SAFETY DATA SHEET

1. Identification

Product identifier	**Flux Cored Arc Welding Electrodes for Carbon Steel**
Other means of identification	None.
Recommended use	Welding Electrodes. There are 4 groups of products covered under this SDS. Group 1: Select 707, Select 710, Select 717, Select 720, Select 720C Low Mn, Select 720 Mil, Select 720A, Select 720C, Select 720i, Select 730C, Select 70CBC, Select 70TR, Select 71, Select 71A, Select 97, Select Super Slag 70, Select 75, Encore, Select 7000-SR, Select 7000-SRC, Select 721, Select 721 Mil, Select 727, Select 737Ni, Select 70, Select 70TS, Select 71CBC, Select 71T-HYD, Select 71T-HYN, Select 72, Select 720 Low Mn. Group 2: Select 720HP, Select 730. Group 3: Select 70CRP, Select 70NSP. Group 4: Select Super 72B.
Recommended restrictions	Workers (and your customers or users in the case of resale) should be informed of the potential presence of respirable dust and respirable crystalline silica as well as their potential hazards. Appropriate training in the proper use and handling of this material should be provided as required under applicable regulations.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier

Company name	Select-Arc, Inc.
Address	600 Enterprise Drive Fort Loramie, OH 45845 United States
Telephone	(800) 341-5215
Fax	1-888-511-5217
Contact person	Technical Assistance
E-mail	CSR1@select-arc.com

Supplier

Company name	
Address	
Telephone	

Emergency phone number	3E Company Emergency Response Hotline Company Code: 334276 Within USA and Canada and Mexico 1-866-519-4752 Europe: 1-760-476-3962 Asia Pacific: 1-760-476-3960 Middle East/Africa: 1-760-476-3959

2. Hazard identification

Physical hazards	Not classified.
Health hazards	Not classified.
Label elements	
Hazard symbol	None.
Signal word	None.
Hazard statement	None.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.

Response	Wash skin with soap and water.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.

Supplemental information

The composition and quantity of welding fumes and gases are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation, plus those from the base metal and coating, etc., of the materials shown in the composition (section 3) of this Safety Data Sheet.

Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, calcium oxide, chromium, fluorspar or fluorides, manganese, nickel, silica and other metal traces. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium, and silicon. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Other hazards

This product presents no hazards in its intrinsic form. However, several hazards are generated during welding operations that can be harmful.

WARNING! - Avoid breathing welding fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment. ARC RAYS: The welding arc can injure eyes and burn skin. HEAT: Molten metal and weld spatter can burn skin and start fires. ELECTRIC SHOCK: Arc welding and associated processes can kill. FUMES AND GASES: Can be dangerous to your health.

Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Overexposure to welding fumes and gases can be hazardous. Workers allergic to nickel may develop eczema or rashes.

Read and understand the manufacturer's instructions, Safety Data Sheets and the precautionary labels before using this product. Refer to Section 8.

Substance(s) formed under the conditions of use

The intended use of this product does not include grinding.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Titanium dioxide		13463-67-7	1-10%
Manganese		7439-96-5	0.5-7%
Calcium fluoride		7789-75-5	0-7%
Quartz		14808-60-7	0.1-5%
Feldspar Potassium		68476-25-5	0-5%
Nickel		7440-02-0	0.01-1%
Lithium carbonate		554-13-2	0-1%
Chromium (III) Oxide		1308-38-9	<0.1%
Other components below reportable levels			71 - < 79

Composition comments

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

This SDS covers 4 Select product groups (See section 1).

Group 1:

Manganese	CAS #7439-96-5	1-5%
Nickel	CAS #7440-02-0	0.1-1%
Titanium Dioxide	CAS #13463-67-7	3-10%
Quartz (SiO2)	CAS #14808-60-7	0.1-5%
Chromium (III) Oxide	CAS #1308-38-9	<0.1%

Group 2:

Manganese	CAS #7439-96-5	1-5%
Nickel	CAS #7440-02-0	0.1-1%
Titanium Dioxide	CAS #13463-67-7	5-10%
Quartz (SiO2)	CAS #14808-60-7	0.1-1.5%
Chromium (III) Oxide	CAS #1308-38-9	<0.1%

Group 3:

Manganese	CAS #7439-96-5	1-5%
Nickel	CAS #7440-02-0	0.1-1%
Titanium Dioxide	CAS #13463-67-7	3-7%
Quartz (SiO2)	CAS #14808-60-7	0.1-1.5%
Lithium Carbonate	CAS #554-13-2	0.1-1%
Chromium (III) Oxide	CAS #1308-38-9	<0.1%

Group 4:

Manganese	CAS #7439-96-5	3-7%
Nickel	CAS #7440-02-0	0.1-1%
Titanium Dioxide	CAS #13463-67-7	1-5%
Quartz (SiO2)	CAS #14808-60-7	0.1-5%
Chromium (III) Oxide	CAS #1308-38-9	<0.1%

4. First-aid measures

Inhalation

Move to fresh air if breathing is difficult cause by inhalation of dust or fume from this product. If breathing has stopped, perform artificial respiration and obtain medical assistance at once.

Skin contact

Remove contaminated clothing and wash the skin thoroughly with soap and water. For reddened or blistered skin, or thermal burns, obtain medical assistance at once.

Eye contact

Dust or fume from this product should be flushed from the eyes with copious amounts of clean, tepid water until transported to an emergency medical facility. Do not allow victim to rub or keep eyes tightly closed. Obtain medical assistance at once. Arc rays can injure eyes. If exposed to arc rays, move victim to dark room, remove contact lenses as necessary for treatment, cover eyes with a padded dressing and rest. Obtain medical assistance if symptoms persist.

Ingestion

Unlikely due to form of product, except for granular materials. Avoid hand, clothing, food, and drink contact with metal fume or powder which can cause ingestion of particulate during hand to mouth activities such as drinking, eating, smoking, etc. If ingested, do not induce vomiting. Contact a poison control center. Unless the poison control center advises otherwise, wash out mouth thoroughly with water. If symptoms develop, seek medical attention at once.

Most important symptoms/effects, acute and delayed

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects. Chronic overexposure to nickel fumes and hexavalent chromium can cause cancer. Some of the products contain silica quartz. Silica quartz is a listed carcinogen. Workers allergic to nickel may develop eczema or rashes.

Indication of immediate medical attention and special treatment needed

Treat symptomatically.

General information

Welding hazards are complex and may include physical and health hazards such as but not limited to electric shock, physical strains, radiation burns (eye flash), thermal burns due to hot metal or spatter and potential health effects of overexposure to welding fume or dust. Refer to Section 11 for more information.

In case of electrical shock turn off power and follow recommended treatment. In all cases call a physician.

Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Special powder against metal fires. Dry sand. As shipped, the product will not burn.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	Welding arc and sparks can ignite combustibles and flammable products.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do it without risk.
General fire hazards	As shipped, this product is nonflammable. However, welding arc and sparks can ignite combustibles and flammable products. Read and understand American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" and National Fire Protection Association NFPA 51B, "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" before using this product. This material has the potential to ignite if subjected to high enough temperatures or create an airborne dust combustion (deflagration) hazard if sufficient concentrations become airborne in an environment with high enough energy sources to cause ignition. For additional information refer to Section 16 of this M(SDS). Handle according to applicable company safety instructions and procedures.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Metallic dust or fumes may be produced during welding: Avoid inhalation of dust and fumes. Avoid contact with skin and eyes. If airborne dust and/or fume is present, use adequate engineering controls and, if needed, personal protection to prevent overexposure. Refer to recommendations in Section 8. Isolate the area and keep non-essential people away. Do not touch or walk through spilled material. Allow the molten metallic material to solidify and cool before disposal. If molten metal spills out of the weldment, turn off the power.
Methods and materials for containment and cleaning up	Stop the flow of material, if this is without risk. Clean up spills immediately, observing precautions in the personal protective equipment in Section 8. Avoid generating dust. Prevent product from entering any drains, sewers or water sources. Refer to Section 13 for proper disposal. Recover and recycle, if practical.
Environmental precautions	Avoid release to the environment.

7. Handling and storage

Precautions for safe handling	Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Read and understand the manufacturer's instruction and the precautionary label on the product. See American National Standard Z49.1, "Safety In Welding, Cutting and Allied Processes" published by the American Welding Society, http://pubs.aws.org and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, www.gpro.gov. Do not breathe fumes and dusts. If dust or fumes are generated during use, use local exhaust in combination with general ventilation as necessary to remove fumes/dust from the workers' breathing zone and to ensure exposures do not exceed applicable limits. Avoid contact with skin and eyes. Wear appropriate personal protective equipment. Keep the workplace clean. Observe good industrial hygiene practices. Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store in a dry place. Use care in handling/storage. Store in accordance with local/regional/national/international regulation. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values (TLV)

Components	Type	Value	Form
Calcium fluoride (CAS 7789-75-5)	TWA	2.5 mg/m3	
Chromium (III) Oxide (CAS 1308-38-9)	TWA	0.003 mg/m3	Inhalable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Quartz (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.
Titanium dioxide (CAS 13463-67-7)	TWA	2.5 mg/m3	Respirable finescale particles
		0.2 mg/m3	Respirable nanoscale particles

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended

Components	Type	Value	Form
Chromium (III) Oxide (CAS 1308-38-9)	TWA	0.5 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	
Quartz (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable particles.
Silicon (CAS 7440-21-3)	TWA	3 mg/m3	Respirable particles.
		10 mg/m3	Total
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Calcium fluoride (CAS 7789-75-5)	TWA	2.5 mg/m3	
Chromium (III) Oxide (CAS 1308-38-9)	TWA	0.5 mg/m3	Total
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	Total
		0.02 mg/m3	Respirable.
Nickel (CAS 7440-02-0)	TWA	0.05 mg/m3	
Quartz (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.
Silicon (CAS 7440-21-3)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
Titanium dioxide (CAS 13463-67-7)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended

Components	Type	Value	Form
Calcium fluoride (CAS 7789-75-5)	TWA	2.5 mg/m3	
Chromium (III) Oxide (CAS 1308-38-9)	TWA	0.003 mg/m3	Inhalable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act), as amended

Components	Type	Value	Form
		0.02 mg/m3	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Quartz (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.
Titanium dioxide (CAS 13463-67-7)	TWA	2.5 mg/m3	Respirable finescale particles
		0.2 mg/m3	Respirable nanoscale particles

Canada. New Brunswick OELs: Threshold Limit Values (TLVs) Based on the 1991 and 1997 ACGIH TLVs and BEIs Publication (New Brunswick Regulation 91-191)

Components	Type	Value	Form
Calcium fluoride (CAS 7789-75-5)	TWA	2.5 mg/m3	
Chromium (III) Oxide (CAS 1308-38-9)	TWA	0.5 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Quartz (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended

Components	Type	Value	Form
Calcium fluoride (CAS 7789-75-5)	TWA	2.5 mg/m3	
Chromium (III) Oxide (CAS 1308-38-9)	TWA	0.5 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
		0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1 mg/m3	Inhalable fraction.
Quartz (CAS 14808-60-7)	TWA	0.1 mg/m3	Respirable fraction.
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	

Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety)

Components	Type	Value	Form
Calcium fluoride (CAS 7789-75-5)	TWA	2.5 mg/m3	
Chromium (III) Oxide (CAS 1308-38-9)	TWA	0.5 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	Fume, total dust.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable dust.
Quartz (CAS 14808-60-7)	TWA	0.05 mg/m3	Respirable dust.
Silicon (CAS 7440-21-3)	TWA	10 mg/m3	Total dust.
Titanium dioxide (CAS 13463-67-7)	TWA	10 mg/m3	Total dust.

Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended

Components	Type	Value	Form
Calcium fluoride (CAS 7789-75-5)	15 minute	5 mg/m3	

Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21), as amended

Components	Type	Value	Form
	8 hour	2.5 mg/m3	
Chromium (III) Oxide (CAS 1308-38-9)	15 minute	1.5 mg/m3	
	8 hour	0.5 mg/m3	
Manganese (CAS 7439-96-5)	15 minute	0.6 mg/m3	
	8 hour	0.2 mg/m3	
Nickel (CAS 7440-02-0)	15 minute	3 mg/m3	Inhalable fraction.
	8 hour	1.5 mg/m3	Inhalable fraction.
Quartz (CAS 14808-60-7)	8 hour	0.05 mg/m3	Respirable fraction.
Silicon (CAS 7440-21-3)	15 minute	20 mg/m3	
	8 hour	10 mg/m3	
Titanium dioxide (CAS 13463-67-7)	15 minute	20 mg/m3	
	8 hour	10 mg/m3	

Biological limit values

ACGIH Biological Exposure Indices (BEI)

Components	Value	Determinant	Specimen	Sampling Time
Calcium fluoride (CAS 7789-75-5)	3 mg/l	Fluoride	Urine	*
	2 mg/l	Fluoride	Urine	*
Chromium (III) Oxide (CAS 1308-38-9)	0.7 µg/l	Total chromium	Urine	*
Nickel (CAS 7440-02-0)	5 µg/l	Nickel	Urine	*

* - For sampling details, please see the source document.

Exposure guidelines

Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

Appropriate engineering controls

Local ventilation should be provided. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the OEL (occupational exposure limit), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits.

Provide adequate ventilation and/or local exhaust at the weld station to keep fumes and gases away from the welder. Train welders and welding operators to keep their head out of the fumes. See ANSI Z49.1 “Safety in Welding, Cutting, and Allied Processes” for recommendations of safe work practices.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles). Wear a helmet or face shield with an appropriate filter lens. Use protective screens to shield others in the work area.

Skin protection

Hand protection

Wear hand protection which help to prevent injury from radiation, sparks and electrical shock. At a minimum this includes welder's gloves and may include arm protectors. Suitable gloves can be recommended by the glove supplier.

Other

Wear appropriate chemical resistant clothing. Use of a welding apron is recommended.

Respiratory protection

Use NIOSH approved fume respirator or air supplied respirator when where ventilation is inadequate, welding in confined spaces or where required to by OSHA regulations. Fume sampling per AWS F1.1 “Method for Sampling Airborne Particulates Generated by Welding and Allied Processes” may be required. Other appropriate standards that may be considered include, but are not limited to, AWS F1.2 “Laboratory Method for Measuring Fume Generation Rate and Total Fume Emission of Welding and Allied Processes” and AWS F3.2 “Ventilation Guide for Weld Fume”. For actual weld fume and particulate analysis, refer to the appropriate analytical methods recommended by NIOSH or OSHA, and consult an industrial hygiene professional.

Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Observe any medical surveillance requirements. When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Physical state	Solid.
Form	Cored Wire.
Colour	Various colours.
Odour	Odourless.
Odour threshold	Not applicable.
Melting point/freezing point	> 1093.33 °C (> 2000 °F)
Boiling point or initial boiling point and boiling range	Not applicable.
Flammability	Not flammable.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit – upper (%)	Not available.
Flash point	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
pH	Not applicable.
Kinematic viscosity	Not applicable.
Solubility	
Solubility (water)	Insoluble in water.
Partition coefficient (n-octanol/water) (log value)	Not applicable.
Vapour pressure	Not applicable.
Density and/or relative density	Not available.
Vapour density	Not applicable.
Particle characteristics	Not available.
Other information	
Evaporation rate	Not applicable.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.
Viscosity	Not applicable.

10. Stability and reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	None expected under normal conditions of use.
Conditions to avoid	Avoid heat. Contamination. Moisture.
Incompatible materials	Strong acids. Strong oxidising substances. Strong bases.

Hazardous decomposition products

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.
Other conditions which also influence the composition and quantity of the 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 and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).
When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 3, plus those from the base metal and coating, etc., as noted above. Reasonably expected fume constituents produced during arc welding include the oxides of iron, manganese and other metals present in the welding consumable or base metal. Hexavalent chromium compounds may be in the welding fume of consumables or base metals which contain chromium. Gaseous and particulate fluoride may be in the welding fume of consumables which contain fluoride.
Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

11. Toxicological information

Information on likely routes of exposure

Inhalation

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects.

Skin contact

Arc rays can burn skin. Skin cancer has been reported.

Eye contact

Arc rays can injure eyes.

Ingestion

Health injuries are not known or expected under normal use.

Symptoms related to the physical, chemical and toxicological characteristics

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects. Chronic overexposure to nickel fumes and hexavalent chromium can cause cancer. Some of the products contain silica quartz. Silica quartz is a listed carcinogen. Workers allergic to nickel may develop eczema or rashes.

Information on toxicological effects

Acute toxicity

Fumes and gases can be dangerous to your health.

Organic polymers may be used in the manufacture of various welding consumables. Overexposure to their decomposition byproducts may result in a condition known as polymer fume fever. Polymer fume fever usually occurs within 4 to 8 hours of exposure with the presentation of flu like symptoms, including mild pulmonary irritation with or without an increase in body temperature. Signs of exposure can include an increase in white blood cell count. Resolution of symptoms typically occurs quickly, usually not lasting longer than 48 hours.

Overexposure to manganese fumes may affect the brain and central nervous system, resulting in poor coordination, difficulty speaking, and arm or leg tremor. This condition can be irreversible.

Chromates may cause ulceration, perforation of the nasal septum, and severe irritation of the bronchial tubes and lungs. Liver damage and allergic reactions, including skin rash, have been reported. Asthma has been reported in some sensitized individuals. Skin contact may result in irritation, ulceration, sensitization, and contact dermatitis. Chromates contain the hexavalent form of chromium. Hexavalent chromium and its compounds are on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans.

Components	Species	Test Results
Calcium fluoride (CAS 7789-75-5)		
Acute		
Inhalation		
Dust		
LC50	Rat	> 5070 mg/m3, 4 Hours

Components	Species	Test Results
Oral		
LD0	Rat	> 2000 mg/kg
Lithium carbonate (CAS 554-13-2)		
Acute		
Inhalation		
LC50	Rat	> 2.17 mg/l, 4 Hours
Oral		
LD50	Rat	525 mg/kg
Manganese (CAS 7439-96-5)		
Acute		
Oral		
LD50	Rat	9000 mg/kg
Nickel (CAS 7440-02-0)		
Acute		
Inhalation		
NOAEC	Rat	10200 mg/l, 1 hours
Oral		
LD50	Rat	> 9000 mg/kg
Quartz (CAS 14808-60-7)		
Chronic		
Inhalation		
LOEC	Human	0.0563 mg/m3
Silicon (CAS 7440-21-3)		
Acute		
Oral		
LD50	Rat	3160 mg/kg
Titanium dioxide (CAS 13463-67-7)		
Acute		
Oral		
LD50	Rat	> 5000 mg/kg

Skin corrosion/irritation Not classified.

Serious eye damage/eye irritation Not classified.

Respiratory or skin sensitisation

Canada - Alberta OELs: Irritant

Chromium (III) Oxide (CAS 1308-38-9)	Irritant
Silicon (CAS 7440-21-3)	Irritant
Titanium dioxide (CAS 13463-67-7)	Irritant

Respiratory sensitisation Not classified.

Skin sensitisation Not classified.

Germ cell mutagenicity Not classified.

Carcinogenicity Arc rays: Skin cancer has been reported. Prolonged exposure to welding fume may cause lung damage and various types of cancer, including lung, larynx and urinary tract.

ACGIH Carcinogens

Calcium fluoride (CAS 7789-75-5)	A4 Not classifiable as a human carcinogen.
Chromium (III) Oxide (CAS 1308-38-9)	A4 Not classifiable as a human carcinogen.
Manganese (CAS 7439-96-5)	A4 Not classifiable as a human carcinogen.
Nickel (CAS 7440-02-0)	A5 Not suspected as a human carcinogen.
Quartz (CAS 14808-60-7)	A2 Suspected human carcinogen.
Titanium dioxide (CAS 13463-67-7)	A3 Confirmed animal carcinogen with unknown relevance to humans.

Canada - Alberta OELs: Carcinogen category

Nickel (CAS 7440-02-0)	Confirmed human carcinogen.
Quartz (CAS 14808-60-7)	Suspected human carcinogen.

Canada - Manitoba OELs: carcinogenicity

Calcium fluoride (CAS 7789-75-5)	Not classifiable as a human carcinogen.
Chromium (III) Oxide (CAS 1308-38-9)	Not classifiable as a human carcinogen.
Manganese (CAS 7439-96-5)	Not classifiable as a human carcinogen.
Nickel (CAS 7440-02-0)	Not suspected as a human carcinogen.
Quartz (CAS 14808-60-7)	Suspected human carcinogen.
Titanium dioxide (CAS 13463-67-7)	Confirmed animal carcinogen with unknown relevance to humans.

Canada - Quebec OELs: Carcinogen category

Quartz (CAS 14808-60-7)	Suspected carcinogenic effect in humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Calcium fluoride (CAS 7789-75-5)	3 Not classifiable as to carcinogenicity to humans.
Chromium (III) Oxide (CAS 1308-38-9)	3 Not classifiable as to carcinogenicity to humans.
Nickel (CAS 7440-02-0)	2B Possibly carcinogenic to humans.
Quartz (CAS 14808-60-7)	1 Carcinogenic to humans.
Titanium dioxide (CAS 13463-67-7)	2B Possibly carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Nickel (CAS 7440-02-0)	Reasonably Anticipated to be a Human Carcinogen.
Quartz (CAS 14808-60-7)	Known To Be Human Carcinogen.

Reproductive toxicity Not classified.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Due to the physical form of the product it is not an aspiration hazard.

Chronic effects Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects. Chromates may cause ulceration, perforation of the nasal septum, and severe irritation of the bronchial tubes and lungs. Liver damage and allergic reactions, including skin rash, have been reported. Asthma has been reported in some sensitized individuals. Skin contact may result in irritation, ulceration, sensitization, and contact dermatitis. Chromates contain the hexavalent form of chromium. Hexavalent chromium and its compounds are on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans. Crystalline silica has been classified by IARC, NTP and ACGIH as a known human carcinogen and suspected human carcinogen respectively. Workers allergic to nickel may develop eczema or rashes.

Further information Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Arc rays can injure eyes. Arc rays can burn skin.

12. Ecological information

Ecotoxicity Not expected to be harmful to aquatic organisms.

Components		Species	Test Results
Lithium carbonate (CAS 554-13-2)			
Aquatic			
Acute			
Fish	LC50	Mummichog (Fundulus heteroclitus)	8.1 mg/l, 96 hours
Nickel (CAS 7440-02-0)			
Aquatic			
Chronic			
Crustacea	NOEC	Ceriodaphnia dubia	2.8 µg/l
Fish	NOEC	Zebra danio (Danio rerio)	40 µg/l

Components		Species	Test Results
Titanium dioxide (CAS 13463-67-7)			
Aquatic			
Acute			
Crustacea	EC50	Daphnia magna	> 100 mg/l, 48 Hours
Fish	LL50	Oryzias latipes	> 100 mg/l, 96 Hours

Persistence and degradability The product solely consists of inorganic compounds which are not biodegradable.

Bioaccumulative potential No data available.

Mobility in soil Due to form of product, mobility in soil is not expected.

Mobility in general Not considered mobile.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions The generation of waste should be avoided or minimized whenever possible. When practical, recycle in an environmentally acceptable, regulatory compliant manner. Dispose of non-recyclable products in accordance with all applicable Federal, State, Provincial, and Local requirements.

Local disposal regulations Dispose in accordance with all applicable regulations.

Waste from residues / unused products Dispose in accordance with all local, provincial, state and federal regulations.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

TDG

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

Canadian regulations This product has been classified in accordance with the hazard criteria of the HPR and the SDS contains all the information required by the HPR.

Controlled Drugs and Substances Act

Not regulated.

Export Control List (CEPA 1999, Schedule 3)

Not listed.

Greenhouse Gases

Not listed.

Precursor Control Regulations

Not regulated.

International regulations

Stockholm Convention

Not applicable.

Rotterdam Convention

Not applicable.

Kyoto Protocol

Not applicable.

Montreal Protocol

Not applicable.

Basel Convention

Not applicable.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

Issue date 18-August-2023

Revision date 05-June-2025

Version No. 03

Further information

The Maximum Fume Exposure Guideline™ (MFEG)™ is provided to assist with the management of workplace exposures where granular solid welding products or other materials are being utilized. The MFEG™ is an estimate of the level of total welding fume exposure for a given product above which the exposure limit for one of the fume constituents may be exceeded. The exposure limits referenced are the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV®) and the U.S. OSHA Permissible Exposure Limit (PEL) whichever limit is lower. The MFEG™ never exceeds 5.0 mg/m3 which is the maximum recommended exposure limit for total welding fume. The MFEG™ is intended to serve as a general guideline to assist in the management of workplace exposure to welding fume and does not replace the regular measurement and analysis of worker exposure to individual welding fume constituents.

The Maximum Dust Exposure Guideline™ (MDEG)™ is provided to assist with the management of workplace exposures where granular solid welding products or other materials are being utilized. It is derived from relevant compositional data and estimates the lowest level of total airborne dust exposure, for a given product, at which some specific constituent might potentially exceed its individual exposure limit. The specific exposure limits referenced are the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV®) and the U. S. OSHA Permissible Exposure Limit (PEL), which ever value is the lowest. The MDEG™ is never greater than 10.0 mg/m³ as this is the airborne exposure guideline for total particulate (total dust). MDEG™ is intended to serve as a general guideline to assist in the management of workplace exposure and does not replace the regular measurement and analysis of worker exposure to individual airborne dust constituents.

List of abbreviations

CAS: Chemical Abstract Service.
EC50: Effective Concentration, 50%.
GHS: Globally Harmonized System of Classification and Labeling of Chemicals.
IATA: International Air Transport Association.
IBC Code: International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.
IDLH: Immediately Dangerous To Life or Health.
IMDG: International Maritime Dangerous Goods.
LC50: Lethal Concentration, 50%.
LD0: Lethal Concentration, 0%.
LD50: Lethal Dose, 50%.
LL50: Lethal level, 50%.
LOEC: Lowest observable effect concentration.
MARPOL: International Convention for the Prevention of Pollution from Ships.
NOAEC: No observed adverse effect concentration.NOEC: No observed effect concentration.
TDG: Transportation of Dangerous Goods.
TWA: Time Weighted Average.

References	ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices (2011)
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