

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) revised in 2012 and GHS Rev 03.

Issue date 09/13/2022

Reviewed on 09/13/2022

1 Identification

Product Identifier

Trade Name: Low-Alloy Steel Electrodes for Flux Cored Arc Welding

Product Number:

Specification: A5.29

Classification: E100T1-K3C, E101T1-GM, E110T5-K4C, E111T1-GM, E111T1-K3C, E111T1-K3M, E111T1-K3M-JH8, E80T5-Ni3M, E81T1-A1C/A1M, E81T1-B2C H8, E81T1-B2C/B2M, E81T1-B2LC, E81T1-B6M, E81T1-B8M, E81T1-K2M, E81T1-Ni1C/Ni1M, E81T1-Ni1C-JH4/Ni1M-JH4, E81T1-Ni2C/Ni2M, E81T1-Ni2C-JH4/Ni2M-JH4, E81T1-W2C/W2M, E91T1-B3C/B3M, E91T1-B9M, E91T1-K2C/K2M, E91T1-K2C-JH8/ K2M-JH8

Low-alloy steel electrodes for flux cored arc welding

Relevant identified uses of the substance or mixture and uses advised against:

For professional use only. Use according to manufacturer's specification.

Product Description: Low-alloy steel electrodes for flux cored arc welding.

Application of the substance / the mixture: Industry specific application.

Details of the Supplier of the Safety Data Sheet:

Manufacturer/Supplier:

Pinnacle Alloys I, LLC

9384 Wallisville Road

Houston, TX 77013

Telephone: 800-856-9353

Emergency telephone number: 713-688-9353

2 Hazard(s) Identification

Classification of the substance or mixture:



Health hazard

Sensitization - Respiratory 1

H334

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

Carcinogenicity 1A

H350

May cause cancer. Route of exposure: Inhalation.

Specific Target Organ Toxicity - Repeated Exposure 1

H372-H373

Causes damage to organs through prolonged or repeated exposure. May cause damage to the respiratory system through prolonged or repeated exposure. Route of exposure: Inhalation.



Skin Irritation 2

H315

Causes skin irritation.

Eye Irritation 2A

H319

Causes serious eye irritation.

Sensitization - Skin 1

H317

May cause an allergic skin reaction.

Specific Target Organ Toxicity - Single Exposure 3

H335

May cause respiratory irritation.

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- **Label elements:**
- **Hazard pictograms:**



- **Signal word:** Danger

- **Hazard-determining components of labeling:**

Iron
Titanium Dioxide
Nickel
Cobalt
Titanium

- **Hazard statements:**

H315 Causes skin irritation.
H319 Causes serious eye irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H350 May cause cancer. Route of exposure: Inhalation.
H335 May cause respiratory irritation.
H372-H373 Causes damage to organs through prolonged or repeated exposure. May cause damage to the respiratory system through prolonged or repeated exposure. Route of exposure: Inhalation.

- **Precautionary statements:**

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with plenty of water.
P304+P312 IF INHALED: Call a POISON CENTER/doctor if you feel unwell.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P321 Specific treatment (see supplementary first aid instructions on this Safety Data Sheet).
P362+P364 Take off contaminated clothing and wash it before reuse.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P342+P311 If experiencing respiratory symptoms: Call a poison center/doctor.
P363 Wash contaminated clothing before reuse.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Unknown acute toxicity:**

This value refers to knowledge of known, established toxicological or ecotoxicological values.
18 % of the mixture consists of component(s) of unknown toxicity.

- **Classification system:** NFPA/HMIS Definitions: 0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme

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· **NFPA ratings (scale 0 - 4)**



· **HMIS-ratings (scale 0 - 4)**



· **Hazard(s) not otherwise classified (HNOC):** None known

3 Composition/Information on Ingredients

· **Chemical characterization: Substance**

· **Description:** Mixture of substances listed below with non-hazardous additions.

· **Dangerous Components:**

CAS: 7439-89-6 RTECS: NO 4565500	Iron ⚠ Flammable Solids 2, H228; ⚠ Skin Irritation 2, H315; Specific Target Organ Toxicity - Single Exposure 3, H335; Eye Irritation 2B, H320; Combustible Dust	70-98%
CAS: 1317-61-9	Iron Oxide	0-12%
CAS: 7787-32-8 RTECS: CQ 9100000	Barium fluoride ⚠ Acute Toxicity - Oral 4, H302; Acute Toxicity - Inhalation 4, H332	0-12%
CAS: 7440-39-3 RTECS: CQ 8370000	Barium ⚠ Substances and mixtures which, in contact with water, emit flammable gases 2, H261	0-10%
CAS: 13463-67-7	Titanium Dioxide ⚠ Carcinogenicity 2, H351	0-10%
CAS: 7429-90-5 RTECS: BD 0330000	Aluminium ⚠ Flammable Solids 2, H228	0-5%
CAS: 7789-75-5 RTECS: EW 1760000	Calcium fluoride ⚠ Skin Irritation 2, H315; Specific Target Organ Toxicity - Single Exposure 3, H335; Eye Irritation 2B, H320	0-5%
CAS: 7439-96-5 RTECS: OO 9275000	Manganese ⚠ Pyrophoric Solids 1, H250; Substances and mixtures which, in contact with water, emit flammable gases 1, H260	0-2%
CAS: 7440-02-0	Nickel ⚠ Carcinogenicity 2, H351; Specific Target Organ Toxicity - Repeated Exposure 1, H372; ⚠ Sensitization - Skin 1, H317; Aquatic Acute 3, H402	0-4%
CAS: 7440-21-3	Silicon ⚠ Flammable Solids 2, H228; ⚠ Acute Toxicity - Oral 4, H302; Eye Irritation 2B, H320; Combustible Dust	0-4%
CAS: 1344-28-1 RTECS: BD 1200000	Aluminum Oxide ⚠ Specific Target Organ Toxicity - Single Exposure 3, H335	0-3%
CAS: 7439-95-4 RTECS: OM 2100000	Magnesium ⚠ Pyrophoric Solids 1, H250; Substances and mixtures which, in contact with water, emit flammable gases 1, H260	0-3%

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CAS: 7440-47-3 RTECS: GB 4200000	Chromium	0-3%
CAS: 554-13-2 RTECS: OJ 5800000	Lithium Carbonate ⚠ Acute Toxicity - Oral 4, H302; Acute Toxicity - Inhalation 4, H332; Eye Irritation 2A, H319	≤2.5%
CAS: 1309-48-4	Magnesium Oxide ⚠ Acute Toxicity - Oral 4, H302	≤2.5%
CAS: 1309-64-4	Antimony trioxide ⚠ Carcinogenicity 2, H351	0-2%
CAS: 1317-95-9	Silica ⚠ Carcinogenicity 1A, H350; ⚠ Specific Target Organ Toxicity - Single Exposure 3, H335	0-2%
CAS: 7439-98-7 RTECS: QA 4680000	Molybdenum	0-2%
CAS: 7440-32-6 RTECS: XR 1700000	Titanium ⚠ Skin Irritation 2, H315; Sensitization - Skin 1, H317; Eye Irritation 2B, H320	0-2%
CAS: 7440-48-4 RTECS: GF 8750000	Cobalt ⚠ Sensitization - Respiratory 1, H334; Germ Cell Mutagenicity 2, H341; Carcinogenicity 1B, H350; Toxic to Reproduction 1B, H360; ⚠ Sensitization - Skin 1, H317; Combustible Dust	0-1%
CAS: 7440-50-8 RTECS: GL 5325000	Copper	0-2%
CAS: 7440-67-7 RTECS: ZH 7070000	Zirconium ⚠ Pyrophoric Solids 1, H250; Substances and mixtures which, in contact with water, emit flammable gases 1, H260	0-1%
CAS: 7789-24-4 RTECS: OJ 6125000	Lithium fluoride ⚠ Acute Toxicity - Oral 3, H301; ⚠ Skin Irritation 2, H315; Eye Irritation 2A, H319; Specific Target Organ Toxicity - Single Exposure 3, H335	0-2%
CAS: 11129-60-5	Manganese oxide	0-2%
CAS: 12057-24-8 RTECS: OJ6360000	Lithium Oxide ⚠ Skin Corrosion 1A, H314; Eye Damage 1, H318	0-2%

Additional information:

The exact percentages of the ingredients of this mixture are considered to be proprietary and are withheld in accordance with the provisions of paragraph (i) of §1910.1200 of 29 CFR 1910.1200 Trade Secrets.

Note: Certain chemical constituents listed in Section 3 may vary depending upon the Classification of the Low-Alloy Steel Electrodes for Flux Cored Arc Welding products.

4 First-Aid Measures

Description of first aid measures

General information:

Symptoms of poisoning may occur after exposure to dust, fumes or particulates; seek medical attention if feeling unwell.

• **After inhalation:** In case of unconsciousness place patient stably in the side position for transportation.

After skin contact:

Immediately wash with water and soap and rinse thoroughly.

If skin irritation occurs, consult a doctor.

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- **After eye contact:**

Do NOT rub eyes. Immediately rinse opened eye(s) for at least 15 minutes under running water, lifting upper and lower lids occasionally. If symptoms persist, consult a physician.
If easy to do so, remove contact lenses if worn.

- **After swallowing:**

Rinse out mouth and then drink plenty of water.
Do not induce vomiting without medical advice.

- **Information for doctor**

- **Most important symptoms and effects, both acute and delayed:** No further relevant information available.

- **Indication of any immediate medical attention and special treatment needed:**

No further relevant information available.

5 Fire-Fighting Measures

- **Extinguishing media**

- **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.

- **For safety reasons unsuitable extinguishing agents:** No further relevant information.

- **Special hazards arising from the substance or mixture:**

Amorphous or crystalline silicon both react exothermically when heated with alkali-metal carbonates attaining incandescence and evolving carbon monoxide.

Material in powder form, capable of creating a dust explosion. Mixture of silicon, aluminum, and lead oxide explodes when heated.

Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame.

Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

Special Remarks on Explosion Hazards:

Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

Material in powder form is capable of creating a dust explosion. Mixture of silicon, aluminum, and lead oxide explodes when heated.

Amorphous or crystalline silicon both react exothermically when heated with alkali-metal carbonates attaining incandescence and evolving carbon monoxide. Mixtures of silicon, aluminum, and lead explode when heated.

If incinerated, product will release the following toxic fumes: Oxides of iron, manganese, silicon, aluminum, nickel, niobium, magnesium, molybdenum, titanium, vanadium, barium, lithium, zirconium, carbon, copper, antimony, barium, cerium, chromium, cobalt, calcium, manganese, and fluorides and ozone.

- **Advice for firefighters**

- **Special protective equipment for firefighters:**

As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear to prevent contact with skin and eyes.

- **Additional information:**

At temperatures above 200°C Zirconium reacts exothermically with the following: fluorine, chloride, bromide, iodine, halocarbons, carbon tetrachloride, carbon, tetra fluoride and Freon's.

These items are not reactive, flammable, or explosive and essentially not hazardous at ambient temperatures. Welding arcs and sparks can ignite combustibles and flammable products. If involved in a fire, these products may generate irritating aluminum fumes and a variety of metal oxides. Emergency responders must wear personal protection equipment suitable for the situation. Use the extinguishing media recommended for the burning materials and fire situation. See ANSI Z49.1 "Safety in Welding and Cutting" and "Safe Practices" Code: SP, published by the American Welding Society.

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6 Accidental Release Measures

· **Personal precautions, protective equipment and emergency procedures:**

Ensure adequate ventilation.

Wear assigned protective equipment. Keep unprotected persons away.

Avoid contact with skin, eyes and clothing.

· **Environmental precautions:** No special measures required.

· **Methods and material for containment and cleaning up:**

Dispose of contaminated material as waste according to section 13.

Ensure adequate ventilation.

Dispose of the collected material according to regulations.

Flammable solid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources.

· **Reference to other sections:**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

· **PAC-1:**

7439-89-6	Iron	3.2 mg/m ³
1317-61-9	Iron Oxide	21 mg/m ³
7787-32-8	Barium fluoride	1.9 mg/m ³
7440-39-3	Barium	1.5 mg/m ³
13463-67-7	Titanium Dioxide	30 mg/m ³
7789-75-5	Calcium fluoride	15 mg/m ³
7439-96-5	Manganese	3 mg/m ³
7440-02-0	Nickel	4.5 mg/m ³
7440-21-3	Silicon	45 mg/m ³
1344-28-1	Aluminum Oxide	15 mg/m ³
7439-95-4	Magnesium	18 mg/m ³
7440-47-3	Chromium	1.5 mg/m ³
554-13-2	Lithium Carbonate	3.1 mg/m ³
1306-38-3	Cerium dioxide	3 mg/m ³
1309-48-4	Magnesium Oxide	30 mg/m ³
1309-64-4	Antimony trioxide	1.8 mg/m ³
7439-98-7	Molybdenum	30 mg/m ³
7440-32-6	Titanium	30 mg/m ³
7440-44-0	Carbon Fiber	6 mg/m ³
7440-48-4	Cobalt	0.18 mg/m ³
7440-50-8	Copper	3 mg/m ³
7440-67-7	Zirconium	10 mg/m ³
7789-24-4	Lithium fluoride	10 mg/m ³
12057-24-8	Lithium Oxide	0.091 mg/m ³
7440-03-1	Niobium	30 mg/m ³
7440-62-2	Vanadium	3 mg/m ³

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· PAC-2:		
7439-89-6	Iron	35 mg/m ³
1317-61-9	Iron Oxide	230 mg/m ³
7787-32-8	Barium fluoride	230 mg/m ³
7440-39-3	Barium	180 mg/m ³
13463-67-7	Titanium Dioxide	330 mg/m ³
7789-75-5	Calcium fluoride	170 mg/m ³
7439-96-5	Manganese	5 mg/m ³
7440-02-0	Nickel	50 mg/m ³
7440-21-3	Silicon	100 mg/m ³
1344-28-1	Aluminum Oxide	170 mg/m ³
7439-95-4	Magnesium	200 mg/m ³
7440-47-3	Chromium	17 mg/m ³
554-13-2	Lithium Carbonate	34 mg/m ³
1306-38-3	Cerium dioxide	33 mg/m ³
1309-48-4	Magnesium Oxide	120 mg/m ³
1309-64-4	Antimony trioxide	16 mg/m ³
7439-98-7	Molybdenum	330 mg/m ³
7440-32-6	Titanium	330 mg/m ³
7440-44-0	Carbon Fiber	330 mg/m ³
7440-48-4	Cobalt	2 mg/m ³
7440-50-8	Copper	33 mg/m ³
7440-67-7	Zirconium	83 mg/m ³
7789-24-4	Lithium fluoride	110 mg/m ³
12057-24-8	Lithium Oxide	1 mg/m ³
7440-03-1	Niobium	330 mg/m ³
7440-62-2	Vanadium	5.8 mg/m ³
· PAC-3:		
7439-89-6	Iron	150 mg/m ³
1317-61-9	Iron Oxide	1,400 mg/m ³
7787-32-8	Barium fluoride	1,400 mg/m ³
7440-39-3	Barium	1,100 mg/m ³
13463-67-7	Titanium Dioxide	2,000 mg/m ³
7789-75-5	Calcium fluoride	1,000 mg/m ³
7439-96-5	Manganese	1,800 mg/m ³
7440-02-0	Nickel	99 mg/m ³
7440-21-3	Silicon	630 mg/m ³
1344-28-1	Aluminum Oxide	990 mg/m ³
7439-95-4	Magnesium	1,200 mg/m ³
7440-47-3	Chromium	99 mg/m ³
554-13-2	Lithium Carbonate	210 mg/m ³
1306-38-3	Cerium dioxide	200 mg/m ³

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1309-48-4	Magnesium Oxide	730 mg/m ³
1309-64-4	Antimony trioxide	96 mg/m ³
7439-98-7	Molybdenum	2,000 mg/m ³
7440-32-6	Titanium	2,000 mg/m ³
7440-44-0	Carbon Fiber	2,000 mg/m ³
7440-48-4	Cobalt	20 mg/m ³
7440-50-8	Copper	200 mg/m ³
7440-67-7	Zirconium	500 mg/m ³
7789-24-4	Lithium fluoride	680 mg/m ³
12057-24-8	Lithium Oxide	6 mg/m ³
7440-03-1	Niobium	2,000 mg/m ³
7440-62-2	Vanadium	35 mg/m ³

7 Handling and Storage

- **Handling**
- **Precautions for safe handling:**
Avoid creating and breathing dust/fume/gas/mist/vapors/spray.
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of dust.
- **Information about protection against explosions and fires:** No special measures required.
- **Conditions for safe storage, including any incompatibilities**
Store away from strong acids, strong bases, strong oxidizing agents and strong reducing agents.
- **Storage**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Keep receptacle tightly sealed.
- **Specific end use(s):** No further relevant information available.

* 8 Exposure Controls/Personal Protection

- **Additional information about design of technical systems:** No further data; see section 7.
- **Control parameters:**
All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use local exhaust at filling zones and where leakage and dust formation is probable. Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure Limits in Air below TLV & PEL limits.
- **Components with occupational exposure limits:**
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.
At this time, the other constituents have no known exposure limits.

1317-61-9 Iron Oxide	
PEL	Short-term value: 80 mg/m ³
TWA	Long-term value: 6
7787-32-8 Barium fluoride	
PEL	Long-term value: 2.5 mg/m ³ as F

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REL	Long-term value: 2.5 mg/m ³ as F
TLV	Long-term value: 2.5 mg/m ³ as F, A4; BEI
7440-39-3 Barium	
REL	Long-term value: 0.5 mg/m ³ as Ba
REL	Long-term value: 0.5 mg/m ³ as Ba
TLV	Long-term value: 0.5 mg/m ³ as Ba, A4
13463-67-7 Titanium Dioxide	
REL	Long-term value: 15* mg/m ³ *total dust
REL	See Pocket Guide App. A
TLV	Long-term value: 0.2* 2.5** mg/m ³ resp. fraction, *nanoscale, **finescale, A3
7429-90-5 Aluminium	
REL	Short-term value: 5** mg/m ³ Long-term value: 15* mg/m ³ *Total dust; ** Respirable fraction
REL	Short-term value: 5** mg/m ³ Long-term value: 10* mg/m ³ as Al*Total dust**Respirable/pyro powd./welding f.
TLV	Long-term value: 1* mg/m ³ as Al; *as respirable fraction, A4
7789-75-5 Calcium fluoride	
REL	Long-term value: 2.5 mg/m ³ as F
REL	Long-term value: 2.5 mg/m ³ as F
TLV	Long-term value: 2.5 mg/m ³ as F, A4; BEI
7439-96-5 Manganese	
REL	Ceiling limit value: 5 mg/m ³ as Mn
REL	Short-term value: 3 mg/m ³ Long-term value: 1 mg/m ³ fume, as Mn
TLV	Long-term value: 0.02* 0.1** mg/m ³ as Mn; A4, *respirable **inhalable fraction
7440-02-0 Nickel	
REL	Long-term value: 1 mg/m ³
REL	Long-term value: 0.015 mg/m ³ as Ni; See Pocket Guide App. A

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TLV	Long-term value: 1.5* mg/m ³ elemental, *inhalable fraction, A5, BEI
7440-21-3 Silicon	
PEL	Long-term value: 15* 5** mg/m ³ *total dust **respirable fraction
REL	Long-term value: 10* 5** mg/m ³ *total dust **respirable fraction
TLV	TLV withdrawn
1344-28-1 Aluminum Oxide	
PEL	Long-term value: 15*, 5** mg/m ³ *Total dust; ** Respirable fraction
REL	Long-term value: 10* 5** mg/m ³ as Al*Total dust**Respirable/pyro powd./welding f.
TLV	Long-term value: 1* mg/m ³ as Al; *as respirable fraction, A4
7440-47-3 Chromium	
PEL	Long-term value: 1 mg/m ³
REL	Long-term value: 0.5* mg/m ³ *metal+inorg.compds.as Cr;See Pocket Guide App. C
TLV	Long-term value: 0.003* 0.5** mg/m ³ inh. fraction, *as Cr(III): A4,**metal
1309-48-4 Magnesium Oxide	
PEL	Long-term value: 15* mg/m ³ fume; *total particulate
TLV	Long-term value: 10* mg/m ³ *as inhalable fraction, A4
1309-64-4 Antimony trioxide	
TLV	Long-term value: 0.02 mg/m ³ inhalable fraction, A2
1317-95-9 Silica	
PEL	Long-term value: 0.05* mg/m ³ *resp. dust; 30mg/m ³ /%SiO ₂ +2
REL	Long-term value: 0.05* mg/m ³ *respirable dust; See Pocket Guide App. A
TLV	Long-term value: 0.025* mg/m ³ *respirable particulate matter, A2
7439-98-7 Molybdenum	
PEL	Long-term value: 15* mg/m ³ *Total dust, as Mo
TLV	Long-term value: 10* 3** mg/m ³ as Mo; *inhalable fraction ** respirable fraction
7440-48-4 Cobalt	
PEL	Long-term value: 0.1* mg/m ³ as Co; *for metal dust and fume

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REL	Long-term value: 0.05 mg/m ³ as Co; metal dust & fume
TLV	Long-term value: 0.02* mg/m ³ *inh. fraction; DSEN, RSEN, BEI, A3
7440-50-8 Copper	
PEL	Long-term value: 1* 0.1** mg/m ³ as Cu *dusts and mists **fume
REL	Long-term value: 1* 0.1** mg/m ³ as Cu *dusts and mists **fume
TLV	Long-term value: 1* 0.2** mg/m ³ *dusts and mists; **fume; as Cu
7440-67-7 Zirconium	
PEL	Long-term value: 5 mg/m ³ as Zr
REL	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as Zr
TLV	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as Zr; A4
7789-24-4 Lithium fluoride	
PEL	Long-term value: 2.5 mg/m ³ as F
REL	Long-term value: 2.5 mg/m ³ as F
TLV	Long-term value: 2.5 mg/m ³ as F, A4; BEI
11129-60-5 Manganese oxide	
PEL	Ceiling limit value: 5 mg/m ³ as Mn
REL	Short-term value: 3 mg/m ³ Long-term value: 1 mg/m ³ as Mn
TLV	Long-term value: 0.02* 0.1** mg/m ³ as Mn; A4, *respirable **inhalable fraction
Ingredients with biological limit values:	
7787-32-8 Barium fluoride	
BEI	2 mg/L urine prior to shift Fluoride (background, nonspecific)
	3 mg/L urine end of shift Fluoride (background, nonspecific)

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7789-75-5 Calcium fluoride	
BEI	2 mg/L urine prior to shift Fluoride (background, nonspecific) 3 mg/L urine end of shift Fluoride (background, nonspecific)
7440-02-0 Nickel	
BEI	5 µg/L urine post-shift at end of workweek Nickel (background) 30 µg/L urine post-shift at end of workweek Nickel (background)
7440-47-3 Chromium	
BEI	0.7 µg/L urine end of shift at end of workweek Total chromium (population based)
7440-48-4 Cobalt	
BEI	15 µg/L urine end of shift at end of workweek Cobalt (nonspecific)
7789-24-4 Lithium fluoride	
BEI	2 mg/L urine prior to shift Fluoride (background, nonspecific) 3 mg/L urine end of shift Fluoride (background, nonspecific)

· **Additional information:** The lists that were valid during the creation of this SDS were used as basis.

· **Exposure controls:**

· **Personal protective equipment**

· **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing and wash before reuse.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

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· **Breathing equipment:**



Suitable respiratory protective device recommended.

Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding, brazing, cutting, grinding, or soldering in a confined space or general work area where local exhaust and/or ventilation does not keep exposure below the limits outlined in Section 8. Monitor the air quality inside the welder's helmet, and/or worker's breathing zone to determine if a respirator is required and the type needed.

· **Protection of hands:**

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Select glove material based on penetration times, rates of diffusion and degradation.



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

· **Material of gloves:**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

· **Penetration time of glove material:**

The exact break-through time has to be determined and observed by the manufacturer of the protective gloves.

· **Eye protection:**



Helmet or face shield

Wear a helmet or face shield with a filter lens around shade number 14. Adjust if needed by selecting the next lighter or darker shade number. See ANSI/ASC Z49.1 Section 4.2 or publication F2.2. Shield other workers by providing screens and flash goggles.

· **Body protection:**



Protective work clothing

Wear approved head, hand, and body protection, which help to prevent injury from radiation, sparks, and electrical shock. This would include wearing welder's gloves and a protective face shield and may include arm protectors, apron, hats, shoulder protection, as well as dark, non-synthetic, substantial clothing. See ANSI Z49.1. Welders should be trained not to allow electrically live parts to contact the skin or wet clothing and gloves. The welders should insulate themselves from the work and ground and should not touch live electrical parts. Welders should not wear short sleeve shirts or short pants.

· **Limitation and supervision of exposure into the environment:** None

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9 Physical and Chemical Properties

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

Form: Flux Coated Wire/Rod
 Color: Silver/gray metallic color

· **Odor:** Odorless until used

· **Odor threshold:** Not determined.

· **pH-value:** Not applicable.

· **Change in condition**

Melting point/Melting range: Not determined.

· **Flash point:** None

· **Flammability (solid, gaseous):** Not determined.

· **Ignition temperature:** Not applicable

· **Decomposition temperature:** Not determined.

· **Auto igniting:** Product is not self-igniting.

· **Danger of explosion:** Product does not present an explosion hazard.

· **Explosion limits:**

Lower: Not determined.

Upper: Not determined.

· **Vapor pressure:** Not applicable.

· **Density:** Not determined.

· **Relative density:** Not determined.

· **Vapor density:** Not applicable.

· **Evaporation rate:** Not applicable.

· **Solubility in / Miscibility with:**

Water: Insoluble.

· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**

Dynamic: Not applicable.

Kinematic: Not applicable.

· **Solvent content:**

VOC content: 0.00 %

Solids content: 100.0 %

· **Other information:** No further relevant information available.

10 Stability and Reactivity

· **Reactivity:**

Stable under normal conditions.

May react violently or explosively on contact with water. Will react with water or steam to product hydrogen.

Incompatible (violent reactions) with chlorine, fluorine, oxidizers, calcium, carbide, alkali carbonates, iodine pentafluoride, cobaltic fluoride, rubidium carbide, MnF₃, nitrosyl fluoride, AgF. Mixtures of cesium acetylide with silicon react vigorously on heating. Rubidium acetylide reacts vigorously with silicon on warming.

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- **Chemical stability:** Stable under normal conditions.
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions:**
May react violently or explosively on contact with water. Will react with water or steam to product hydrogen Incompatible (violent reactions) with chlorine, fluorine, oxidizers, calcium, carbide, alkali carbonates, iodine pentafluoride, cobaltic fluoride, rubidium carbide, MnF₃, nitrosyl fluoride, AgF. Mixtures of cesium acetylide with silicon react vigorously on heating. Rubidium acetylide reacts vigorously with silicon on warming. Contact with acids or strong bases may cause generation of gas.
- **Conditions to avoid:** No further relevant information available.
- **Incompatible materials:**
Incompatible (violent reactions) with chlorine, fluorine, oxidizers, calcium, carbide, alkali carbonates, iodine pentafluoride, cobaltic fluoride, rubidium carbide, MnF₃, nitrosyl fluoride, AgF.
Strong acids, strong bases, strong oxidizing agents and strong reducing agents.
- **Hazardous decomposition products:**
Toxic chromium oxide fumes.
Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the processes and procedures followed, and the welding consumables used. Other conditions that also influence the composition and quantity of fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders in operation and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, and the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing procedures). When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 8. Fume and gas decomposition, and not the ingredients in the electrode, are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration. Also, new compounds not in the electrodes may form. The known gases and fumes that may form during welding or cutting and their exposure limits are noted in the list in Section 11 below. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 8, plus those from the base metal and coating, etc. as noted above. Chlorinated solvents may be decomposed into toxic gases such as phosgene. It is understood, however, that the elements and/or oxides to be mentioned are virtually always present as complex oxides and not as metals (See "Characterization of Arc Welding Fume", from the American Welding Society). The elements or oxides listed Section 8 correspond to the ACGIH categories found in "Threshold Limit Values for Chemical Substances and Physical Agents" listed in Section 8. Some products will also contain: Oxides of iron, manganese, silicon, aluminum, nickel, niobium, magnesium, molybdenum, titanium, vanadium, barium, lithium, zirconium, carbon, copper, antimony, barium, cerium, chromium, cobalt, calcium, manganese, and fluorides and ozone. Some elements or compounds may exceed thier PELs/TLVs before the total fumes exceed 5 mg/m³.

11 Toxicological Information

- **Information on toxicological effects:**
Effects of Over-Exposure: Electric arc welding may create one or more of the following health hazards:
 - ARC RAYS can injure eyes and burn skin. Incidences of skin cancer have been reported.
 - ELECTRIC SHOCK can kill.
 - FUMES AND GASES GENERATED FROM WELDING can be dangerous to your health.
 - PRIMARY ROUTES OF ENTRY are the respiratory system, eyes, skin, and/or indigestion.
 - NOISE can damage hearing.

Short-term (acute) over-exposure effects:

- WELDING FUMES may result in discomfort, such as dizziness, nausea, or dryness or irritation of the nose, throat, or eyes.
- ALUMINUM OXIDE may cause irritation of the respiratory system.
- FLUORIDES, FLUORIDE COMPOUNDS may cause skin and eye burns, pulmonary edema, and

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bronchitis.

- IRON, IRON OXIDE have no known effects. Treat as a nuisance dust or fume.
- MAGNESIUM, MAGNESIUM OXIDE overexposure may cause metal fume fever, characterized by metallic taste, tightness of chest, and fever. Symptoms may last 24-48 hours following overexposure.
- MANGANESE, MANGANESE COMPOUNDS may cause metal fume fever, characterized by irritation of the throat, vomiting, nausea, fever, body aches, and chills. Recovery is generally complete within 48 hours of overexposure.
- MOLYBDENUM may cause irritation of the eyes, nose, and throat.
- NICKEL, NICKEL COMPOUNDS may cause metallic taste, nausea, tightness in chest, fever, and allergic reactions.
- SILICA (amorphous) dust and fumes may cause irritation of the respiratory system, skin, and eyes.
- TITANIUM DIOXIDE may cause irritation of the respiratory system.
- COPPER may cause capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure.

Long-term (chronic) over-exposure effects:

- WELDING FUMES in excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis, or 'siderosis.' Overexposure to air contaminants may lead to their accumulation in the lungs, a condition which may be seen as dense areas on chest x-rays. The severity of the change is proportional to the length of exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on X-rays may be caused by non-work factors such as smoking, etc.
- ALUMINUM OXIDE may cause pulmonary fibrosis and emphysema.
- FLUORIDES may cause serious bone erosion (osteoporosis) and mottling of teeth.
- IRON, IRON OXIDE may cause siderosis or deposits of iron in the lungs, which is believed to affect pulmonary function. Lungs will clear in time when exposure to iron fumes and its compounds ceases. Iron and magnetite (Fe₃O₄) are not regarded as fibrogenic materials.
- MANGANESE, MANGANESE COMPOUNDS may cause central nervous system effects referred to as 'manganism.' Symptoms include languor, sleepiness, muscular weakness, emotional disturbances, spastic gait, and tremors. Behavioral changes and changes in handwriting may also appear. These effects are irreversible. Employees overexposed to manganese should receive regular medical examinations for early detection of manganism.
- MOLYBDENUM prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing, and anemia.
- NICKEL, NICKEL COMPOUNDS may lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers.
- SILICA (respirable crystalline silica) overexposure may result in silicosis. Respirable crystalline silica is a known human carcinogen. SILICA (amorphous) long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential.
- TITANIUM DIOXIDE may cause pulmonary irritation and slight fibrosis.
- COPPER may cause hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis.

· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

7439-89-6 Iron		
Oral	LD50	7,500 mg/kg (Rat)
1317-61-9 Iron Oxide		
Oral	LD50	>5,000 mg/kg (Rat)

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7787-32-8 Barium fluoride		
Oral	LD50	250 mg/kg (Rat)
13463-67-7 Titanium Dioxide		
Oral	LD50	>10,000 mg/kg (Rat)
Dermal	LD50	>10,000 mg/kg (Rabbit)
Inhalative	LC50/4 h	>6.82 mg/l (Rat)
7429-90-5 Aluminium		
Oral	LD50	>2,000 mg/kg (Rat)
Inhalative	LC50/4 h	888 mg/l (Rat)
7789-75-5 Calcium fluoride		
Oral	LD50	4,250 mg/kg (Rat)
7439-96-5 Manganese		
Oral	LD50	9,000 mg/kg (Rat)
7440-21-3 Silicon		
Oral	LD50	3,160 mg/kg (Rat)
1344-28-1 Aluminum Oxide		
Oral	LD50	>10,000 mg/kg (Rat)
Inhalative	LC50/4 h	>2.6 mg/l (Rat)
7440-47-3 Chromium		
Inhalative	LC50/96 hours	14.3 mg/l (Cyprinus carpio)
554-13-2 Lithium Carbonate		
Oral	LD50	525 mg/kg (Rat)
Dermal	LD50	>2,000 mg/kg (Rabbit)
Inhalative	LC50/4 h	>2.17 mg/l (Rat)
1309-48-4 Magnesium Oxide		
Oral	LD50	810 mg/kg (Mouse)
1309-64-4 Antimony trioxide		
Oral	LD50	>20,000 mg/kg (Rat)
7439-98-7 Molybdenum		
Oral	LD50	>5,000 mg/kg (Rat)
Dermal	LD50	>2,000 mg/kg (Rat)
Inhalative	LC50/4 h	800 mg/l (Trout)
		>5.84 mg/l (Rat)
7440-48-4 Cobalt		
Oral	LD50	6,170 mg/kg (Rat)

• **Primary irritant effect:**

• **On the skin:**

Irritant to skin and mucous membranes.

May cause an allergic skin reaction.

• **On the eye:** Irritating effect.

• **Sensitization:**

Sensitization possible through inhalation.

Sensitization possible through skin contact.

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· **Additional toxicological information:**

The product shows the following dangers according to internally approved calculation methods for preparations:

Harmful

Irritant

Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis.

· **Carcinogenic categories:**

· **IARC (International Agency for Research on Cancer):**

(a) Although IARC has classified titanium dioxide as possible carcinogenic to human (2B), their summary concludes: "No significant exposure to titanium dioxide is thought to occur during the use of products which titanium dioxide is bound to other materials, such as in cosmetics or in paints."

(b) OSHA does not regulate Titanium Dioxide as a carcinogen. However, under 29 CFR 1910.1200 the SDS must convey the fact that Titanium Dioxide is a potential carcinogen to rats.

Group 1 - Carcinogenic to humans

Group 2A - Probably carcinogenic to humans

Group 2B - Possibly carcinogenic to humans

Group 3 - Not classifiable as to its carcinogenicity to humans

Group 4 - Probably not carcinogenic to humans

7787-32-8	Barium fluoride	3
13463-67-7	Titanium Dioxide	2B
7789-75-5	Calcium fluoride	3
7440-02-0	Nickel	2B
7440-47-3	Chromium	3
1309-64-4	Antimony trioxide	2B
1317-95-9	Silica	1
7440-48-4	Cobalt	2B
7789-24-4	Lithium fluoride	3

· **NTP (National Toxicology Program):**

7440-02-0	Nickel	R
7440-48-4	Cobalt	R

· **OSHA-Ca (Occupational Safety & Health Administration):**

None of the ingredients are listed.

12 Ecological Information

· **Toxicity:**

· **Aquatic toxicity:**

1317-61-9 Iron Oxide	
EC50	>10,000 mg/l (Activated sludge)
13463-67-7 Titanium Dioxide	
EC50	>1,000 mg/l (Water flea)

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7439-96-5 Manganese	
EC50	40 mg/l (Water flea)
7440-02-0 Nickel	
EC50	1 mg/l (Water flea)
7440-47-3 Chromium	
EC50	0.07 mg/l (Water flea)
554-13-2 Lithium Carbonate	
EC50	>400 mg/l (Green algae)
	33.2 mg/l (Daphnia)
7440-50-8 Copper	
EC50	0.04-0.05 mg/l (Water flea)

- **Persistence and degradability:** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential:** No further relevant information available.
- **Mobility in soil:** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
Do not allow undiluted product or product that has not been neutralized to reach ground water, water course or sewage system.
- **Results of PBT and vPvB assessment:**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects:** No further relevant information available.

13 Disposal Considerations

- **Waste treatment methods**
- **Recommendation:**
Must not be disposed of together with household waste. Do not allow product to reach sewage system. Observe all federal, state and local environmental regulations when disposing of this material.
- **Uncleaned packaging**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport Information

- **UN-Number:**
- **DOT, ADR/ADN, ADN, IMDG, IATA** Non-Regulated Material
- **UN proper shipping name:**
- **DOT, ADR/ADN, ADN, IMDG, IATA** Non-Regulated Material
- **Transport hazard class(es):**
- **DOT, ADR/ADN, ADN, IMDG, IATA**
- **Class:** Non-Regulated Material
- **Packing group:**
- **DOT, ADR/ADN, IMDG, IATA** Non-Regulated Material
- **Environmental hazards:** Not applicable.
- **Special precautions for user:** Not applicable.
- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.
- **UN "Model Regulation":** Non-Regulated Material

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15 Regulatory Information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture:**
- **SARA (Superfund Amendments and Reauthorization):**

- **Section 355 (extremely hazardous substances):**

None of the ingredients are listed.

- **Section 313 (Specific toxic chemical listings):**

7787-32-8 Barium fluoride

7440-39-3 Barium

7429-90-5 Aluminium

7439-96-5 Manganese

7440-02-0 Nickel

1344-28-1 Aluminum Oxide

7440-47-3 Chromium

554-13-2 Lithium Carbonate

1309-64-4 Antimony trioxide

7440-48-4 Cobalt

7440-50-8 Copper

11129-60-5 Manganese oxide

7440-62-2 Vanadium

- **TSCA (Toxic Substances Control Act):**

7439-89-6	Iron	ACTIVE
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1317-61-9	Iron Oxide	ACTIVE
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7787-32-8	Barium fluoride	ACTIVE
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7440-39-3	Barium	ACTIVE
-----------	--------	--------

13463-67-7	Titanium Dioxide	ACTIVE
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7429-90-5	Aluminium	ACTIVE
-----------	-----------	--------

7789-75-5	Calcium fluoride	ACTIVE
-----------	------------------	--------

7439-96-5	Manganese	ACTIVE
-----------	-----------	--------

7440-02-0	Nickel	ACTIVE
-----------	--------	--------

7440-21-3	Silicon	ACTIVE
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1344-28-1	Aluminum Oxide	ACTIVE
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7439-95-4	Magnesium	ACTIVE
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7440-47-3	Chromium	ACTIVE
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554-13-2	Lithium Carbonate	ACTIVE
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1306-38-3	Cerium dioxide	ACTIVE
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1309-48-4	Magnesium Oxide	ACTIVE
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1309-64-4	Antimony trioxide	ACTIVE
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7439-98-7	Molybdenum	ACTIVE
-----------	------------	--------

7440-32-6	Titanium	ACTIVE
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7440-44-0	Carbon Fiber	ACTIVE
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7440-48-4	Cobalt	ACTIVE
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7440-50-8	Copper	ACTIVE
7440-67-7	Zirconium	ACTIVE
7789-24-4	Lithium fluoride	ACTIVE
12057-24-8	Lithium Oxide	ACTIVE
7440-03-1	Niobium	ACTIVE
7440-62-2	Vanadium	ACTIVE
· Hazardous Air Pollutants		
7439-96-5	Manganese	
1309-64-4	Antimony trioxide	
7440-48-4	Cobalt	
11129-60-5	Manganese oxide	

· California Proposition 65:



WARNING: This product can expose you to chemicals including the listed chemicals which are known to the State of California to cause cancer, birth defects and/or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

· Chemicals known to cause cancer:

13463-67-7	Titanium Dioxide
7440-02-0	Nickel
1309-64-4	Antimony trioxide
7440-48-4	Cobalt

· Chemicals known to cause reproductive toxicity for females:

None of the ingredients are listed.

· Chemicals known to cause reproductive toxicity for males:

None of the ingredients are listed.

· Chemicals known to cause developmental toxicity:

554-13-2	Lithium Carbonate
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· New Jersey Right-to-Know List:

7440-39-3	Barium
13463-67-7	Titanium Dioxide
7429-90-5	Aluminium
7439-96-5	Manganese
7440-02-0	Nickel
7440-21-3	Silicon
1344-28-1	Aluminum Oxide
7439-95-4	Magnesium
7440-47-3	Chromium
554-13-2	Lithium Carbonate
1309-48-4	Magnesium Oxide
1309-64-4	Antimony trioxide
1317-95-9	Silica
7439-98-7	Molybdenum

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7440-32-6	Titanium	
7440-48-4	Cobalt	
7440-50-8	Copper	
7440-67-7	Zirconium	
7440-62-2	Vanadium	
New Jersey Special Hazardous Substance List:		
7440-39-3	Barium	F3, R2
7429-90-5	Aluminium	F3, R1
7439-96-5	Manganese	F3, R1
7440-02-0	Nickel	CA
7440-21-3	Silicon	F3
7440-47-3	Chromium	F3
554-13-2	Lithium Carbonate	TE
1309-64-4	Antimony trioxide	CA
1317-95-9	Silica	CA
7440-32-6	Titanium	F3, R1
7440-48-4	Cobalt	CA, F3
7440-67-7	Zirconium	F4, R1
Pennsylvania Right-to-Know List:		
7440-39-3	Barium	
13463-67-7	Titanium Dioxide	
7429-90-5	Aluminium	
7439-96-5	Manganese	
7440-02-0	Nickel	
7440-21-3	Silicon	
1344-28-1	Aluminum Oxide	
7439-95-4	Magnesium	
7440-47-3	Chromium	
1309-48-4	Magnesium Oxide	
1309-64-4	Antimony trioxide	
1317-95-9	Silica	
7439-98-7	Molybdenum	
7440-48-4	Cobalt	
7440-50-8	Copper	
7440-67-7	Zirconium	
7440-62-2	Vanadium	
Pennsylvania Special Hazardous Substance List:		
7440-39-3	Barium	E
7429-90-5	Aluminium	E
7439-96-5	Manganese	E
7440-02-0	Nickel	ES
1344-28-1	Aluminum Oxide	E

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7440-47-3	Chromium	ES
1309-64-4	Antimony trioxide	E
7440-48-4	Cobalt	E
7440-50-8	Copper	E
7440-62-2	Vanadium	E

· Carcinogenic categories:

· EPA (Environmental Protection Agency):

7787-32-8	Barium fluoride	D, CBD(inh), NL(oral)
7440-39-3	Barium	D, CBD(inh), NL(oral)
7439-96-5	Manganese	D
7440-47-3	Chromium	D
1306-38-3	Cerium dioxide	II
7440-50-8	Copper	D
11129-60-5	Manganese oxide	D

· TLV (Threshold Limit Value established by ACGIH):

7787-32-8	Barium fluoride	A4
7440-39-3	Barium	A4
13463-67-7	Titanium Dioxide	A4
7429-90-5	Aluminium	A4
7789-75-5	Calcium fluoride	A4
7440-02-0	Nickel	A5
1344-28-1	Aluminum Oxide	A4
7440-47-3	Chromium	A4
1309-48-4	Magnesium Oxide	A4
1309-64-4	Antimony trioxide	A2
1317-95-9	Silica	A2
7439-98-7	Molybdenum	A3
7440-48-4	Cobalt	A3
7440-67-7	Zirconium	A4
7789-24-4	Lithium fluoride	A4

· NIOSH-Ca (National Institute for Occupational Safety and Health):

13463-67-7	Titanium Dioxide
7440-02-0	Nickel
1317-95-9	Silica

· GHS label elements

The product is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms:



· Signal word: Danger

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· Hazard-determining components of labeling:

Iron
Titanium Dioxide
Nickel
Cobalt
Titanium

· Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H350 May cause cancer. Route of exposure: Inhalation.
H335 May cause respiratory irritation.
H372-H373 Causes damage to organs through prolonged or repeated exposure. May cause damage to the respiratory system through prolonged or repeated exposure. Route of exposure: Inhalation.

· Precautionary statements:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with plenty of water.
P304+P312 IF INHALED: Call a POISON CENTER/doctor if you feel unwell.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P321 Specific treatment (see supplementary first aid instructions on this Safety Data Sheet).
P362+P364 Take off contaminated clothing and wash it before reuse.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P342+P311 If experiencing respiratory symptoms: Call a poison center/doctor.
P363 Wash contaminated clothing before reuse.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· National regulations:

The product is not subject to be labelled according with the prevailing version of the regulations on hazardous substances.

· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other Information

Pinnacle Alloys urges each end user and recipient of this SDS to study it carefully. If necessary, consult an industrial hygienist or other expert to understand this information and safeguard the environment and protect workers from potential hazards associated with the handling or use of this product. This information is believed to be accurate as of the revision date shown above. However, no warranty, expressed or implied, is given. Because the conditions or methods of use are beyond Pinnacle Alloys' control, we assume no liability resulting from the use of this product. Regulatory requirements are subject to change and may differ between

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various locations. Compliance with all applicable Federal, State, Provincial, and Local laws and regulations remain the responsibility of the user.

· **Contact:**

· **Abbreviations and acronyms:**

ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road
 ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
 IMDG: International Maritime Code for Dangerous Goods
 DOT: US Department of Transportation
 IATA: International Air Transport Association
 EINECS: European Inventory of Existing Commercial Chemical Substances
 ELINCS: European List of Notified Chemical Substances
 CAS: Chemical Abstracts Service (division of the American Chemical Society)
 NFPA: National Fire Protection Association (USA)
 HMIS: Hazardous Materials Identification System (USA)
 VOC: Volatile Organic Compounds (USA, EU)
 LC50: Lethal concentration, 50 percent
 LD50: Lethal dose, 50 percent
 PBT: Persistent, Bioaccumulative and Toxic
 vPvB: very Persistent and very Bioaccumulative
 NIOSH: National Institute for Occupational Safety and Health
 OSHA: Occupational Safety & Health Administration
 TLV: Threshold Limit Value
 PEL: Permissible Exposure Limit
 REL: Recommended Exposure Limit
 BEI: Biological Exposure Limit
 Flammable Solids 2: Flammable solids – Category 2
 Pyrophoric Solids 1: Pyrophoric solids – Category 1
 Substances and mixtures which, in contact with water, emit flammable gases 1: Substances and mixtures which in contact with water emit flammable gases – Category 1
 Substances and mixtures which, in contact with water, emit flammable gases 2: Substances and mixtures which in contact with water emit flammable gases – Category 2
 Acute Toxicity - Oral 3: Acute toxicity – Category 3
 Acute Toxicity - Oral 4: Acute toxicity – Category 4
 Skin Corrosion 1A: Skin corrosion/irritation – Category 1A
 Skin Irritation 2: Skin corrosion/irritation – Category 2
 Eye Damage 1: Serious eye damage/eye irritation – Category 1
 Eye Irritation 2A: Serious eye damage/eye irritation – Category 2A
 Eye Irritation 2B: Serious eye damage/eye irritation – Category 2B
 Sensitization - Respiratory 1: Respiratory sensitisation – Category 1
 Sensitization - Skin 1: Skin sensitisation – Category 1
 Germ Cell Mutagenicity 2: Germ cell mutagenicity – Category 2
 Carcinogenicity 1A: Carcinogenicity – Category 1A
 Carcinogenicity 1B: Carcinogenicity – Category 1B
 Carcinogenicity 2: Carcinogenicity – Category 2
 Toxic to Reproduction 1B: Reproductive toxicity – Category 1B
 Specific Target Organ Toxicity - Single Exposure 3: Specific target organ toxicity (single exposure) – Category 3
 Specific Target Organ Toxicity - Repeated Exposure 1: Specific target organ toxicity (repeated exposure) – Category 1
 Aquatic Acute 3: Hazardous to the aquatic environment - acute aquatic hazard – Category 3

· *** Data compared to the previous version altered.**

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