECTION 3: Composition/information on ingredients

Main Composition

Identification	Name	Weight %
CAS number: 7439-89-6	Iron	>90
CAS number: 7439-96-5	Manganese	<2
CAS number: 7440-21-3	Silicon	<1

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CAS number: 7440-47-3	Chromium	<1
CAS number: 7440-02-0	Nickel	<0.4
CAS number: 7440-62-2	Vanadium	<0.2

Metallic Coating (<0.1% of total weight)

Identification	Name	Weight %
CAS number: 7440-21-3	Silicon	5-11
CAS number: 7429-90-5	Aluminum	89-95

Additional Information:

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret in accordance with paragraph (i) of the OSHA Hazard Communication Standard (29 CFR §1910.1200).

- Product surface may be treated with small amounts of corrosion-inhibiting oil that may contain mineral oil, and may be passivated with chromic acid leaving residual coating of chromium III or VI compounds or coated with acrylic coating based on customer specifications. Contact facility for further information.

SECTION 4: First aid measures

Description of first aid measures

General notes:

Show this Safety Data Sheet to the doctor in attendance.

This product is not hazardous as supplied, shipped or sold. The first aid measures described below are applicable only if hazardous chemicals are made available for exposure during further processing of this product.

After inhalation:

If inhaled, remove person to fresh air and place in a position comfortable for breathing. Keep person at rest. If breathing is difficult, administer oxygen. If breathing has stopped, provide artificial respiration. If experiencing respiratory symptoms, seek medical advice/attention.

After skin contact:

Remove contaminated clothing and shoes. Rinse skin with copious amounts of water [shower] for several minutes. Launder contaminated clothing before reuse. If symptoms develop or persist, seek medical advice/attention.

After eye contact:

Rinse eyes with plenty of gently flowing lukewarm water for 15 minutes. Remove contact lenses if present and easy to do so. Protect unexposed eye. If symptoms develop or persist, seek medical advice/attention.

After swallowing:

Not a likely route of exposure.

Most important symptoms and effects, both acute and delayed

Acute symptoms and effects:

This product is not hazardous as supplied, shipped or sold. The acute effects/symptoms described below are applicable to exposure during further processing of this product.

Exposure to airborne dusts and fumes may cause skin and eye irritation (chemical and mechanical). Symptoms include redness, burning, tearing, itching and inflammation.

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Exposure to airborne dusts or fumes may cause respiratory irritation. Symptoms include cough, breathing difficulties, inflammation of the mucous membranes lining the respiratory tract and nose and throat pain.

Dermal exposure may cause an allergic skin reaction. Symptoms may include irritation, redness, pain, rash, inflammation, itching, burning and dermatitis.

Inhalation exposure may cause allergy, asthma symptoms or breathing difficulties. Symptoms may include cough, chronic phlegm, shortness of breath, wheezing and chest tightness. Symptoms may be delayed.

Excessive inhalation of metal fumes may cause a flu-like illness called "Metal Fume Fever". Symptoms include: headache, fever, chills, muscle aches, thirst, nausea, vomiting, chest soreness, fatigue, gastrointestinal pain and weakness. The symptoms usually start several hours after exposure; the attack may last 6 to 24 hours. Complete recovery generally occurs without intervention within 24 to 48 hours. Metal Fume Fever is more likely to occur after a period away from the job (after weekends or vacations) and usually last from 12 to 48 hours.

Delayed symptoms and effects:

This product is not hazardous as supplied, shipped or sold. The delayed effects/symptoms described below are applicable to exposure during further processing of this product.

Effects are dependent on exposure (dose, concentration, contact time).

Repeated or prolonged exposure to metal fumes and dust may cause damage to organs.

Prolonged or repeated inhalation exposure to excessive concentrations of iron and iron oxide fumes or dust may result in the development of a benign pneumoconiosis, called siderosis and reduced pulmonary function.

Prolonged or repeated exposure to fumes and dust of manganese and manganese oxide may adversely affect the lungs, resulting in increased susceptibility to bronchitis and pneumonitis. Long-term exposure to manganese compounds may affect the central nervous system.

Repeated or prolonged inhalation of chromium oxide dust or fume may cause nasal ulceration and perforation of the nasal septum. Repeated or prolonged exposure to hexavalent chromium may damage the kidneys, resulting in kidney impairment.

Chronic inhalation exposure to nickel and nickel compounds may cause lung fibrosis and pneumoconiosis.

Repeated or prolonged inhalation exposure to fumes and dust of vanadium and vanadium oxides may cause damage to the lungs resulting in chronic bronchitis and pneumonitis. Chronic exposure may cause a greenish-black discoloration of the tongue.

Chronic exposure to aluminum and aluminum oxides may cause pulmonary fibrosis and emphysema.

Repeated or prolonged exposure to fumes and dust may cause cancer.

Inhalation of excessive concentrations of iron and iron oxide dust and fume may enhance the risk of lung cancer development in workers exposed to carcinogens.

Exposure to hexavalent chromium may cause cancer. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung and sinus cancers.

Inhalation of nickel and nickel oxide fume and dust may cause lung cancer.

The International Agency for Research on Cancer (IARC) has classified vanadium pentoxide as possibly carcinogenic to humans based on evidence of lung cancer in exposed mice.

Repeated or prolonged exposure to fumes and dust may damage fertility or the unborn child.

Animal studies indicate that hexavalent chromium may be toxic to human reproduction and development.

Exposure to nickel and nickel oxides may damage fertility and the unborn child.

Vanadium Pentoxide is a suspected reproductive toxin, affecting fertility and development of the unborn child, and a suspected mutagen. Studies in animals exposed during pregnancy have shown that vanadium can cause decreases in growth and increases in the occurrence of birth defects.

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Immediate medical attention and special treatment

Specific treatment:

Not determined or not applicable.

Notes for the doctor:

Treat symptomatically.

SECTION 5: Firefighting measures

Extinguishing media

Suitable extinguishing media:

Use extinguishers appropriate for surrounding materials.

Unsuitable extinguishing media:

Do not use water jet.

Specific hazards during fire-fighting:

Thermal decomposition may release irritating and toxic fumes including, but not limited to, iron oxides, manganese oxides, silicon oxides, chromium oxides, nickel oxides, vanadium oxides and aluminum oxides.

Special protective equipment for firefighters:

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full-face piece operated in positive pressure mode.

Special precautions:

Avoid contact with skin, eyes, hair and clothing. Do not breathe fumes/gas/mists/aerosols/vapors/dusts. Direct water stream will scatter and spread flames and, therefore, should not be used. Avoid unnecessary run-off of extinguishing media which may cause pollution.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Not applicable to product as supplied, shipped and sold.

For spills or release involving dust generated from further processing: Wear recommended personal protective equipment (see Section 8). Avoid contact with eyes, skin and clothing. Do not breathe dust or fumes. Wear suitable respiratory protection if inhalation of airborne dust is possible. Avoid generation of dust or actions that result in dust becoming airborne. Wash thoroughly after handling.

Environmental precautions:

Prevent further leakage or spillage if safe to do so. Prevent from reaching drains, sewers and waterways. Discharge into the environment must be avoided.

Methods and material for containment and cleaning up:

Not applicable to product as supplied, shipped and sold.

Collect material and place in a suitable container for recovery or disposal. Dispose of in accordance with all applicable regulations (see Section 13).

Reference to other sections:

For personal protective equipment see Section 8. For disposal see Section 13.

SECTION 7: Handling and storage

Precautions for safe handling:

Avoid contact with sharp edges and hot surfaces. Cut resistant gloves and sleeves should be worn when working with steel products. Use work methods which minimize dust/fume production.

The following recommendations for handling pertain to further processing (such as welding, soldering, smelting, grinding, or polishing): Use appropriate personal protective equipment, including respiratory protection, (see Section 8). Ensure adequate ventilation. Avoid breathing fumes and/or dust. Avoid contact with skin, eyes and clothing. Do not eat, drink, smoke, or use personal products when handling chemical substances. Wash affected areas thoroughly after handling. Keep away from incompatible materials (See Section 10).

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Conditions for safe storage, including any incompatibilities:

Store away from incompatible materials (See Section 10).

SECTION 8: Exposure controls/personal protection

Only those substances with limit values have been included below.

Occupational Exposure limit values:

Country (Legal Basis)	Substance	Identifier	Permissible concentration	
OSHA	Silicon	7440-21-3	8-Hour TWA-PEL: 15 mg/m ³ (total dust)	
	Silicon	7440-21-3	8-Hour TWA-PEL: 5 mg/m ³ (respirable fraction)	
	Vanadium	7440-62-2	PEL Ceiling: 0.1 mg/m ³ (fume, as V ₂ O ₅)	
	Vanadium	7440-62-2	PEL Ceiling: 0.5 mg/m ³ (respirable dust - as V ₂ O ₅)	
	Iron	7439-89-6	8-Hour TWA-PEL: 10 mg/m ³ (Iron Oxide - dust and fume)	
	Manganese	7439-96-5	PEL Ceiling: 5 mg/m ³ (Manganese, compounds & fume as Mn)	
	Chromium	7440-47-3	8-Hour TWA-PEL: 1 mg/m ³ (Chromium, metal & insoluble salts, as Cr)	
	Chromium	7440-47-3	8-Hour TWA-PEL: 0.5 mg/m ³ (Chromium (III) compounds, as Cr)	
	Chromium	7440-47-3	8-Hour TWA: 0.5 mg/m ³ (Chromium (III) compounds, as Cr)	
	Chromium	7440-47-3	8-Hour TWA-PEL: 0.5 mg/m ³ (Chromium (II) compounds, as Cr)	
	Chromium	7440-47-3	8-Hour TWA-PEL: 5 ug/m ³ (Chromium VI compounds (Hexavalent Chromium))	
	Chromium	7440-47-3	8-Hour TWA-PEL: 2.5 ug/m ³ (Chromium VI compounds (Hexavalent Chromium) - Action level)	
	Nickel	7440-02-0	8-Hour TWA-PEL: 1 mg/m ³ (Nickel, Metal & Insoluble Compounds, as Ni)	
	Nickel	7440-02-0	8-Hour TWA-PEL: 1 mg/m ³ (Nickel, Soluble compounds, as Ni)	
	Aluminum	Aluminum	7429-90-5	8-Hour TWA-PEL: 15 mg/m ³ (total dust)
Aluminum		7429-90-5	8-Hour TWA-PEL: 5 mg/m ³ (respirable fraction)	
Aluminum		7429-90-5	8-Hour TWA: 5 mg/m ³ (pyro powders & welding fumes, as Al)	
NIOSH		Silicon	7440-21-3	REL-TWA: 5 mg/m ³ (respirable - up to 10 hr)
		Silicon	7440-21-3	REL-TWA: 10 mg/m ³ (total dust - up to 10 hr)

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Country (Legal Basis)	Substance	Identifier	Permissible concentration
	Vanadium	7440-62-2	Ceiling Limit: 0.05 mg/m ³ ([15 min] respirable dust & fume, as V ₂ O ₅)
	Vanadium	7440-62-2	IDLH: 35 mg/m ³
	Vanadium	7440-62-2	TWA: 3 mg/m ³
	Vanadium	7440-62-2	REL-TWA: 1 mg/m ³ (up to 10 hr)
	Iron	7439-89-6	REL-TWA: 5 mg/m ³ (Iron Oxide - dust and fume - up to 10 hrs.)
	Iron	7439-89-6	IDLH: 2500 mg/m ³ (Iron Oxide - dust and fume)
	Manganese	7439-96-5	REL-TWA: 1 mg/m ³ (Manganese, compounds & fume as Mn - up to 10 hrs.)
	Manganese	7439-96-5	15-Minute STEL: 3 mg/m ³ (Manganese, compounds & fume as Mn)
	Manganese	7439-96-5	IDLH: 500 mg/m ³ (Manganese, compounds & fume as Mn)
	Chromium	7440-47-3	REL-TWA: 0.5 mg/m ³ (Chromium, metal & insoluble salts, as Cr [up to 10 hr])
	Chromium	7440-47-3	IDLH: 250 mg/m ³ (Chromium, metal & insoluble salts, as Cr)
	Chromium	7440-47-3	REL-TWA: 0.5 mg/m ³ (Chromium (III) compounds, as Cr [up to 10 hr])
	Chromium	7440-47-3	IDLH: 250 mg/m ³ (Chromium (III) compounds, as Cr)
	Chromium	7440-47-3	REL-TWA: 0.5 mg/m ³ (Chromium (III) compounds, as Cr [up to 10 hr])
	Chromium	7440-47-3	IDLH: 250 mg/m ³ (Chromium (III) compounds, as Cr)
	Chromium	7440-47-3	REL-TWA: 0.5 mg/m ³ (Chromium (II) compounds, as Cr [up to 10 hr])
	Chromium	7440-47-3	IDLH: 250 mg/m ³ (Chromium (II) compounds, as Cr)
	Chromium	7440-47-3	8-Hour TWA: 0.0002 mg/m ³ (Chromium VI compounds (Hexavalent Chromium))
	Nickel	7440-02-0	REL-TWA: 0.015 mg/m ³ (Nickel, Metal & Insoluble Compounds, as Ni -up to 10 hr)
	Nickel	7440-02-0	IDLH: 10 mg/m ³ (Nickel, Metal & Insoluble Compounds, as Ni)
	Nickel	7440-02-0	REL-TWA: 0.015 mg/m ³ (Nickel, Soluble compounds, as Ni)
	Nickel	7440-02-0	IDLH: 10 mg/m ³ (Nickel, Soluble compounds, as Ni)

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Country (Legal Basis)	Substance	Identifier	Permissible concentration
	Aluminum	7429-90-5	REL-TWA: 10 mg/m ³ (total dust [up to 10 hr])
	Aluminum	7429-90-5	REL-TWA: 5 mg/m ³ (respirable fraction [up to 10 hr])
	Aluminum	7429-90-5	8-Hour TWA: 5 mg/m ³ (pyro powders & welding fumes, as Al)
United States(California)	Silicon	7440-21-3	8-Hour TWA-PEL: 10 mg/m ³ (total dust)
	Silicon	7440-21-3	8-Hour TWA-PEL: 5 mg/m ³ (respirable fraction)
	Vanadium	7440-62-2	8-Hour TWA: 0.05 mg/m ³ (respirable dust & fume, as V ₂ O ₅)
	Manganese	7439-96-5	8-Hour TWA-PEL: 0.2 mg/m ³ (Manganese, compounds & fume as Mn)
	Manganese	7439-96-5	15-Minute STEL: 3 mg/m ³ (Manganese, compounds & fume as Mn)
	Chromium	7440-47-3	8-Hour TWA-PEL: 0.5 mg/m ³ (Chromium, metal & insoluble salts, as Cr)
	Chromium	7440-47-3	8-Hour TWA: 0.5 mg/m ³ (Chromium (II) compounds, as Cr)
	Chromium	7440-47-3	8-Hour TWA: 0.5 mg/m ³ (Chromium (III) compounds, as Cr)
	Chromium	7440-47-3	8-Hour TWA-PEL: 0.005 mg/m ³ (Chromium VI compounds (Hexavalent Chromium))
	Chromium	7440-47-3	PEL Ceiling: 0.1 mg/m ³ (Chromium VI compounds (Hexavalent Chromium))
	Nickel	7440-02-0	8-Hour TWA-PEL: 0.5 mg/m ³ (metal)
	Nickel	7440-02-0	8-Hour TWA-PEL: 0.1 mg/m ³ (Nickel compounds, insoluble, as Ni)
	Nickel	7440-02-0	8-Hour TWA-PEL: 0.05 mg/m ³ (Nickel, Soluble compounds, as Ni)
	Aluminum	7429-90-5	8-Hour TWA-PEL: 10 mg/m ³ (total dust)
	Aluminum	7429-90-5	8-Hour TWA-PEL: 5 mg/m ³ (respirable fraction)
ACGIH	Vanadium	7440-62-2	8-Hour TWA: 0.05 mg/m ³ (inhalable particulate matter, as V ₂ O ₅)
	Iron	7439-89-6	8-Hour TWA: 5 mg/m ³ (Iron Oxide - dust and fume - respirable particulate matter)
	Manganese	7439-96-5	8-Hour TWA: 0.02 mg/m ³ (Manganese, compounds & fume as Mn - respirable particulate matter)

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Country (Legal Basis)	Substance	Identifier	Permissible concentration
	Manganese	7439-96-5	8-Hour TWA: 0.1 mg/m ³ (Manganese, compounds & fume as Mn - inhalable particulate matter)
	Chromium	7440-47-3	8-Hour TWA: 0.5 mg/m ³ (Chromium, metal & insoluble salts, as Cr - inhalable particulate matter)
	Chromium	7440-47-3	8-Hour TWA: 0.003 mg/m ³ (Chromium (III) compounds, as Cr - inhalable particulate matter)
	Chromium	7440-47-3	8-Hour TWA: 0.5 mg/m ³ (Chromium (III) compounds, as Cr)
	Chromium	7440-47-3	8-Hour TWA: 0.0002 mg/m ³ (Chromium VI compounds (Hexavalent Chromium) - inhalable particulate matter)
	Chromium	7440-47-3	15-Minute STEL: 0.0005 mg/m ³ (Chromium VI compounds (Hexavalent Chromium) - inhalable particulate matter)
	Nickel	7440-02-0	8-Hour TWA: 1.5 mg/m ³ (Elemental - inhalable particulate matter)
	Nickel	7440-02-0	8-Hour TWA: 0.2 mg/m ³ (Nickel, Metal & Insoluble Compounds, as Ni - inhalable particulate matter)
	Nickel	7440-02-0	8-Hour TWA: 0.1 mg/m ³ (Nickel, Soluble compounds, as Ni - inhalable particulate matter)
	Aluminum	7429-90-5	8-Hour TWA: 1 mg/m ³ (respirable particulate matter)

Biological limit values:

No biological exposure limits noted for the ingredient(s).

Information on monitoring procedures:

Not determined or not applicable.

Appropriate engineering controls:

The engineering controls described below are recommended only if hazardous chemicals are made available for exposure during further processing of this product.

Use local exhaust, mechanical ventilation or additional engineering measures to maintain airborne concentration below any occupational exposure limits. Ensure that Emergency eye wash station and safety shower are in good working order and in the immediate vicinity of any possible exposure.

Personal protection equipment

Eye and face protection:

It is recommended that eye protection be worn at all times in a manufacturing or industrial environment. Wear safety goggles or safety glasses with side shields. Contact lenses should not be worn where industrial exposures to this material are likely. Use eye protection equipment that has been tested and approved by recognized national standards (or equivalent).

A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.

A welding helmet with appropriate shaded shield is required during welding, burning, or brazing.

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Skin and body protection:

Wear protective gloves and suitable protective clothing. While handling product and/or steel packing material wear cut resistant gloves and sleeves for laceration protection.

When material is heated, wear gloves to protect against thermal burns. Thermally protective apron and long sleeves are recommended when volume of hot material is significant.

The skin protection described below is necessary only if hazardous chemicals are made available for exposure during further processing of this product.

Chemical resistant, impervious gloves approved by the appropriate standards. Gloves must be inspected prior to use. Avoid skin contact with used gloves. Appropriate techniques should be used to remove used gloves and contaminated clothing. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Ensure that all personal protective equipment is approved by recognized national standards (or equivalent).

Respiratory protection:

The respiratory protection described below is necessary only if hazardous chemicals are made available for exposure during further processing of this product.

In case of insufficient ventilation, wear suitable 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. Wear a properly fitted, air-purifying or air-fed respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. Use a positive pressure demand full-face air supplied respirator with escape bottle or SCBA if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

WARNING! Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.

General hygienic measures:

Handle in accordance with good industrial hygiene and safety measures. Wash hands and face after handling chemical products. Wash hands before eating, drinking and smoking. Wash hands at the end of the workday. Appropriate techniques should be applied to remove contaminated clothing and shoes. Wash contaminated clothing before reuse. Observe any medical surveillance requirements.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Solid, metallic gray
Odor	Odorless
Odor threshold	Not determined or not available.
pH	Not determined or not available.
Melting point/freezing point	~2750 °F (~1510 °C)
Initial boiling point/range	Not determined or not available.
Flash point (closed cup)	Not determined or not available.
Evaporation rate	Not determined or not available.
Flammability (solid, gas)	Not determined or not available.
Upper flammability/explosive limit	Not determined or not available.
Lower flammability/explosive limit	Not determined or not available.
Vapor pressure	Not determined or not available.
Vapor density	Not determined or not available.

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Density	Not determined or not available.
Relative density	7 - 8
Solubilities	Not determined or not available.
Partition coefficient (n-octanol/water)	Not determined or not available.
Auto/Self-ignition temperature	Not determined or not available.
Decomposition temperature	Not determined or not available.
Dynamic viscosity	Not determined or not available.
Kinematic viscosity	Not determined or not available.
Explosive properties	Not determined or not available.
Oxidizing properties	Not determined or not available.

Other information

SECTION 10: Stability and reactivity

Reactivity:

Not reactive under recommended handling and storage conditions.

Chemical stability:

Stable under recommended handling and storage conditions.

Possibility of hazardous reactions:

Hazardous reactions are not anticipated under recommended conditions of handling and storage.

Conditions to avoid:

Incompatible materials

Incompatible materials:

Strong acids; Oxidizing agents

Hazardous decomposition products:

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

Acute toxicity

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

Product data: No data available.

Substance data:

Name	Route	Result
Silicon	oral	LD50 Rat: 3160 mg/kg
Iron	oral	LD50 Rat: 30,000 mg/kg
Manganese	oral	LD50 Rat: 9000 mg/kg
Chromium	oral	LD50 Rat: >3400 mg/kg
	inhalation	LC50 Rat: >5.41 mg/L (4 hr)
Aluminum	oral	LD50 Rat: 15,900 mg/kg

Skin corrosion/irritation

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

Product data:

No data available.

Substance data: No data available.

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Serious eye damage/irritation

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

Product data:

No data available.

Substance data:

Name	Result
Chromium	Causes serious eye irritation.

Respiratory or skin sensitization

Assessment:

May cause an allergic skin reaction.

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

Product data:

No data available.

Substance data:

Name	Result
Chromium	May cause an allergic skin reaction.
	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Nickel	May cause an allergic skin reaction.

Carcinogenicity

Assessment:

Suspected of causing cancer.

Product data: No data available.

Substance data:

Name	Species	Result
Iron	Not Applicable	Inhalation of excessive concentrations of iron oxide may enhance the risk of lung cancer development in workers exposed to carcinogens.
Nickel	Not Applicable	Suspected of causing cancer.

International Agency for Research on Cancer (IARC):

Name	Classification
Chromium	Group 3
Nickel	Group 2B

National Toxicology Program (NTP):

Name	Classification
Chromium	Known to be human carcinogens
Nickel	Reasonably anticipated to be human carcinogens

OSHA Carcinogens: Not applicable

Germ cell mutagenicity

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

Product data:

No data available.

Substance data: No data available.

Reproductive toxicity

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

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Product data:

No data available.

Substance data: No data available.

Specific target organ toxicity (single exposure)

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

Product data:

No data available.

Substance data: No data available.

Specific target organ toxicity (repeated exposure)

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

Product data:

No data available.

Substance data:

Name	Result
Iron	Chronic inhalation of excessive concentrations of iron fumes or dust may result in the development of a benign pneumoconiosis, called siderosis.
Manganese	Long-term overexposure to manganese compounds may affect the central nervous system.
Nickel	Causes damage to organs (lungs) through prolonged or repeated exposure.

Aspiration toxicity

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

Product data:

No data available.

Substance data: No data available.

Information on likely routes of exposure:

Not Applicable to product as supplied, shipped and sold.

If subjected to further processing, the anticipated routes of exposure are inhalation, skin contact and eye contact.

Symptoms related to the physical, chemical and toxicological characteristics:

Refer to Section 4 of this SDS.

Other information:

No data available.

SECTION 12: Ecological information

Acute (short-term) toxicity

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

Product data: No data available.

Substance data: No data available.

Chronic (long-term) toxicity

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

Product data: No data available.

Substance data: No data available.

Persistence and degradability

Product data: No data available.

Substance data: No data available.

Bioaccumulative potential

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Product data: No data available.

Substance data: No data available.

Mobility in soil

Product data: No data available.

Substance data: No data available.

Results of PBT and vPvB assessment

Product data:

PBT assessment: This product does not contain any substances that are assessed to be a PBT.

vPvB assessment: This product does not contain any substances that are assessed to be a vPvB.

Substance data:

PBT assessment: This product does not contain any substances that are assessed to be a PBT.

vPvB assessment: This product does not contain any substances that are assessed to be a vPvB.

Other adverse effects: No data available.

SECTION 13: Disposal considerations

Disposal methods:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory agencies. Dispose of in accordance with all applicable local, regional, state and federal regulations.

Contaminated packages:

Not determined or not applicable.

SECTION 14: Transport information

United States Transportation of dangerous goods (49 CFR DOT)

UN number	Not regulated
UN proper shipping name	Not regulated
UN transport hazard class(es)	None
Packing group	None
Environmental hazards	None
Special precautions for user	None

International Maritime Dangerous Goods (IMDG)

UN number	Not regulated
UN proper shipping name	Not regulated
UN transport hazard class(es)	None
Packing group	None
Environmental hazards	None
Special precautions for user	None

International Air Transport Association Dangerous Goods Regulations (IATA-DGR)

UN number	Not regulated
UN proper shipping name	Not regulated
UN transport hazard class(es)	None
Packing group	None
Environmental hazards	None
Special precautions for user	None

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SECTION 15: Regulatory information

United States regulations

Inventory listing (TSCA): All ingredients are listed-active or exempt.

Significant New Use Rule (TSCA Section 5): None of the ingredients are listed.

Export notification under TSCA Section 12(b): None of the ingredients are listed.

SARA Section 302 extremely hazardous substances: None of the ingredients are listed.

SARA Section 313 toxic chemicals:

7440-62-2	Vanadium	Listed
7439-96-5	Manganese	Listed
7440-47-3	Chromium	Listed
7440-02-0	Nickel	Listed
7429-90-5	Aluminum	Listed

CERCLA:

7440-47-3	Chromium	Listed	5000 LB
7440-02-0	Nickel	Listed	100 lbs.

RCRA:

7440-47-3	Chromium	Listed	D007
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Section 112(r) of the Clean Air Act (CAA): None of the ingredients are listed.

Massachusetts Right to Know:

7440-21-3	Silicon	Listed
7440-21-3	Silicon	Listed
7440-62-2	Vanadium	Listed
7439-96-5	Manganese	Listed
7440-47-3	Chromium	Listed
7440-02-0	Nickel	Listed
7429-90-5	Aluminum	Listed

New Jersey Right to Know:

7440-21-3	Silicon	Listed
7440-21-3	Silicon	Listed
7440-62-2	Vanadium	Listed
7439-96-5	Manganese	Listed
7440-47-3	Chromium	Listed
7440-02-0	Nickel	Listed
7429-90-5	Aluminum	Listed

New York Right to Know:

7440-62-2	Vanadium	Listed
7439-96-5	Manganese	Listed
7440-47-3	Chromium	Listed
7440-02-0	Nickel	Listed
7429-90-5	Aluminum	Listed

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Pennsylvania Right to Know:

7440-21-3	Silicon	Listed
7440-21-3	Silicon	Listed
7440-62-2	Vanadium	Listed
7439-96-5	Manganese	Listed
7440-47-3	Chromium	Listed
7440-02-0	Nickel	Listed
7429-90-5	Aluminum	Listed

California Proposition 65:

⚠WARNING: This product can expose you to Nickel (Hot Work); which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov

SECTION 16: Other information

Abbreviations and Acronyms: None

Disclaimer:

This product has been classified in accordance with OSHA HCS 2012 guidelines. The information provided in this SDS is correct, to the best of our knowledge, based on information available. The information given is designed only as a guidance for safe handling, use, storage, transportation and disposal and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials, unless specified in the text. The responsibility to provide a safe workplace remains with the user.

NFPA: 0-0-0

HMIS: 0-0-0

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End of Safety Data Sheet