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Revision Number 1

1. IDENTIFICATION

Product identification

Product identifier	Certanium® 281 Martensitic Hardfacing MIG Welding Wire
Other means of identification	P19573
Recommended use	Welding Alloy
Restrictions on use	For industrial use only These items are only intended for normal welding purposes.

Supplier

Corporate Headquarters:
Cronatron, A Lawson Brand
Lawson Products, Inc.
8770 W.Bryn Mawr Ave.- Suite 900
Chicago, IL 60631
1-866-529-7664

Canadian Distribution Center:
Lawson Canada
7315 Rapistan Court
Mississauga, ON L5N 5Z4
(800) 323-5922

24 Hour Emergency Phone Number (888) 426-4851 (Prosar)

2. HAZARD(S) IDENTIFICATION

Hazard Classification When this product is used in a welding process the most important hazards are: heat, radiation, electric shock and welding fumes.

Symbol Not applicable

Signal word Not applicable

Hazard statements Not applicable

Precautionary statements

Prevention Not applicable

Response

Storage Not applicable

Disposal Not applicable

Hazard(s) Not Otherwise Classified (HNOC) None known.

**Physical Hazards Not
Otherwise Classified
(PHNOC)** None known.

Unknown acute toxicity None known

3. COMPOSITION/INFORMATION ON INGREDIENTS

Composition Mixture.

Chemical name	CAS-No	Weight %
Iron	7439-89-6	55-95
Chromium	7440-47-3	15-25
Manganese	7439-96-5	1-25
Vanadium	7440-62-2	0-10
Titanium dioxide	13463-67-7	0-10
Titanium	7440-32-6	0-10
Niobium	7440-03-1	0-10
Nickel	7440-02-0	0-10
Molybdenum	7439-98-7	0-10
Calcium Fluoride	7789-75-5	0-10
Silicon	7440-21-3	< 5
Crystalline Silica	14808-60-7	0-5
Zirconium	7440-67-7	0-3
Calcium Carbonate	1317-65-3	0-2
Tungsten	7440-33-7	0-2
Sodium Silicate	1344-09-8	0-1
Silica Amorphous	69012-64-2	varies*
Copper	7440-50-8	0-1
Cobalt	7440-48-4	0-2
Chromium trioxide (CrO ₃)	1333-82-0	varies*
Boron	7440-42-8	0-1
Aluminum	7429-90-5	0-2

*Not present in product, may form during use.

4. FIRST-AID MEASURES

Necessary first-aid measures

Inhalation IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing has stopped, contact emergency medical services immediately. Get medical attention immediately.

Ingestion Not an expected route of exposure. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Get medical attention immediately if symptoms occur.

Skin contact Remove contaminated clothing. Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Eye contact Flush with a large amount of fresh water for at least 15 minutes to remove dusts or fumes. Continue rinsing eyes during transport to hospital. Do not rub eye. Get medical attention. If exposed to arc rays, move victim to a dark room, remove contact lenses as necessary for treatment, cover eyes with a padded dressing and rest.

**Most important symptoms
(acute)** Not available.

**Most important symptoms
(over-exposure)** Not available.

**Indication of any immediate
medical attention and
special treatment needed** Not available.

5. FIRE-FIGHTING MEASURES

**Suitable extinguishing
media** Use the extinguishing media recommended for the burning material and fire situation.

**Unsuitable extinguishing
media** Not applicable.

Specific hazards Welding arcs and sparks can ignite combustible and flammable materials. If there are flammable materials, including fuel or hydraulic lines, in the work area and the worker cannot move the work or the flammable material, a fire-resistant shield such as a piece of sheet metal or fire resistant blanket should be placed over the flammable material. If welding work is conducted within 35 feet or so of flammable materials, station a responsible person in the work zone to act as fire watcher to observe where sparks are flying and to grab an extinguisher or sound the alarm if needed.

**Special protective equipment
for fire-fighters** Firefighters should wear NIOSH/MSHA approved (or equivalent) self-contained pressure-demand breathing apparatus and full protective clothing. Unused welding consumables may remain hot for a period of time after completion of the welding process. See American National Standard Institute (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

6. ACCIDENTAL RELEASE MEASURES

**Personal precautions,
protective equipment and
emergency procedures** Use personal protection recommended in Section 8. For waste disposal, see section 13 of the SDS.

**Methods and materials
for containment and
cleaning up** Solid objects may be picked up and placed in a container. Make sure the solid objects are at room temperature before handling. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Dispose contaminated material as waste according to section 13.

7. HANDLING AND STORAGE

**Precautions for
safe handling** Handle with care to avoid cuts and prevent the wire from piercing the skin. Wear gloves. Some individuals may develop an allergic reaction to certain materials. Keep all warning and identification labels on the product. Avoid exposure to dust and do not ingest.

**Conditions for safe
storage, including any
incompatibilities** Keep in a dry, cool and well-ventilated place. Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	OSHA PEL (TWA)	ACGIH OEL (TWA)	NIOSH - TWA
Iron	-	-	-
Chromium	1 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA

Chemical name	OSHA PEL (TWA)	ACGIH OEL (TWA)	NIOSH - TWA
Manganese	5 mg/m ³ Ceiling	0.02 mg/m ³ TWA 0.1 mg/m ³ TWA	3 mg/m ³ STEL 1 mg/m ³ TWA 1 mg/m ³ TWA
Vanadium	0.5 mg/m ³ Ceiling 0.1 mg/m ³ Ceiling	-	3 mg/m ³ STEL 1 mg/m ³ TWA
Titanium dioxide	15 mg/m ³ TWA	10 mg/m ³ TWA	-
Titanium	-	-	-
Niobium	-	-	-
Nickel	1 mg/m ³ TWA	1.5 mg/m ³ TWA	0.015 mg/m ³ TWA 0.015 mg/m ³ TWA
Molybdenum	15 mg/m ³ TWA	10 mg/m ³ TWA 3 mg/m ³ TWA	-
Calcium Fluoride	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	-
Silicon	15 mg/m ³ TWA 5 mg/m ³ TWA	-	10 mg/m ³ TWA 5 mg/m ³ TWA
Crystalline Silica	50 µg/m ³ TWA 50 µg/m ³ TWA	0.025 mg/m ³ TWA	0.05 mg/m ³ TWA
Zirconium	5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA 5 mg/m ³ TWA
Calcium Carbonate	15 mg/m ³ TWA 5 mg/m ³ TWA	-	10 mg/m ³ TWA 5 mg/m ³ TWA
Tungsten	-	3 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA 5 mg/m ³ TWA
Sodium Silicate	-	-	-
Silica Amorphous	-	-	-
Copper	0.1 mg/m ³ TWA 1 mg/m ³ TWA	0.2 mg/m ³ TWA 1 mg/m ³ TWA	1 mg/m ³ TWA 0.1 mg/m ³ TWA 1 mg/m ³ TWA
Cobalt	0.1 mg/m ³ TWA	0.02 mg/m ³ TWA	0.05 mg/m ³ TWA
Chromium trioxide (CrO ₃)	0.1 mg/m ³ Ceiling 5 µg/m ³ TWA	0.05 mg/m ³ TWA	0.0002 mg/m ³ TWA 0.0002 mg/m ³ TWA 0.0002 mg/m ³ TWA
Boron	-	-	-
Aluminum	15 mg/m ³ TWA 5 mg/m ³ TWA	1 mg/m ³ TWA	10 mg/m ³ TWA 5 mg/m ³ TWA 5 mg/m ³ TWA 5 mg/m ³ TWA

Appropriate engineering controls

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust. Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep workplace and protective clothing clean and dry. Train the welder not to touch live electrical parts and to insulate himself from work and ground. Check condition of protective clothing and equipment on a regular basis. Provide adequate ventilation to keep exposure limits below PEL.

Individual protection measures, such as personal protective equipment

Eye protection

Wear helmet or face shield with filter lens. As a rule of thumb, start with a shade which is too dark to see the work area. Then go to the next lighter shade which gives sufficient view of the work area. Provide protective screens and flash goggles, if necessary, to shield others.

Skin and body protection

Wear head, hand, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum, this includes welders' gloves and a protective face shield and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate themselves from work and ground, especially if clothing and gloves are wet.

Respiratory protection

Use respirable fume respirator or air supplied respirator when welding in a confined space or where local exhaust or ventilation does not keep exposure below the TLV's.

Hygiene measures

Keep away from food, drink and animal feeding stuffs. Wash hands after handling the product. Immediately remove all soiled and contaminated clothing. Wash hands before breaks and at the end of workday. Store protective clothing separately. Keep unnecessary

and unprotected personnel from entering the area. Wear protective equipment.

**Canadian Province Occupational
Exposure Limits**

Chemical name	Alberta OEL	British Columbia OEL	Manitoba OEL	New Brunswick - OEL	Newfoundl and & Labrador - OEL	Nova Scotia - OEL	Ontario OEL	Prince Edward Island - OEL	Quebec OEL	Saskatche wan - OEL
Iron	-	-	-	-	-	-	-	-	-	-
Chromium	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	0.5 mg/m ³ TWA	1.5 mg/m ³ STEL 0.5 mg/m ³ TWA
Manganese	0.2 mg/m ³ TWA	0.2 mg/m ³ TWA 0.2 mg/m ³ TWA	0.02 mg/m ³ TWA 0.1 mg/m ³ TWA	0.2 mg/m ³ TWA	0.02 mg/m ³ TWA 0.1 mg/m ³ TWA 0.02 mg/m ³ TWA 0.1 mg/m ³ TWA	0.02 mg/m ³ TWA 0.1 mg/m ³ TWA	0.2 mg/m ³ TWA 0.02 mg/m ³ TWA 0.1 mg/m ³ TWA	0.02 mg/m ³ TWA 0.1 mg/m ³ TWA 0.02 mg/m ³ TWA 0.1 mg/m ³ TWA	0.2 mg/m ³ TWA 0.2 mg/m ³ TWA	0.6 mg/m ³ STEL 0.2 mg/m ³ TWA 0.2 mg/m ³ TWA
Vanadium	-	-	-	-	-	-	-	-	-	-
Titanium dioxide	10 mg/m ³ TWA	10 mg/m ³ TWA 3 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA	10 mg/m ³ TWA	20 mg/m ³ STEL 10 mg/m ³ TWA
Titanium	-	-	-	-	-	-	-	-	-	-
Niobium	-	-	-	-	-	-	-	-	-	-
Nickel	1.5 mg/m ³ TWA	0.05 mg/m ³ TWA	1.5 mg/m ³ TWA	1 mg/m ³ TWA	1.5 mg/m ³ TWA	1.5 mg/m ³ TWA	1 mg/m ³ TWA	1.5 mg/m ³ TWA	1 mg/m ³ TWA	3 mg/m ³ STEL 1.5 mg/m ³ TWA
Molybdenum	10 mg/m ³ TWA 3 mg/m ³ TWA	3 mg/m ³ TWA 10 mg/m ³ TWA 3 mg/m ³ TWA 10 mg/m ³ TWA	3 mg/m ³ TWA 10 mg/m ³ TWA	10 mg/m ³ TWA	3 mg/m ³ TWA 10 mg/m ³ TWA 3 mg/m ³ TWA 10 mg/m ³ TWA	3 mg/m ³ TWA 10 mg/m ³ TWA	10 mg/m ³ TWA 3 mg/m ³ TWA 10 mg/m ³ TWA 3 mg/m ³ TWA	3 mg/m ³ TWA 10 mg/m ³ TWA 3 mg/m ³ TWA 10 mg/m ³ TWA	10 mg/m ³ TWA	20 mg/m ³ STEL 6 mg/m ³ STEL 10 mg/m ³ TWA 3 mg/m ³ TWA 10 mg/m ³ TWA 3 mg/m ³ TWA
Calcium Fluoride	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	2.5 mg/m ³ TWA	5 mg/m ³ STEL 2.5 mg/m ³ TWA
Silicon	-	10 mg/m ³ TWA 3 mg/m ³ TWA	-	10 mg/m ³ TWA	-	-	-	-	10 mg/m ³ TWA	20 mg/m ³ STEL 10 mg/m ³ TWA
Crystalline Silica	0.025 mg/m ³ TWA	0.025 mg/m ³ TWA	0.025 mg/m ³ TWA	0.1 mg/m ³ TWA	0.025 mg/m ³ TWA	0.025 mg/m ³ TWA	0.10 mg/m ³ TWA	0.025 mg/m ³ TWA	0.1 mg/m ³ TWA	0.05 mg/m ³ TWA
Zirconium	10 mg/m ³ STEL 5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA 5 mg/m ³ TWA	5 mg/m ³ TWA 10 mg/m ³ STEL	10 mg/m ³ STEL 5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA 5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA 5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA 5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA 5 mg/m ³ TWA	10 mg/m ³ STEL 5 mg/m ³ TWA 5 mg/m ³ TWA
Calcium Carbonate	10 mg/m ³ TWA	20 mg/m ³ STEL 10 mg/m ³ TWA 3 mg/m ³ TWA	-	10 mg/m ³ TWA	-	-	-	-	10 mg/m ³ TWA	20 mg/m ³ STEL 10 mg/m ³ TWA
Tungsten	10 mg/m ³ STEL	10 mg/m ³ STEL	3 mg/m ³ TWA	10 mg/m ³ STEL	3 mg/m ³ TWA 3	3 mg/m ³ TWA	10 mg/m ³ STEL	3 mg/m ³ TWA 3	10 mg/m ³ STEL	10 mg/m ³ STEL

Chemical name	Alberta OEL	British Columbia OEL	Manitoba OEL	New Brunswick - OEL	Newfoundl and & Labrador - OEL	Nova Scotia - OEL	Ontario OEL	Prince Edward Island - OEL	Quebec OEL	Saskatche wan - OEL
	5 mg/m ³ TWA	5 mg/m ³ TWA 5 mg/m ³ TWA		5 mg/m ³ TWA	mg/m ³ TWA		5 mg/m ³ TWA 5 mg/m ³ TWA	mg/m ³ TWA	5 mg/m ³ TWA EV	5 mg/m ³ TWA 5 mg/m ³ TWA
Sodium Silicate	-	-	-	-	-	-	-	-	-	-
Silica Amorphous	-	4 mg/m ³ TWA 1.5 mg/m ³ TWA	-	2 mg/m ³ TWA	-	-	2 mg/m ³ TWA	-	2 mg/m ³ TWA EV	2 mg/m ³ TWA
Copper	0.2 mg/m ³ TWA 1 mg/m ³ TWA	1 mg/m ³ TWA 0.2 mg/m ³ TWA	0.2 mg/m ³ TWA 1 mg/m ³ TWA	0.2 mg/m ³ TWA 1 mg/m ³ TWA	0.2 mg/m ³ TWA 1 mg/m ³ TWA	0.2 mg/m ³ TWA 1 mg/m ³ TWA	0.2 mg/m ³ TWA 1 mg/m ³ TWA	0.2 mg/m ³ TWA 1 mg/m ³ TWA	0.2 mg/m ³ TWA EV 1 mg/m ³ TWA EV	0.6 mg/m ³ STEL 3 mg/m ³ STEL 0.2 mg/m ³ TWA 1 mg/m ³ TWA
Cobalt	0.02 mg/m ³ TWA	0.02 mg/m ³ TWA 0.02 mg/m ³ TWA	0.02 mg/m ³ TWA	0.02 mg/m ³ TWA	0.02 mg/m ³ TWA 0.02 mg/m ³ TWA	0.02 mg/m ³ TWA	0.02 mg/m ³ TWA 0.02 mg/m ³ TWA	0.02 mg/m ³ TWA 0.02 mg/m ³ TWA	0.02 mg/m ³ TWA EV 0.02 mg/m ³ TWA EV	0.06 mg/m ³ STEL 0.02 mg/m ³ TWA 0.02 mg/m ³ TWA
Chromium trioxide (CrO ₃)	0.05 mg/m ³ TWA 0.5 mg/m ³ TWA	0.1 mg/m ³ Ceiling 0.025 mg/m ³ TWA	0.0002 mg/m ³ TWA 0.0005 mg/m ³ STEL	0.05 mg/m ³ TWA	0.0005 mg/m ³ STEL 0.0002 mg/m ³ TWA	0.0005 mg/m ³ STEL 0.0002 mg/m ³ TWA	0.05 mg/m ³ TWA	0.0005 mg/m ³ STEL 0.0002 mg/m ³ TWA	0.05 mg/m ³ TWA EV	0.15 mg/m ³ STEL 1.5 mg/m ³ STEL 0.05 mg/m ³ TWA 0.5 mg/m ³ TWA
Boron	-	-	-	-	-	-	-	-	-	-
Aluminum	10 mg/m ³ TWA 5 mg/m ³ TWA	1.0 mg/m ³ TWA	1 mg/m ³ TWA	10 mg/m ³ TWA 5 mg/m ³ TWA	1 mg/m ³ TWA	1 mg/m ³ TWA	1 mg/m ³ TWA	1 mg/m ³ TWA	10 mg/m ³ TWA EV 5 mg/m ³ TWA EV	20 mg/m ³ STEL 10 mg/m ³ STEL 10 mg/m ³ TWA 5 mg/m ³ TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	Solid
Color	Gray
Odor	Not available
Odor threshold	Not applicable
pH	Not applicable
Melting point/range °C	Not available
Melting point/range °F	Not available
Boiling point/range °C	Not available
Boiling point/range °F	Not available
Flash point °C / °F	Not available

Evaporation rate	Not applicable
Flammability (Solid, Gas)	Not available
Lower explosion limit	Not available
Upper explosion limit	Not available
Vapor pressure	Not applicable
Vapor density	Not applicable
Relative density	Not available
Solubility	Not available
Partition coefficient (n-octanol/water)	No data available
Autoignition temperature °C	Not applicable
Autoignition temperature °F	Not applicable
Decomposition temperature °C	Not available
Decomposition temperature °F	Not available
Viscosity	Not available

10. STABILITY AND REACTIVITY

Reactivity	Stable under normal conditions.
Chemical stability	Stable under normal storage conditions.
Possibility of hazardous reactions	Contact with chemical substances like acids or strong bases could cause generation of gas.
Conditions to avoid	Contact with chemical substances like acids or strong bases could cause generation of gas.
Incompatible materials	Incompatible with acids.
Hazardous decomposition products	When this product is used in a welding process, hazardous decomposition products would include those from volatilization, reaction or oxidation of the materials listed in section 3 and those from the base metal and coating. The amount of fumes generated from this product varies with welding parameters and dimensions. Refer to applicable national exposure limits for the fume compounds. Fume limit for chromium, nickel, and or manganese may be reached before limit of 5 mg/m ³ of general welding fumes is reached. Air contaminants around the welding area can be affected by the welding process and influence the composition and quality of fumes and gases produced.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	Dermal. Inhalation. Ingestion.
Symptoms	Inhalation of welding fumes and gases can be dangerous to your health. Welding fumes cannot be classified simply. Their composition and quantity are dependent upon the metal being welded, the process, procedures and electrodes being used. The International

Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (group 2B). Overexposure to brazing and soldering fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. May cause sensitization by skin contact.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Overexposure to brazing and soldering fumes may affect pulmonary function. May cause an allergic skin reaction or rash if in contact with skin. Causes skin, eye, and respiratory irritation. Inhalation of vapors and fumes from thermal decomposition may cause respiratory irritation and metal fume fever with symptoms of fever and chills. Excessive exposure will aggravate pre-existing skin disorders, respiratory, liver, kidney, cardiovascular or pulmonary illnesses. Individuals with a pre-existing disease in, or a history of ailments involving the skin or respiratory tract, are a greater risk of developing adverse health effects when exposed to this material. Warn wearers of heart pacemakers or other medical electronic equipment vital to life that welding operations may impede the function of the medical device. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Long term overexposure to nickel compounds may cause lung fibrosis, edema or pneumoconiosis. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defect and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has led to hemolytic anemia and accelerates arteriosclerosis, damage to the lungs, vomiting, diarrhea, abdominal pain and blood disorders. Long term overexposure to hexavalent chromium (CrVI) is reported to cause lung cancer in humans.

Numerical measures of toxicity

Chemical name	Inhalation LC50:	Dermal LD50:	Oral LD50:
Iron	-	-	= 30 g/kg (Rat)
Chromium	-	-	-
Manganese	-	-	= 9 g/kg (Rat)
Vanadium	-	-	> 2000 mg/kg (Rat)
Titanium dioxide	-	-	> 10000 mg/kg (Rat)
Titanium	-	-	-
Niobium	-	-	-
Nickel	-	-	> 9000 mg/kg (Rat)
Molybdenum	-	-	-
Calcium Fluoride	-	-	= 4250 mg/kg (Rat)
Silicon	-	-	= 3160 mg/kg (Rat)
Crystalline Silica	-	-	-
Zirconium	-	-	-
Calcium Carbonate	-	-	-
Tungsten	-	-	-
Sodium Silicate	-	> 4640 mg/kg (Rabbit)	= 1960 mg/kg (Rat)
Silica Amorphous	-	-	-
Copper	-	-	-
Cobalt	> 10 mg/L (Rat) 1 h	-	= 6171 mg/kg (Rat)
Chromium trioxide (CrO3)	= 0.217 mg/L (Rat) 4 h	= 57 mg/kg (Rabbit)	= 80 mg/kg (Rat)
Boron	-	-	= 650 mg/kg (Rat)
Aluminum	-	-	-

ATEmix (dermal) Not available

ATEmix (oral) Not available

ATEmix (inhalation-gas) Not available

ATEmix (inhalation-vapor) Not available

ATEmix (inhalation-dust/mist) Not available

Carcinogenicity

Chemical name	ACGIH OEL - Carcinogens	IARC	OSHA RTK Carcinogens	NTP
Iron	-	-	-	-
Chromium	A4	Group 3	-	-
Manganese	A4	-	-	-
Vanadium	-	-	-	-
Titanium dioxide	A4	Group 2B	Listed	-
Titanium	-	-	-	-
Niobium	-	-	-	-
Nickel	-	Group 1 Group 2B	Listed	Known Reasonably Anticipated
Molybdenum	-	-	-	-
Calcium Fluoride	A4	Group 3	-	-
Silicon	-	-	-	-
Crystalline Silica	A2	Group 1	Listed	Known
Zirconium	A4	-	-	-
Calcium Carbonate	-	-	-	-
Tungsten	-	-	-	-
Sodium Silicate	-	-	-	-
Silica Amorphous	-	-	-	-
Copper	-	-	-	-
Cobalt	A3	Group 2B	Listed	Reasonably Anticipated
Chromium trioxide (CrO3)	A1	Group 1	Listed	Known
Boron	-	-	-	-
Aluminum	A4	-	-	-

Canadian Province carcinogenicity limits

Chemical name	Alberta - Carcinogen	British Columbia - Carcinogen	Manitoba - Carcinogen	New Brunswick - Carcinogen	Nova Scotia - Carcinogen	Quebec - Carcinogen
Iron	-	-	-	-	-	-
Chromium	-	-	ACGIH A4	ACGIH A4	ACGIH A4	-
Manganese	-	-	ACGIH A4	-	ACGIH A4	-
Vanadium	-	-	-	-	-	-
Titanium dioxide	-	IARC 2B	ACGIH A4	ACGIH A4	ACGIH A4	-
Titanium	-	-	-	-	-	-
Niobium	-	-	-	-	-	-
Nickel	-	IARC 2B	ACGIH A5	-	ACGIH A5	-
Molybdenum	-	-	-	-	-	-
Calcium Fluoride	-	-	ACGIH A4	ACGIH A4	ACGIH A4	-
Silicon	-	-	-	-	-	-
Crystalline Silica	A2 - Suspected Human Carcinogen	ACGIH A2 IARC 1	ACGIH A2	-	ACGIH A2	C2 carcinogen
Zirconium	-	-	ACGIH A4	ACGIH A4	ACGIH A4	-
Calcium Carbonate	-	-	-	-	-	-

Chemical name	Alberta - Carcinogen	British Columbia - Carcinogen	Manitoba - Carcinogen	New Brunswick - Carcinogen	Nova Scotia - Carcinogen	Quebec - Carcinogen
Tungsten	-	-	-	-	-	-
Sodium Silicate	-	-	-	-	-	-
Silica Amorphous	-	-	-	-	-	-
Copper	-	-	-	-	-	-
Cobalt	-	IARC 2B	ACGIH A3	ACGIH A3	ACGIH A3	C3 carcinogen
Chromium trioxide (CrO3)	A1 - Confirmed Human Carcinogen	ACGIH A1 IARC 1 IARC 1	ACGIH A1	ACGIH A1	ACGIH A1	C1 carcinogen
Boron	-	-	-	-	-	-
Aluminum	-	-	ACGIH A4	-	ACGIH A4	-

12. ECOLOGICAL INFORMATION

Ecotoxicity

Chemical name	Algae/aquatic plants	Fish
Iron	-	13.6: 96 h <i>Morone saxatilis</i> mg/L LC50 static
Chromium	-	-
Manganese	-	-
Vanadium	-	-
Titanium dioxide	-	-
Titanium	-	-
Niobium	-	-
Nickel	0.18: 72 h <i>Pseudokirchneriella subcapitata</i> mg/L EC50 0.174 - 0.311: 96 h <i>Pseudokirchneriella</i> <i>subcapitata</i> mg/L EC50 static	1.3: 96 h <i>Cyprinus carpio</i> mg/L LC50 semi-static 100: 96 h <i>Brachydanio rerio</i> mg/L LC50 10.4: 96 h <i>Cyprinus carpio</i> mg/L LC50 static
Molybdenum	-	-
Calcium Fluoride	-	-
Silicon	-	-
Crystalline Silica	-	-
Zirconium	-	-
Calcium Carbonate	-	-
Tungsten	-	-
Sodium Silicate	-	301 - 478: 96 h <i>Lepomis macrochirus</i> mg/L LC50 3185: 96 h <i>Brachydanio rerio</i> mg/L LC50 semi-static
Silica Amorphous	-	-
Copper	0.0426 - 0.0535: 72 h <i>Pseudokirchneriella</i> <i>subcapitata</i> mg/L EC50 static 0.031 - 0.054: 96 h <i>Pseudokirchneriella subcapitata</i> mg/L EC50 static	0.0068 - 0.0156: 96 h <i>Pimephales promelas</i> mg/L LC50 0.2: 96 h <i>Pimephales promelas</i> mg/L LC50 flow-through 0.3: 96 h <i>Pimephales promelas</i> mg/L LC50 static 1.25: 96 h <i>Lepomis macrochirus</i> mg/L LC50 static 0.052: 96 h <i>Oncorhynchus mykiss</i> mg/L LC50 flow-through 0.112: 96 h <i>Poecilia reticulata</i> mg/L LC50 flow-through 0.8: 96 h <i>Cyprinus carpio</i> mg/L LC50 static 0.3: 96 h <i>Cyprinus carpio</i> mg/L LC50 semi-static
Cobalt	-	100: 96 h <i>Brachydanio rerio</i> mg/L LC50 static
Chromium trioxide (CrO3)	-	40: 96 h <i>Colisa fasciatus</i> mg/L LC50 static
Boron	-	-
Aluminum	-	-

Persistence and degradability The welding rods consist of elements that cannot degrade any further in the environment.

Bioaccumulation

Chemical name	CAS-No	Partition coefficient (log Kow)
Iron 7439-89-6	7439-89-6	-
Chromium 7440-47-3	7440-47-3	-
Manganese 7439-96-5	7439-96-5	-
Vanadium 7440-62-2	7440-62-2	-
Titanium dioxide 13463-67-7	13463-67-7	-
Titanium 7440-32-6	7440-32-6	-
Niobium 7440-03-1	7440-03-1	-
Nickel 7440-02-0	7440-02-0	-
Molybdenum 7439-98-7	7439-98-7	-
Calcium Fluoride 7789-75-5	7789-75-5	-
Silicon 7440-21-3	7440-21-3	-
Crystalline Silica 14808-60-7	14808-60-7	-
Zirconium 7440-67-7	7440-67-7	-
Calcium Carbonate 1317-65-3	1317-65-3	-
Tungsten 7440-33-7	7440-33-7	-
Sodium Silicate 1344-09-8	1344-09-8	-
Silica Amorphous 69012-64-2	69012-64-2	-
Copper 7440-50-8	7440-50-8	-
Cobalt 7440-48-4	7440-48-4	-
Chromium trioxide (CrO3) 1333-82-0	1333-82-0	-
Boron 7440-42-8	7440-42-8	-
Aluminum 7429-90-5	7429-90-5	-

Mobility in soil

Welding rods are not soluble in water or soil. Particles formed by working welding rods can be transported in the air.

Other adverse effects

Welding consumables and materials can degrade into the components used to manufacture the product. Avoid exposure to conditions that could lead to accumulation in soils and groundwater. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

13. DISPOSAL CONSIDERATIONS

Disposal information	Collect, transport, store or dispose in accordance with local, state, provincial and federal regulations. Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste.
Contaminated packaging	Dispose in accordance with local, state and federal regulations.

14. TRANSPORTATION INFORMATION

Shipping Descriptions

DOT	
Proper shipping name	Not regulated
TDG	
Proper shipping name	Not regulated
IATA	
Proper shipping name	Not regulated
IMDG/IMO	
Proper shipping name	Not regulated

Marine Pollutants

Chemical name	CAS-No	USDOT Marine Pollutant	Canada TDG Marine Pollutant	IMDG Marine Pollutant
Iron	7439-89-6	-	-	-
Chromium	7440-47-3	-	-	-
Manganese	7439-96-5	-	-	-
Vanadium	7440-62-2	-	-	-
Titanium dioxide	13463-67-7	-	-	-
Titanium	7440-32-6	-	-	-
Niobium	7440-03-1	-	-	-
Nickel	7440-02-0	-	-	-
Molybdenum	7439-98-7	-	-	-
Calcium Fluoride	7789-75-5	-	-	-
Silicon	7440-21-3	-	-	-
Crystalline Silica	14808-60-7	-	-	-
Zirconium	7440-67-7	-	-	-
Calcium Carbonate	1317-65-3	-	-	-
Tungsten	7440-33-7	-	-	-
Sodium Silicate	1344-09-8	-	-	-
Silica Amorphous	69012-64-2	-	-	-
Copper	7440-50-8	X	-	X
Cobalt	7440-48-4	-	-	-
Chromium trioxide (CrO3)	1333-82-0	-	-	-
Boron	7440-42-8	-	-	-
Aluminum	7429-90-5	-	-	-

Special Precautions	Multi-modal shipping descriptions are provided for informational purposes and do not consider container size. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering
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the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.

15. REGULATORY INFORMATION

State regulations

U.S. state Right-to-Know regulations

Chemical name	CAS-No	Massachusetts - RTK	New Jersey - RTK	Pennsylvania - RTK
Iron	7439-89-6	-	-	-
Chromium	7440-47-3	X	X	X
Manganese	7439-96-5	X	X	X
Vanadium	7440-62-2	X	X	X
Titanium dioxide	13463-67-7	X	X	X
Titanium	7440-32-6	-	X	-
Niobium	7440-03-1	-	-	-
Nickel	7440-02-0	X	X	X
Molybdenum	7439-98-7	X	X	X
Calcium Fluoride	7789-75-5	-	X	-
Silicon	7440-21-3	X	X	X
Crystalline Silica	14808-60-7	X	X	X
Zirconium	7440-67-7	X	X	X
Calcium Carbonate	1317-65-3	X	X	X
Tungsten	7440-33-7	X	X	X
Sodium Silicate	1344-09-8	-	-	-
Silica Amorphous	69012-64-2	X	X	-
Copper	7440-50-8	X	X	X
Cobalt	7440-48-4	X	X	X
Chromium trioxide (CrO3)	1333-82-0	X	X	X
Boron	7440-42-8	-	X	-
Aluminum	7429-90-5	X	X	X

California Prop. 65

WARNING: This product contains a chemical(s) known to the state of California to cause cancer, birth defects or other reproductive harm

Chemical name	CAS-No	California Prop. 65
Iron	7439-89-6	-
Chromium	7440-47-3	-
Manganese	7439-96-5	-
Vanadium	7440-62-2	-
Titanium dioxide	13463-67-7	Carcinogen
Titanium	7440-32-6	-
Niobium	7440-03-1	-
Nickel	7440-02-0	Carcinogen
Molybdenum	7439-98-7	-
Calcium Fluoride	7789-75-5	-
Silicon	7440-21-3	-
Crystalline Silica	14808-60-7	Carcinogen
Zirconium	7440-67-7	-
Calcium Carbonate	1317-65-3	-
Tungsten	7440-33-7	-
Sodium Silicate	1344-09-8	-

Chemical name	CAS-No	California Prop. 65
Silica Amorphous	69012-64-2	-
Copper	7440-50-8	-
Cobalt	7440-48-4	Carcinogen
Chromium trioxide (CrO3)	1333-82-0	Carcinogen Developmental Female Reproductive Male Reproductive
Boron	7440-42-8	-
Aluminum	7429-90-5	-

U.S. Federal Regulations

US EPA SARA 313

Chemical name	CAS-No	CERCLA/SARA Hazardous Substances RQ	SARA 313 - Threshold Values
Iron	7439-89-6	-	-
Chromium	7440-47-3	5000 lb 2270 kg 10 lb 4.54 kg	1.0 %
Manganese	7439-96-5	-	1.0 %
Vanadium	7440-62-2	-	1.0 %
Titanium dioxide	13463-67-7	-	-
Titanium	7440-32-6	-	-
Niobium	7440-03-1	-	-
Nickel	7440-02-0	100 lb 45.4 kg	0.1 %
Molybdenum	7439-98-7	-	-
Calcium Fluoride	7789-75-5	-	-
Silicon	7440-21-3	-	-
Crystalline Silica	14808-60-7	-	-
Zirconium	7440-67-7	-	-
Calcium Carbonate	1317-65-3	-	-
Tungsten	7440-33-7	-	-
Sodium Silicate	1344-09-8	-	-
Silica Amorphous	69012-64-2	-	-
Copper	7440-50-8	5000 lb 2270 kg	1.0 %
Cobalt	7440-48-4	-	0.1 %
Chromium trioxide (CrO3)	1333-82-0	-	0.1 %
Boron	7440-42-8	-	-
Aluminum	7429-90-5	-	1.0 %

US EPA SARA 311/312 hazardous categorization

Acute Health Hazard
Chronic Health Hazard

International inventories

All components of this product are listed on the following inventories: U.S.A. (TSCA 8(b)), Canada (DSL/NDSL) or are exempt.

Chemical name	DSL/NDSL	Inventory - United States - Section 8(b) Inventory (TSCA)	U.S. - TSCA (Toxic Substances Control Act) - Section 12(b) - Export Notification
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Chemical name	DSL/NDSL	Inventory - United States - Section 8(b) Inventory (TSCA)	U.S. - TSCA (Toxic Substances Control Act) - Section 12(b) - Export Notification
Iron	X	X	-
Chromium	X	X	-
Manganese	X	X	-
Vanadium	X	X	-
Titanium dioxide	X	X	-
Titanium	X	X	-
Niobium	X	X	-
Nickel	X	X	-
Molybdenum	X	X	-
Calcium Fluoride	X	X	-
Silicon	X	X	-
Crystalline Silica	X	X	-
Zirconium	X	X	-
Calcium Carbonate	X	X	-
Tungsten	X	X	-
Sodium Silicate	X	X	-
Silica Amorphous	X	X	-
Copper	X	X	-
Cobalt	X	X	-
Chromium trioxide (CrO3)	X	X	X
Boron	X	X	-
Aluminum	X	X	-

Legend X - Listed

16. OTHER INFORMATION

NFPA

Health	2
Flammability	0
Instability	0

HMIS

Health	2
Flammability	0
Physical hazards	0

Notice: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA).

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Revision note

Key to abbreviations

ACGIH (American Conference of Governmental Industrial Hygienists)

ATE (Average Toxicity Estimate)
DSL/NDL (Domestic Substance List/Non-Domestic Substance List)
HMIS (Hazardous Materials Identification System)
IARC (International Agency for Research on Cancer)
IATA (International Air Transport Association)
IMDG/IMO (International Maritime Dangerous Goods/International Maritime Organization)
NFPA (National Fire Protection Association)
NTP (National Toxicology Program)
OEL (Occupational Exposure Level)
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
PEL (Permissible Exposure Limit)
TSCA (Toxic Substance Control Act)
USEPA (United States Environmental Protection Agency)

Disclaimer

The information accumulated herein is believed to be accurate, but is not warranted to be, whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

End of Safety Data Sheet