



# Chamfer Arc Electrodes

## SAFETY DATA SHEET

Control # 610 date: 5/29/15

### SECTION: 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

- 1.1 Product Name: Chamfer Arc Electrodes  
Product Identification: Chamfer Arc Electrodes
- Product Specification:
- 1.2 Relevant identified uses of the substance or mixture and uses advised against:
- 1.2.1 Relevant identified uses: Arc metal removal
- 1.2.2 Uses advised: Reference the [ 7. Handling and storage]
- 1.3 Details of the supplier of the safety data sheet:
- Supplier: Weldcote Metals Inc.  
842 Oak Grove Rd.  
Kings Mountain, NC 28086
- Emergency telephone number: (800) 424-9300 or (704) 739-4115
- Email: [info@weldcotemetals.com](mailto:info@weldcotemetals.com)

### SECTION: 2 HAZARDS IDENTIFICATION

- 2.1 Classification of the mixture:  
The product is placed on the market in solid form

2.1.1 Classification in accordance with GHS-US

Acute Tox. 4 (Oral)	H302
Carc.1A	H350
Aquatic Acute 1	H400

- 2.2 Label elements:

GHS-US labeling

Hazard Pictograms (GHS-US):



Signal word (GHS-US): Danger

Hazard statements (GH5-US):

H317 May cause an allergic skin reaction

H319 Causes serious eye irritation

H351 Suspected of causing cancer

H335 May cause respiratory irritation

H372 Cause damage to respiratory system, eyes, brain and nervous system through prolonged or

repeated exposure

Precautionary statements:

P201 Obtain special instructions before use

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

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P264 Wash thoroughly after handling

P270 Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in well-ventilated area.

P272 Contaminated work clothing should not be allowed out of the workplace.

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

P281 Use personal protective equipment as required.

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

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

breathing.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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

P337+P313 If eye irritation persists: Get medical advice/attention.



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- P308+P313 If exposed or concerned: Get medical advice/attention.  
P312 Call a POISON CENTER or doctor/physician if you feel unwell.  
P314 Get medical advice/attention if you feel unwell.  
P363 Wash contaminated clothing before reuse.  
P403+P233 Store in a well-ventilated place. Keep container tightly closed.  
P405 Store locked up  
P501 Dispose of contents and container in accordance with local regional/national international regulations.
- 2.3 Other hazards: No additional information available  
2.4 Unknown acute toxicity (GHS-US): No data available.

## SECTION: 3 COMPOSITION/INFORMATION ON INGREDIENTS

- 3.1 Substances: No data available  
Full text of H-phrases: see section 16
- 3.2 Mixtures: The mixture contains dangerous substances:

Substance name	Product Identifier (CAS No)	% Percent	GHS-US classification
Cellulose	9004-34-6	10-20	Not classified
Iron oxide FeO	1317-61-9	1-11	Acute Tox. 4 (Oral) H302
Manganese Mn	7439-96-5	1-11	Not classified
Titanium dioxide TiO <sub>2</sub>	13463-67-7	1-11	Carc. 2 H351
Potassium Silicate K <sub>2</sub> SiO <sub>3</sub>	1312-76-1	1-11	Skin Irrit. 1; Eye Dam. 1; STOT SE 3; H315, H318, H335
Sodium Silicate Na <sub>2</sub> SiO <sub>3</sub>	1344-99-8	1-11	Skin corr. 1B H314, STOT SE 3 H335
Iron Fe	7439-89-6	60-70	Acute Tox. 4 (Oral) H302

## SECTION: 4 FIRST AID MEASURES

- 4.1 Description of first aid measures:  
First-aid measures after inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen and get medical attention.  
First-aid measures after skin contact: Flush with water for at least 15 minutes. Seek medical attention if irritation develops or persists.  
First-aid measures after eye contact: Immediately flush eyes with water and continue washing for at least 15 minutes. Obtain medical attention if discomfort persists.  
First-aid measures after ingestion: Do NOT induce vomiting. Get immediate medical attention.
- 4.2 Most important symptoms and effects, both acute and delayed:  
Symptoms/injuries after inhalation: Short-term (acute) overexposure to the gases, fumes, and dusts may include irritation of the eyes, lungs, nose, and throat. Some toxic gases associated with welding may cause pulmonary edema, asphyxiation, and death. Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty in breathing, frequent coughing, or chest pain. The presence of chromium/chromate in fume can cause irritation of nasal membranes and skin. The presence of nickel compounds in fume can cause metallic taste, nausea, tightness of chest, fever, and allergic reaction. Excessive inhalation or ingestion of manganese can produce manganese poisoning. Overexposure to manganese compounds may affect the central nervous system, symptoms of which are languor, sleepiness, muscular weakness, emotional disturbances, and spastic gait resembling Parkinsonism. These symptoms can become progressive and permanent if not treated. Excessive inhalation of fumes may cause "Metal Fume Fever" with Flu-like symptoms such as chills, fever, body aches, vomiting, sweating, etc.

Symptoms/injuries after skin contact:

Dusts may cause irritation.

Symptoms/injuries after eye contact:

Causes eye irritation.

Symptoms/injuries after ingestion: Not an anticipated route of exposure during normal product handling. May be harmful if ingested.

4.3 Indication of any immediate medical attention and special treatment needed: No data available.

### SECTION: 5 FIREFIGHTING MEASURES

5.1 Extinguishing media:

Suitable extinguishing media: Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media: No data available.

5.2 Special hazards arising from the substance or mixture: Fire may produce irritating or poisonous gases.

Fire hazard:

Not flammable

Explosion hazard:

None known

5.3 Advice for firefighters: In the event of fire, wear self-contained breathing apparatus and full protective gear.

### SECTION: 6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel: Wear appropriate personal protective equipment as specified in Section 8. Ensure adequate ventilation.

For emergency responders: No data available.

6.2 Environmental precautions: Avoid release into the environment. Avoid dispersal of spilled material and contact with soil, ground and surface water drains and sewers.

6.3 Methods and material for containment and cleaning up: Take up mechanically. Collect the material in labeled containers and dispose of according to local and regional authority requirements.

6.4 Reference to other sections: See Section 7 for information of safe handling. See Section 8 for information on personal protection equipment. See Section 13 for disposal information.

### SECTION: 7 HANDLING AND STORAGE

7.1 Precautions and safe handling: Welding may produce dust, fumes and gases hazardous to health. Avoid breathing dust, fumes and gases. Use adequate ventilation. Keep away from sources of ignition. Avoid contact with skin, eyes and clothing. Do not eat, drink and smoke in work areas.

7.2 Conditions for safe storage, including and incompatibilities: Store in cool, dry and well-ventilated place. Keep away from incompatible materials. Keep away from heat and open flame.

7.3 Specific end use(s): For welding consumables and related products.

### SECTION: 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters: Exposure limits were not established for this product

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Cellulose (CAS No) 9004-34-6		
USA ACGIH	ACGIH (TWA) (mg/m <sup>3</sup> )	
Iron oxide (CAS No) 1317-61-9		
USA ACGIH	ACGIH (TWA) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
Manganese (CAS No ) 7439-96-5		
USA ACGIH	ACGIH (TWA) (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (Ceiling) (mg/m <sup>3</sup> )	5 mg/m <sup>3</sup>
Titanium dioxide (CAS No) 13463-67-7		
USA ACGIH	ACGIH (TWA) (mg/m <sup>3</sup> )	10 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	15 mg/m <sup>3</sup>
Potassium Silicate (CAS No) 7447-40-7		
USA ACGIH	ACGIH (TWA) (mg/m <sup>3</sup> )	No data
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	No data
Sodium Silicate (CAS No) 1344-09-8		
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	20 million parts per cubic ft
Iron (CAS No) 7439-89-6		
USA ACGIH	ACGIH (TWA) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	2 mg/m <sup>3</sup>

### 8.2 Exposure controls:

Appropriate engineering controls: local exhaust and general ventilation must be adequate to meet exposure standards.

Hand protection: Wear welding gloves.

Eye protection: Wear helmet or face shield with filter lens of appropriate shade number. See ANSI/ASC Z49.1 Section 4.2. Provide protective screens and flash goggles, if necessary, to shield others.

Skin and body protection: Wear head and body protection, which help to prevent injury from radiation, sparks, flame and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the employee not to touch live electrical parts and to insulate him/herself from work and ground. Welders should not wear short sleeve shirts or short pants.

Respiratory protection: If exposure limits are exceeded or irritation is experienced, NIOSH approved respiratory protection should be worn.

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**SECTION: 9 PHYSICAL AND CHEMICAL PROPERTIES**

9.1 Information on basic physical and chemical properties:

Physical state:	- Solid
Appearances:	- Rods
Color:	- Black / Green
Odor:	- No data available
Odor threshold:	- No data available
pH:	- No data available
Relative evaporation rate (butyl acetate = 1):	- No data available
Melting point:	- 1560-2000F (850-1110C)
Freezing point:	- No data available
Initial boiling point and boiling range:	- No data available
Flash point:	- No data available
Self ignition temperature:	- No data available
Decomposition temperature:	- No data available
Flammability (solid, gas):	- No data available
Vapour pressure:	" No data available
Relative vapour density at 20· C:	- No data available
Relative density:	- 6-9 g/cm3
Solubility(ies)	- No data available
Log Pow:	- No data available
Log Kow:	- No data available
Viscosity, kinematic:	- No data available
Viscosity, dynamic:	- No data available
Explosive properties:	- No data available
Oxidizing properties:	- No data available
Explosive limits:	- No data available

9.2 Other information: No additional information available.

**SECTION: 10 STABILITY AND REACTIVITY**

10.1 Reactivity: No additional information available.

10.2 Chemical stability: The product is stable under normal conditions. When using it may produce dangerous fumes and gases.

10.3 Possibility of hazardous reactions: Will not occur.

10.4 Conditions to avoid: None

10.5 Incompatible materials: None

10.6 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 welding consumables used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coating on the metal being welded (i.e. paint, painting, galvanizing), the number of welders, the volume of the work area, the quality and the amount of ventilation, the position of the welders head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from the cleaning and degreasing activities).

When an electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Fume and gas decomposition, and not the ingredients in the electrode, are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration. Also, new compounds not in the electrodes may form. 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 coating, etc., as noted above. Reasonable expected fume constituents of this product would include: Complex oxides of iron, manganese, silicon, chromium, nickel, columbium, molybdenum, copper, carbon dioxide, carbon monoxide, ozone and nitrogen Oxides. Some products will also contain antimony, barium, molybdenum, aluminum, columbium, magnesium, strontium, tungsten, and or zirconium. Fume limit for chromium, nickel and or manganese may be reached before limit of 5 mg/m3 of general welding fumes is reached.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. 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, F1.3 and F1.5, available from the American Welding Society, 550 N.W. Lejeune Road, Miami, FL 33126.

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## SECTION: 11 TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects:

Acute toxicity: Harmful if swallowed

Substance name	CAS number	LD50 oral rat (mg/kg)	ATE (oral) (mg/kg)	Comments
Cellulose	9004-34-6	5000 mg/kg	>2000 mg/kg	
Iron oxide	1317-61-9	984 mg/kg	984,000 mg/kg	bodyweight
Manganese	7439-96-5		9,000,000 mg/kg	
Titanium Dioxide	13463-67-7	> 10,000 mg/kg		
Potassium Silicate	1312-76-1	>5000 mg/kg		
Sodium silicate	1344-09-8	1153 mg/kg	1153.000 mg/kg	
Iron	7439-89-6	984 mg/kg	984,000 mg/kg	bodyweight

Skin corrosion/irritation: May cause irr  
 Serious eye damage/irritation: Not classified  
 Respiratory or skin sensitization: May cause an allergic skin reaction.  
 Germ cell mutagenicity: Not classified  
 Carcinogenicity: May cause cancer.

Reproductive toxicity: Not classified  
 Specific target organ toxicity (single exposure): Not classified  
 Specific target organ toxicity (repeated exposure): Not classified  
 Aspiration hazard: Not classified

## SECTION: 12 ECOLOGICAL INFORMATION

### 12.1 Toxicity:

Ecology - general: Very toxic to aquatic life.

Cellulose	(CAS No) 9004-34-6
BCF fish 1	(no bioaccumulation expected)
Iron oxide	(CAS No) 1317-61-9
LC50 fishes 1	0.56 mg/l (Exposure time: 96 h - species: Cyprinus carpio [semi-static])
Manganese	(CAS No) 7439-96-5
LC50 fishes 1	0.12 mg/l (Exposure time: 96 h - species: Oncorhynchus mykiss [semi-static])
EC50 other aquatic organisms 1	0.1 mg/l (Exposure time: 96 h - species: Ctenopharynhodon idella[static])
Titanium Dioxide	(CAS No) 13463-67-7
LC50 fishes 1	1000 mg/l (Exposure time: 96 h - species: Oncorhynchus mykiss [semi-static])
EC50 other aquatic organisms 1	1000 mg/l (Exposure time: 96 h - species: Ctenopharynhodon idella[static])
Potassium silicate	(CAS No) 1312-76-1
BCF fish 1	(no bioaccumulation expected)
Sodium silicate	(CAS No) 1344-09-8
BCF fish 1	(no bioaccumulation expected)
Iron	(CAS No) 7439-89-6
LC50 fishes 1	0.56 mg/l (Exposure time: 96 h - species: Cyprinus carpio [semi-static])



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- 12.2 Persistence and degradability: No additional information available.
- 12.3 Bioaccumulative potential: No additional information available.
- 12.4 Mobility in soil: No additional information available.
- 12.5 Other adverse effects: No additional information available.

**SECTION: 13 DISPOSAL CONSIDERATIONS**

- 13.1 Waste treatment methods: Dispose of in accordance with local and national regulations.  
Waste disposal recommendations: Dispose of contents/container in accordance with local/regional/national/international regulations.

**SECTION: 14 TRANSPORT INFORMATION**

In accordance with DOT / ADR / RID / ADNR / IMDG / ICAO / IATA

- 14.1 UN Number: Not a dangerous good in sense of transport regulations
- 14.2 UN proper shipping name: Not applicable

**SECTION: 15 REGULATORY INFORMATION**

- 15.1 US Federal Regulations:

Cellulose (CAS No) 9004-34-6
Listed on the United States TSCA (Toxic Substances Control Act) Inventory
Iron Oxide (CAS No) 1309-37-1
Listed on the United States TSCA (Toxic Substances Control Act) Inventory
Manganese (CAS No) 7439-21-3
Listed on the United States TSCA (Toxic Substances Control Act) Inventory
Listed on SARA Section 313 (Specific toxic chemical listings)
SARA Section 313 - Emission Reporting 1.0% (dust or fume only)
Titanium dioxide (CAS No) 13463-67-7
Listed on the United States TSCA (Toxic Substances Control Act) Inventory
Potassium silicate (CAS No) 1312-76-1
Listed on the United States TSCA (Toxic Substances Control Act) Inventory
Sodium silicate (CAS No) 1344-09-8
Listed on the United States TSCA (Toxic Substances Control Act) Inventory
Iron (CAS No) 7439-89-6
Listed on the United States TSCA (Toxic Substances Control Act) Inventory



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## 15.2 US State Regulations:

Iron oxide (CAS No) 1317-61-9				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. California - Proposition 65 - Reproductive Toxicity - Female	U.S. California - Proposition 65 - Reproductive Toxicity - Male	No Significance risk level (NSRL)
Yes				
Manganese (CAS No) 7439-96-5				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. California - Proposition 65 - Reproductive Toxicity - Female	U.S. California - Proposition 65 - Reproductive Toxicity - Male	No Significance risk level (NSRL)
Yes				
Titanium Dioxide (CAS No) 13463-67-7				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. California - Proposition 65 - Reproductive Toxicity - Female	U.S. California - Proposition 65 - Reproductive Toxicity - Male	No Significance risk level (NSRL)
Yes				
Potassium silicate (CAS No) 1312-76-1				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. California - Proposition 65 - Reproductive Toxicity - Female	U.S. California - Proposition 65 - Reproductive Toxicity - Male	No Significance risk level (NSRL)
Yes				
Sodium silicate (CAS No) 1344-09-8				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. California - Proposition 65 - Reproductive Toxicity - Female	U.S. California - Proposition 65 - Reproductive Toxicity - Male	No Significance risk level (NSRL)
Yes				
Iron (CAS No) 7439-89-6				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. California - Proposition 65 - Reproductive Toxicity - Female	U.S. California - Proposition 65 - Reproductive Toxicity - Male	No Significance risk level (NSRL)
Yes				

<b>Iron oxide</b> (CAS No) 1317-61-9 U.S. - Massachusetts - Right To Know List U.S. - Minnesota - Hazardous Substance List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Manganese</b> (CAS No) 7439-96-5 U.S. - Massachusetts - Right To Know List U.S. - Minnesota - Hazardous Substance List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
<b>Potassium Silicate</b> (CAS No) 1312-76-1 U.S. - Massachusetts - Right To Know List U.S. - Minnesota - Hazardous Substance list U.S. - New Jersey - Right to Know Hazardous Substance list U.S. - Pennsylvania - RTK (Right to Know) List
<b>Iron</b> (CAS No) 7439-89-6 U.S. - Massachusetts - Right To Know List U.S. - Minnesota - Hazardous Substance List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List





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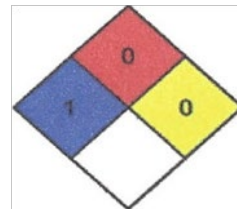
SECTION: 16

OTHER INFORMATION

Full text of H-phrases:

H228	Flammable solid
H261	In contact with water releases flammable gas
H301	Toxic if swallowed
H302	Harmful if swallowed
H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H317	May cause an allergic skin reaction
H318	Causes serious eye damage
H319	Causes serious eye irritation
H322	Harmful if inhaled
H330	Fatal if inhaled
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation
H336	May cause drowsiness or dizziness
H350	May cause cancer
H351	Suspected of causing cancer
H360	May damage fertility or the unborn child
H361	Suspected of damaging fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life
Acute Tox. 2 (Inhalation)	Acute toxicity (inhal.), Category 2
Acute Tox. 3 (Oral)	Acute toxicity (oral), Category 3
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard, Category 1
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard, Category 1
Carc. 1A	Carcinogenicity, Category 1A
Carc. 1A	Carcinogenicity, Category 1A
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A

NFPA health hazard: 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.  
NFPA fire hazard: 0 - Materials that will not burn.  
NFPA reactivity: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health: 2 - Moderate Hazard - Temporary or minor injury may occur  
Flammability: 0 - Minimal Hazard  
Physical: 0 - Minimal Hazard

We believe that the information contained herein is believed to be true and accurate as of the date of this SOS. All statements or suggestions are made without any warranty, expressed or implied, regarding the accuracy of the information, the hazard connected with the use of this material or the results to be obtained for use thereof. As the condition or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. It is the user's obligation to determine the conditions of safe use of these products.

All chemical products can in fact present unknown risks to health, safety and / or the environment, even in relation to the different operating conditions, and they must therefore be used with care. For this reason we cannot guarantee that the risk described in this form are the only foreseeable risks. The user must therefore satisfy himself as to the particular conditions under which it is intended to be use in. Moreover, it must be noted that the user is obliged to comply with all the legislative, administrative and regulatory provisions regarding the product and its use in terms of occupational hygiene and safety, and environmental protection, apart from the information given in the form, given purely as guidance.

Technical Department

**⚠ WARNING:** This product may expose you to chemicals including [cobalt (II) oxide, titanium dioxide (airborne, unbound particles of respirable size), chromium (hexavalent compounds), nickel, lead and lead compounds, carbon black, cadmium, and/or beryllium and beryllium compounds] which are known to the State of California to cause cancer, and [chromium (hexavalent compounds), nickel, lead and lead compounds, and/or cadmium] which are known to the State of California to cause birth defects and/or other reproductive harm. For more information go to <https://www.p65warnings.ca.gov/>.

**Supplemental Safety Guidance Documents**

Please refer to the following supplemental safety guidance documents for additional information:

American National Standard, Safety in Welding, Cutting and Allied Processes Guidance (American National Standard Z49.1)  
[https://app.aws.org/technical/AWS\\_Z49.pdf?\\_ga=2.92930778.674520871.1541095810-1419732123.1541007130](https://app.aws.org/technical/AWS_Z49.pdf?_ga=2.92930778.674520871.1541095810-1419732123.1541007130)

American Welding Society, Safety and Health Fact Sheets (All topics)  
<https://www.aws.org/standards/page/safety-health-fact-sheets>

American Welding Society, Safety and health fact sheet – Fumes and Gases  
<https://www.aws.org/library/doclib/fs1-201410.pdf>

American Welding Society, Health effects from Welding Exposures  
<https://www.aws.org/library/doclib/AWS-LiteratureUpdate-2016.pdf>

OSHA Technical Manual, Section III, Chapter 3, Ventilation Investigation  
[https://www.osha.gov/dts/osta/otm/otm\\_iii/otm\\_iii\\_3.html](https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_3.html)

