SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier
Product Name: CARBOFIL CRMO1
Product Size: 1.0 mm (.040")

Other means of identification
SDS number: 200000013701

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: GMAW (Gas Metal Arc Welding)
Uses advised against: Not known. Read this SDS before using this product.

1.3 Details of the supplier of the safety data sheet
Manufacturer/Importer/Supplier/Distributor Information

Company Name:	Lincoln Electric Europe B.V.
Address:	Nieuwe Dukenburgseweg 20 Nijmegen 6534AD The Netherlands
Telephone:	+31 243 522 911
Contact Person:	Safety Data Sheet Questions: www.lincolnelectric.com/sds Arc Welding Safety Information: www.lincolnelectric.com/safety

1.4 Emergency telephone number:

USA/Canada/Mexico	+1 (888) 609-1762
Americas/Europe	+1 (216) 383-8962
Asia Pacific	+1 (216) 383-8966
Middle East/Africa	+1 (216) 383-8969

3E Company Access Code: 333988

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The product has not been classified as hazardous according to the legislation in force.

Classification according to Regulation (EC) No 1272/2008 as amended.

Not classified as hazardous according to applicable GHS hazard classification criteria.

Supplemental label information

EUH210: Safety data sheet available on request.
Safety data sheet available for professional user on request.

2.3 Other hazards

Electrical 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 work piece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Arc rays can injure eyes and burn skin. Welding arc and sparks can ignite combustibles and flammable materials. Overexposure to welding fumes and gases can be hazardous. 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 welding fume produced from this welding electrode may contain the following constituent(s) and/or their complex metallic oxides as well as solid particles or other constituents from the consumables, base metal, or base metal coating not listed below. Fume from this product may contain low levels of copper, typically less than 1% by weight. Overexposure to copper may cause metal fume fever, as well as skin, eye and respiratory tract irritation.

Chemical name	CAS-No.
Carbon dioxide	124-38-9
Carbon monoxide	630-08-0
Nitrogen dioxide	10102-44-0
Ozone	10028-15-6
Manganese	7439-96-5

SECTION 3: Composition/information on ingredients

Reportable Hazardous Ingredients

3.2 Mixtures

Chemical name	Concentration	CAS-No.	EC No.	Classification	Notes	REACH Registration No.
Iron	50 - <100%	7439-89-6	231-096-4	Not classified		01-2119462838-24;
Chromium and chromium alloys or compounds (as Cr)	1 - <5%	7440-47-3	231-157-5	Not classified	#	01-2119485652-31;
Manganese	0,1 - <1%	7439-96-5	231-105-1	Not classified	#	01-2119449803-34;
Molybdenum	0,1 - <1%	7439-98-7	231-107-2	Not classified	#	01-2119472304-43;
Nickel	0,1 - <1%	7440-02-0	231-111-4	Carc.: 2: H351 STOT RE: 1: H372 Skin Sens.: 1: H317	#	01-2119438727-29;
Silicon	0,1 - <1%	7440-21-3	231-130-8	Not classified	#	01-2119480401-47;

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
# This substance has workplace exposure limit(s).

CLP: Regulation No. 1272/2008.

The full text for all H-statements is displayed in section 16.

Composition Comments: The term “Hazardous Ingredients” should be interpreted as a term defined in Hazard Communication standards and does not necessarily imply the existence of a welding hazard. The product may contain additional non-hazardous ingredients or may form additional compounds under the condition of use. Refer to Sections 2 and 8 for more information.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation: Move to fresh air if breathing is difficult. 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: Avoid hand, clothing, food, and drink contact with fluxes, 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.

4.2 Most important symptoms and effects, both acute and delayed: Short-term (acute) overexposure to fumes and gases from welding and allied processes 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 fumes and gases from welding and allied processes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects. Refer to Section 11 for more information.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: The hazards associated with welding and its allied processes such as soldering and brazing 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 fumes, gases or dusts potentially generated during the use of this product. Refer to Section 11 for more information.

Treatment: Treat symptomatically.

SECTION 5: Firefighting measures

General Fire Hazards:	As shipped, this product is nonflammable. However, welding arc and sparks as well as open flames and hot surfaces associated with brazing and soldering can ignite combustible and flammable materials. 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.
5.1 Extinguishing media	
Suitable extinguishing media:	As shipped, the product will not burn. In case of fire in the surroundings: use appropriate extinguishing agent.
Unsuitable extinguishing media:	Do not use water jet as an extinguisher, as this will spread the fire.
5.2 Special hazards arising from the substance or mixture:	Welding arc and sparks can ignite combustibles and flammable products.
5.3 Advice for firefighters	
Special fire fighting procedures:	Use standard firefighting procedures and consider the hazards of other involved materials.
Special protective equipment for fire-fighters:	Selection of respiratory protection for fire fighting: follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:	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.
6.2 Environmental Precautions:	Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages.
6.3 Methods and material for containment and cleaning up:	Absorb with sand or other inert absorbent. 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.
6.4 Reference to other sections:	For further specification, refer to section 8 of the SDS.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling:

Prevent formation of dust. Provide appropriate exhaust ventilation at places where dust is formed.

Read and understand the manufacturer's instruction and the precautionary label on the product. Refer to Lincoln Safety Publications at www.lincolnelectric.com/safety. 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.gpo.gov.

7.2 Conditions for safe storage, including any incompatibilities:

Store in closed original container in a dry place. Store in accordance with local/regional/national regulations. Store away from incompatible materials.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

MAC, PEL, TLV and other exposure limit values may vary per element and form - as well as per country. All country-specific values are not listed. If no occupational exposure limit values are listed below, your local authority may still have applicable values. Refer to your local or national exposure limit values.

Control Parameters

Occupational Exposure Limits: Great Britain

Chemical Identity	Type	Exposure Limit Values	Source
Chromium and chromium alloys or compounds (as Cr)	TWA	0,5 mg/m3	UK. EH40 Workplace Exposure Limits (WELs) (2007)
	TWA	2 mg/m3	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (12 2009)
Chromium and chromium alloys or compounds (as Cr) - Total dust. - as Cr	TWA	2,0 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended (2014)
Manganese - Respirable fraction. - as Mn	TWA	0,05 mg/m3	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (02 2017)
Manganese - Inhalable fraction. - as Mn	TWA	0,2 mg/m3	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (02 2017)
Manganese - Respirable fraction.	TWA	0,050 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended (2014)
Manganese - Inhalable fraction.	TWA	0,200 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended (2014)
Manganese - Respirable fraction. - as Mn	TWA	0,05 mg/m3	UK. EH40 Workplace Exposure Limits (WELs) (08 2018)
Manganese - Inhalable fraction. - as Mn	TWA	0,2 mg/m3	UK. EH40 Workplace Exposure Limits (WELs) (08 2018)
Molybdenum - as Mo	TWA	10 mg/m3	UK. EH40 Workplace Exposure Limits (WELs) (2007)
	STEL	20 mg/m3	UK. EH40 Workplace Exposure Limits (WELs) (2007)
Nickel - as Ni	TWA	0,5 mg/m3	UK. EH40 Workplace Exposure Limits (WELs) (2007)

Nickel - Respirable fraction. - as Ni	TWA	0,005 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended (2014)
Nickel - Respirable fraction.	TWA	0,005 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended (2014)
Silicon - Inhalable dust.	TWA	10 mg/m3	UK. EH40 Workplace Exposure Limits (WELs) (2007)
Silicon - Respirable dust.	TWA	4 mg/m3	UK. EH40 Workplace Exposure Limits (WELs) (2007)

Biological Limit Values: Great Britain

None of the components have assigned exposure limits.

Biological Limit Values: ACGIH

None of the components have assigned exposure limits.

Additional exposure limits under the conditions of use: Great Britain

Chemical Identity	Type	Exposure Limit Values	Source
Carbon dioxide	TWA	5.000 ppm	UK. EH40 Workplace Exposure Limits (WELs)
	STEL	15.000 ppm	UK. EH40 Workplace Exposure Limits (WELs)
	TWA	5.000 ppm	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (Indicative)
Carbon monoxide	STEL	100 ppm	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (Indicative)
	TWA	20 ppm	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (Indicative)
	STEL	100 ppm	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended
	TWA	20 ppm	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended
	STEL	200 ppm	UK. EH40 Workplace Exposure Limits (WELs)
	TWA	30 ppm	UK. EH40 Workplace Exposure Limits (WELs)
	TWA	20 ppm	UK. EH40 Workplace Exposure Limits (WELs)
	STEL	100 ppm	UK. EH40 Workplace Exposure Limits (WELs)
Nitrogen dioxide	TWA	0,5 ppm	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (Indicative)
	STEL	1 ppm	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (Indicative)
	STEL	1 ppm	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended
	TWA	0,5 ppm	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended
	TWA	0,5 ppm	UK. EH40 Workplace Exposure Limits (WELs)
	STEL	1 ppm	UK. EH40 Workplace Exposure Limits (WELs)
Ozone	STEL	0,2 ppm	UK. EH40 Workplace Exposure Limits (WELs)
Manganese - Respirable	TWA	0,05 mg/m3	EU. Indicative Occupational Exposure Limit

fraction. - as Mn			Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (Indicative)
Manganese - Inhalable fraction. - as Mn	TWA	0,2 mg/m3	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (Indicative)
Manganese - Respirable fraction.	TWA	0,050 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended
Manganese - Inhalable fraction.	TWA	0,200 mg/m3	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL, as amended
Manganese - Respirable fraction. - as Mn	TWA	0,05 mg/m3	UK. EH40 Workplace Exposure Limits (WELs)
Manganese - Inhalable fraction. - as Mn	TWA	0,2 mg/m3	UK. EH40 Workplace Exposure Limits (WELs)

Additional exposure limits under the conditions of use: US

Chemical Identity	Type	Exposure Limit Values		Source
Carbon dioxide	TWA	5.000 ppm		US. ACGIH Threshold Limit Values, as amended (12 2010)
	STEL	30.000 ppm		US. ACGIH Threshold Limit Values, as amended (12 2010)
	PEL	5.000 ppm	9.000 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
Carbon monoxide	TWA	25 ppm		US. ACGIH Threshold Limit Values, as amended (12 2010)
	PEL	50 ppm	55 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
Nitrogen dioxide	TWA	0,2 ppm		US. ACGIH Threshold Limit Values, as amended (02 2012)
	Ceiling	5 ppm	9 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
Ozone	PEL	0,1 ppm	0,2 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	0,05 ppm		US. ACGIH Threshold Limit Values, as amended (03 2014)
	TWA	0,20 ppm		US. ACGIH Threshold Limit Values, as amended (03 2014)
	TWA	0,10 ppm		US. ACGIH Threshold Limit Values, as amended (03 2014)
	TWA	0,08 ppm		US. ACGIH Threshold Limit Values, as amended (03 2014)
Manganese - Fume. - as Mn	Ceiling		5 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
Manganese - Inhalable fraction. - as Mn	TWA		0,1 mg/m3	US. ACGIH Threshold Limit Values, as amended (03 2014)
Manganese - Respirable fraction. - as Mn	TWA		0,02 mg/m3	US. ACGIH Threshold Limit Values, as amended (03 2014)

8.2 Exposure controls

Appropriate Engineering Controls

Ventilation: Use enough ventilation and local exhaust at the arc, flame or heat source to keep the fumes and gases from the worker's breathing zone and the general area. Train the operator to keep their head out of the fumes. **Keep exposure as low as possible.**

Individual protection measures, such as personal protective equipment

General information:

Exposure Guidelines: To reduce the potential for overexposure, use controls such as adequate ventilation and personal protective equipment (PPE). Overexposure refers to exceeding applicable local limits, the

American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) or the Occupational Safety and Health Administration's (OSHA) Permissible Exposure Limits (PELs). Workplace exposure levels should be established by competent industrial hygiene assessments. Unless exposure levels are confirmed to be below the applicable local limit, TLV or PEL, whichever is lower, respirator use is required. Absent these controls, overexposure to one or more compound constituents, including those in the fume or airborne particles, may occur resulting in potential health hazards. According to the ACGIH, TLVs and Biological Exposure Indices (BEIs) "represent conditions under which ACGIH believes that nearly all workers may be repeatedly exposed without adverse health effects." The ACGIH further states that the TLV-TWA should be used as a guide in the control of health hazards and should not be used to indicate a fine line between safe and dangerous exposures. See Section 10 for information on constituents which have some potential to present health hazards. Welding consumables and materials being joined may contain chromium as an unintended trace element. Materials that contain chromium may produce some amount of hexavalent chromium (CrVI) and other chromium compounds as a byproduct in the fume. In 2018, the American Conference of Governmental Industrial Hygienists (ACGIH) lowered the Threshold Limit Value (TLV) for hexavalent chromium from 50 micrograms per cubic meter of air (50 µg/m³) to 0.2 µg/m³. At these new limits, CrVI exposures at or above the TLV may be possible in cases where adequate ventilation is not provided. CrVI compounds are on the IARC and NTP lists as posing a lung cancer and sinus cancer risk. Workplace conditions are unique and welding fume exposures levels vary. Workplace exposure assessments must be conducted by a qualified professional, such as an industrial hygienist, to determine if exposures are below applicable limits and to make recommendations when necessary for preventing overexposures.

Eye/face protection:

Wear helmet or use face shield with filter lens shade number 12 or darker for open arc processes – or follow the recommendations as specified in ANSI Z49.1, Section 4, based on your process and settings. No specific lens shade recommendation for submerged arc or electroslag processes. Shield others by providing appropriate screens and flash goggles.

Skin protection

Hand Protection:

Wear protective gloves. Suitable gloves can be recommended by the glove supplier.

Other:

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, open flames, hot surfaces, sparks and electrical shock. See Z49.1. At a minimum, this includes welder's gloves and a protective face shield when welding, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing when welding, brazing and soldering. Wear dry gloves free of holes or split seams. Train the operator not to permit electrically live parts or electrodes from contacting the skin . . . or clothing or gloves if they are wet. Insulate yourself from the work piece and ground using dry plywood, rubber mats or other dry insulation.

Respiratory Protection:	Keep your head out of fumes. Use enough ventilation and local exhaust to keep fumes and gases from your breathing zone and the general area. An approved respirator should be used unless exposure assessments are below applicable exposure limits.
Hygiene measures:	Do not eat, drink or smoke when using the product. 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. Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, www.aws.org.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	Solid welding wire or rod.
Physical state:	Solid
Form:	Solid
Color:	No data available.
Odor:	No data available.
Odor Threshold:	No data available.
pH:	No data available.
Melting Point:	No data available.
Boiling Point:	No data available.
Flash Point:	No data available.
Evaporation Rate:	No data available.
Flammability (solid, gas):	No data available.
Flammability Limit - Upper (%):	No data available.
Flammability Limit - Lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density (air=1):	No data available.
Density:	No data available.
Relative density:	No data available.
Solubility(ies)	
Solubility in Water:	No data available.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Autoignition Temperature:	No data available.
Decomposition Temperature:	No data available.
SADT:	No data available.
Viscosity:	No data available.
Explosive properties:	No data available.
Oxidizing properties:	No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity:	The product is non-reactive under normal conditions of use, storage and transport.
10.2 Chemical Stability:	Material is stable under normal conditions.
10.3 Possibility of hazardous reactions:	None under normal conditions.
10.4 Conditions to avoid:	Avoid heat or contamination.
10.5 Incompatible Materials:	Strong acids. Strong oxidizing substances. Strong bases.
10.6 Hazardous Decomposition Products:	Fumes and gases from welding and its allied processes such as brazing and soldering cannot be classified simply. The composition and quantity of both are dependent upon the metal to which the joining or hot work is applied, the process, procedure - and where applicable - the electrode or consumable 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 or worked (such as paint, plating, or galvanizing), the number of operators and the volume of the work area, the quality and amount of ventilation, the position of the operator'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.) In cases where an electrode or other applied material 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 and brazing 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 or brazing fume of consumables or base metals which contain chromium. Gaseous and particulate fluoride may be in the fume of consumables or flux materials 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 associated with welding.

SECTION 11: Toxicological information

General information: The International Agency for Research on Cancer (IARC) has determined welding fumes and ultraviolet radiation from welding are carcinogenic to humans (Group 1). According to IARC, welding fumes cause cancer of the lung and positive associations have been observed with cancer of the kidney. Also according to IARC, ultraviolet radiation from welding causes ocular melanoma. IARC identifies gouging, brazing, carbon arc or plasma arc cutting, and soldering as processes closely related to welding. Read and understand the manufacturer's instructions, Safety Data Sheets and the precautionary labels before using this product.

Information on likely routes of exposure

Inhalation: Potential chronic health hazards related to the use of welding consumables are most applicable to the inhalation route of exposure. Refer to Inhalation statements in Section 11.

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

Eye contact: Arc rays can injure eyes.

Ingestion: Health injuries from ingestion are not known or expected under normal use.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation: Short-term (acute) overexposure to fumes and gases from welding and allied processes 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 fumes and gases from welding and allied processes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects.

11.1 Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product: Not classified

Specified substance(s):

Iron — LD 50 (Rat): 98,6 g/kg

Dermal

Product: Not classified

Inhalation

Product: Not classified

Repeated dose toxicity

Product: Not classified

Skin Corrosion/Irritation

Product: Not classified

Serious Eye Damage/Eye Irritation

Product: Not classified

Respiratory or Skin Sensitization

Product: Not classified

Carcinogenicity
Product: Arc rays: Skin cancer has been reported.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
Specified substance(s):

Chromium and chromium alloys or compounds (as Cr)	Overall evaluation: 3. Not classifiable as to carcinogenicity to humans.
Nickel	Overall evaluation: 2B. Possibly carcinogenic to humans.

Germ Cell Mutagenicity
In vitro
Product: Not classified

In vivo
Product: Not classified

Reproductive toxicity
Product: Not classified

Specific Target Organ Toxicity - Single Exposure
Product: Not classified

Specific Target Organ Toxicity - Repeated Exposure
Product: Not classified

Aspiration Hazard
Product: Not classified

Other effects: 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.

Symptoms related to the physical, chemical and toxicological characteristics under the condition of use

Inhalation:
Specified substance(s):

Manganese	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.

Additional toxicological Information under the conditions of use:
Acute toxicity

Inhalation
Specified substance(s):

Carbon dioxide	LC Lo (Human, 5 min): 90000 ppm

Carbon monoxide	LC 50 (Rat, 4 h): 1300 ppm
Nitrogen dioxide	LC 50 (Rat, 4 h): 88 ppm
Ozone	LC Lo (Human, 30 min): 50 ppm

Other effects:

Specified substance(s):

Carbon dioxide	Asphyxia
Carbon monoxide	Carboxyhemoglobinemia
Nitrogen dioxide	Lower respiratory tract irritation

SECTION 12: Ecological information

12.1 Ecotoxicity

Acute hazards to the aquatic environment:

Fish

Product: Not classified.

Specified substance(s):

Molybdenum	LC 50 (Rainbow trout,donaldson trout (Oncorhynchus mykiss), 96 h): 800 mg/l
Nickel	LC 50 (Fathead minnow (Pimephales promelas), 96 h): 2,916 mg/l

Aquatic Invertebrates

Product: Not classified.

Specified substance(s):

Manganese	EC 50 (Water flea (Daphnia magna), 48 h): 40 mg/l
Nickel	EC 50 (Water flea (Daphnia magna), 48 h): 1 mg/l

Chronic hazards to the aquatic environment:

Fish

Product: Not classified.

Aquatic Invertebrates

Product: Not classified.

Toxicity to Aquatic Plants

Product: Not classified.

12.2 Persistence and Degradability

Biodegradation

Product: No data available.

12.3 Bioaccumulative potential

Bioconcentration Factor (BCF)

Product: No data available.

Specified substance(s):

Nickel	Zebra mussel (Dreissena polymorpha), Bioconcentration Factor (BCF): 5.000 - 10.000 (Lotic) Bioconcentration factor calculated using dry weight tissue conc

12.4 Mobility in soil: No data available.

12.5 Results of PBT and vPvB assessment: No data available.

12.6 Other adverse effects: No data available.

12.7 Additional Information: No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: 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.

Disposal instructions: Disposal of this product may be regulated as a Hazardous Waste. The welding consumable and/or by-product from the welding process (including, but not limited to slag, dust, etc.) may contain levels of leachable heavy metals such as Barium or Chromium. Prior to disposal, a representative sample must be analyzed in accordance with US EPA's Toxicity Characteristic Leaching Procedure (TCLP) to determine if any constituents exist above regulated threshold levels. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner according to Federal, State and Local Regulations.

Contaminated Packaging: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

SECTION 14: Transport information

ADR

14.1 UN Number:	
14.2 UN Proper Shipping Name:	NOT DG REGULATED
14.3 Transport Hazard Class(es)	
Class:	NR
Label(s):	–
Hazard No. (ADR):	–
Tunnel restriction code:	
14.4 Packing Group:	–
Limited quantity	
Excepted quantity	
14.5 Marine Pollutant	No

ADN

14.1 UN Number:	
14.2 UN Proper Shipping Name:	NOT DG REGULATED
14.3 Transport Hazard Class(es)	
Class:	NR
Label(s):	–

Hazard No. (ADR):	–
14.4 Packing Group:	–
Limited quantity	
Excepted quantity	
14.5 Marine Pollutant	No

RID

14.1 UN Number:	
14.2 UN Proper Shipping Name	NOT DG REGULATED
14.3 Transport Hazard Class(es)	
Class:	NR
Label(s):	–
14.4 Packing Group:	–
14.5 Marine Pollutant	No

IMDG

14.1 UN Number:	
14.2 UN Proper Shipping Name:	NOT DG REGULATED
14.3 Transport Hazard Class(es)	
Class:	NR
Label(s):	–
EmS No.:	
14.4 Packing Group:	–
Limited quantity	
Excepted quantity	
14.5 Marine Pollutant	No

IATA

14.1 UN Number:	
14.2 Proper Shipping Name:	NOT DG REGULATED
14.3 Transport Hazard Class(es):	
Class:	NR
Label(s):	–
14.4 Packing Group:	–
Cargo aircraft only :	
Passenger and cargo aircraft :	
Limited quantity:	
Excepted quantity	
14.5 Marine Pollutant	No
Cargo aircraft only:	Allowed.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

EU Regulations

Regulation (EC) No. 2037/2000 Substances that deplete the ozone layer: None

Regulation (EC) No. 2037/2000 Substances that deplete the ozone layer: None

Regulation (EC) No. 850/2004 on persistent organic pollutants: None

Regulation (EC) No. 649/2012 Import and export of dangerous chemicals: None

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorisation, as amended: None

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:

Chemical name	CAS-No.	Concentration
Nickel	7440-02-0	0,1 - 1,0%

Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work.: None

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breast feeding.:

Chemical name	CAS-No.	Concentration
Nickel	7440-02-0	0,1 - 1,0%

Directive 2012/18/EU (Seveso III): on the control of major accident hazards involving dangerous substances: None

EU. Regulation No. 166/2006 PRTR (Pollutant Release and Transfer Registry), Annex II: Pollutants:

Chemical name	CAS-No.	Concentration
Chromium and chromium alloys or compounds (as Cr)	7440-47-3	1,0 - 10%
Nickel	7440-02-0	0,1 - 1,0%
Copper and/or copper alloys and compounds (as Cu)	7440-50-8	0 - <0,1%

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:

Chemical name	CAS-No.	Concentration
Nickel	7440-02-0	0,1 - 1,0%
Copper and/or copper alloys and compounds (as Cu)	7440-50-8	0 - <0,1%

National Regulations

Water Hazard Class (WGK): WGK 1: slightly water-endangering.

INRS, maladies professionelles, table of work-related illnesses

Listed: 44 bis
44
A

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
Canada NDSL Inventory:	One or more components are not listed or are exempt from listing.
Ontario Inventory:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Japan (ENCS) List:	One or more components are not listed or are exempt from listing.
Japan ISHL Listing:	One or more components are not listed or are exempt from listing.
Japan Pharmacopoeia Listing:	One or more components are not listed or are exempt from listing.
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Mexico INSQ:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Philippines PICCS:	On or in compliance with the inventory
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory

SECTION 16: Other information

Definitions:

References

PBT	PBT: persistent, bioaccumulative and toxic substance.
vPvB	vPvB: very persistent and very bioaccumulative substance.

Key literature references and sources for data: According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended.

Wording of the H-statements in section 2 and 3

H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure.

Other information: Additional information is available by request.

Issue Date: 25.05.2020

Disclaimer: The Lincoln Electric Company urges each end user and recipient of this SDS to study it carefully. See also www.lincolnelectric.com/safety. 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 Lincoln Electric's control, we assume no liability resulting from the use of this product. Regulatory requirements are subject to change and may differ between various locations. Compliance with all applicable Federal, State, Provincial, and local laws and regulations remain the responsibility of the user.

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Annex to the extended Safety Data Sheet (eSDS)
Exposure Scenario:

Read and understand the **"Recommendations for Exposure Scenarios, Risk Management Measures and to identify Operational Conditions under which metals, alloys and metallic articles may be safely welded"**, which is available from your supplier and at http://european-welding.org/health-safety.

Welding/Brazing produces fumes which can affect human health and the environment. Fumes are a varying mixture of airborne gases and fine particles which, if inhaled or swallowed, constitute a health hazard. The degree of risk will depend on the composition of the fume, concentration of the fume and duration of exposure. The fume composition is dependent upon the material being worked, the process and consumables being used, coatings on the work such as paint, galvanizing or plating, oil or contaminants from cleaning and degreasing activities. A systematic approach to the assessment of exposure is necessary, taking into account the particular circumstances for the operator and ancillary worker that can be exposed.

Considering the emission of fumes when welding, brazing or cutting of metals, it is recommended to (1) arrange risk management measures through applying general information and guidelines provided by this exposure scenario and (2) using the information provided by the Safety Data Sheet, issued in accordance with REACH, by the welding consumable manufacturer.

The employer shall ensure that the risk from welding fumes to the safety and health of workers is eliminated or reduced to a minimum. The following principle shall be applied:
1- Select the applicable process/material combinations with the lowest class, whenever possible.
2- Set welding process with the lowest emission parameter.
3- Apply the relevant collective protective measure in accordance with class number. In general, the use of PPE is taken into account after all other measures is applied.
4- Wear the relevant personal protective equipment in accordance with the duty cycle.

In addition, compliance with the National Regulations regarding the exposure to welding fumes of welders and related personnel shall be verified.