SAFETY DATA SHEET
CE 002 Stainless steel Covered Electrodes

Version number: 1
Replaces SDS: 2009-11-23
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BOC
A Member of The Linde Group

Not for sale in the USA

Section 1. IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

1.1 Product identifier

Trade name **SMOOTHARC S 308L, SMOOTHARC S 309L, SMOOTHARC S 309MoL, SMOOTHARC S 312, SMOOTHARC S 316L, SMOOTHARC S 347**

Article-no

Product/Article	Diameter(mm)	Packaging (kg)	Part Number
SMOOTHARC S 308L	2.5	2.5	188082
SMOOTHARC S 308L	3.2	3	188083
SMOOTHARC S 308L	4.0	3	188084
SMOOTHARC S 309L	2.5	2.5	188092
SMOOTHARC S 309L	3.2	3	188093
SMOOTHARC S 309L	4.0	3	188094
SMOOTHARC S 309MoL	2.5	2.5	188096
SMOOTHARC S 309MoL	3.2	3	188097
SMOOTHARC S 309MoL	4.0	3	188098
SMOOTHARC S 312	2.5	2.5	188122
SMOOTHARC S 312	3.2	3	188123
SMOOTHARC S 312	4.0	3	188124
SMOOTHARC S 316L	2.5	2.5	188162
SMOOTHARC S 316L	3.2	3	188163
SMOOTHARC S 316L	4.0	3	188164
SMOOTHARC S 316L	5.0	5	188165
SMOOTHARC S 347	2.5	2.5	188472
SMOOTHARC S 347	3.2	3	188473
SMOOTHARC S 347	4.0	3	184164

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

Article type SMAW Stainless steel covered electrodes Classification: AWS SFA 5.9 (or other)

Use Electric arc welding

1.3 Details of the supplier of the safety data sheet

Supplier	BOC Limited	BOC Limited
Street address	10 Julius Avenue	970-988 Great South Road
	North Ryde NSW 2113	Penrose, Auckland
	Australia	New Zealand
Telephone	**131 262**	**0800 111 333**
Fax	**132 427**	**0800 229 923**
Email	**contact@boc.com**	**customer.servicenz@boc.com**

1.4 Emergency telephone number

Available outside office hours	Yes
Emergency phone number	1800 653 572 (Aus) or 0800 111 333 (NZ)

Other

Additional product information	**Web site: www.boc.com.au or www.boc.co.nz**

Section 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

As shipped the product is:

Not Classified as Hazardous according to Australian, New Zealand and European regulations (refer Section 15 for references)

Not a Dangerous Good for Transport by road, rail, air or sea according to Australian, New Zealand, European, IMO, and IATA.

GHS Classification

Not Classified

2.2 Label Elements

Not Applicable

2.3 Other hazards

This product contains: Nickel as classified as sensitising and limited evidence of carcinogenic effect. The form of this product does not contribute to a hazard classification of the product.
When the product is used in the welding process the most important hazards are:
Overexposure to fumes and gases from welding released from the welding process may release products that are classified as hazardous and can be dangerous to health. Refer to Section 16 for more information.
Watch out for splatter, hot metal and slag. It may cause skin burn and cause fire.
Arc rays can injure eyes and burn skin. Electric shock can kill. Avoid touching live electrical parts.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

This product is a mixture and please refer to Section 3.2

3.2 Mixtures

Stainless steel core	**%C**	**%Si**	**%Mn**	**%Cr**	**%Ni**	**%Mo**	**%Fe**
Ranges	.01-.15	1.00max	0.3-2.5	13-32	0-22	0-3.0	balance

Flux coating	**E308, 309, 310**	**E309M0, 316, 317**	**E309Nb, 347**	**E410**	**CAS No.**

Limestone and/or Calcium Carbonate	0-20	0-20	0-20	0-20	1317-65-3
Mica	0-12	0-12	0-12	0-12	12001-26-2
Kaolin	0-15	0-15	0-15	0-15	1332-58-7
Cellulose	0-2	0-2	0-2	-	9004-34-6
Mineral Silicates	0-30	0-30	0-30	0-15	1332-58-7 1344-95-2
Inorganic Fluorides (as F)	0-6	0-6	0-6	0-5	16984-48-8
Manganese and its Inorganic compounds (as Mn)	0-5	0-5	0-5	0-5	7439-96-5 and others
Aluminium	0-2	0-2	0-2	0-2	7429-90-5
Rutile/ Titanium oxide	0-45	0-45	0-45	0-45	13463-67-7
Nickel and its inorganic compounds (soluble, as Ni) (insoluble, as Ni)	0-15	0-15	0-15	0-15	7440-02-0
Silicon and Silicon alloys, (as Si)	0-5	0-5	0-5	0-5	7440-21-3
Molybdenum compounds (as Mo)	-	0-5	-	-	7439-98-7
Chromium	0-30	0-30	0-30	0-30	7440-47-3
Antimony oxide	0-2	0-2	0-2	0-2	7440-36-0
Silicate Binders	0-25	0-25	0-25	0-25	1344-09-8
Others					

Section 4. FIRST AND MEASURES

4.1 Description of first aid measures

Inhalation	IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms occur.
Skin contact	Burns should be treated by a doctor. Wash affected areas with running water/soap. Seek medical attention in event of irritation
Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Burns from radiation, see doctor.
Ingestion	Contact a doctor if more than an insignificant amount has been swallowed.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation	Welding can generate fumes, mists, dust, vapours and gases, including ozone. The amounts and types of fumes produced vary greatly depending on the process involved and the materials being used such as metals, solvents, flux, paint and plastics. The health effects of exposure to fumes, dust, vapour and gases can vary. Effects can include irritation of the upper respiratory tract (nose and throat), tightness in the chest, asphyxiation, asthma, wheezing, metal fume fever, lung damage, bronchitis, cancer, pneumonia or emphysema.

4.3 Indication of any immediate medical attention and special treatment needed

Acute effects include irritation of the eyes, nose and throat, shortness of breath

Some individuals may develop skin irritation

Section 5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media	Carbon dioxide (CO2), powder or diffuse jet of water. In case of major fire: Extinguish fire with diffuse jet of water or foam.

5.2 Special hazards arising from the substance or mixture

Avoid contact with strong acids or other substances which are corrosive to metals

5.3 Advice for fire fighters

Special protective equipment for fire fighters	Wear self contained breathing apparatus as in a fire welding rods may decompose on heating and produce hazardous decomposition products

Section 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

General ventilation and local fume extraction must be adequate to keep fume concentrations within safe limits. Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding. Skin contact should be avoided to prevent possible allergic reactions.

6.2 Environmental precautions

Try to prevent the material from entering drains or water courses.

6.3 Methods and material for containment and cleaning up

Spills to be cleaned up immediately using dry clean up methods and avoid dust generation
Use appropriate PPE to prevent contact with skin
Ensure good hygiene practices following clean up

6.4 Reference to other sections

For *Personal protection* see section 8. For *Disposal* see section 13. For *Environmental precautions* see section 12. For *Precautions for safe handling* see 7.1.

Section 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Preventive handling precautions	Ensure adequate ventilation for the welder and others. Use respiratory equipment when welding in a confined space. Wear protective clothing and eye protection appropriate to arc welding. Remove all flammable materials and liquids before welding.
General hygiene	Wash hands before breaks and immediately after handling the product.

7.2 Conditions for safe storage, including any incompatibilities

Store welding consumables inside a room with low humidity. Do not store welding consumables directly on the ground or beside walls. Store away from chemical substances like acids which could cause chemical reactions.

7.3 Specific end use(s)

Welding process.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Welding fume component	CAS No.	TWA[1] (mg/m^3)	STEL[1] 15min (mg/m^3)	Hazard Classification 67/548/EC	Hazard Classification (GHS) 1272/2008
Welding fumes (not otherwise classified)	-	5		R43	H351 Carc.2
Iron oxide fume (as Fe)	1309-37-1	5	10		
Manganese, fume (as Mn)	7439-96-5	1	3	R20/R22	H332/H302 Acute Tox.4
Chromium III compounds (as Cr)	24613-89-6			R45: R43:	H351 Carc. 2 H317 skin sens 1
Chromium VI Compounds Certain water insoluble Water soluble		0.05 0.05			
Nickel and its inorganic compounds Water soluble	7440-02-0	0.1		R40/R43 R49/R53	H351 Carc.2 H317skin sens 1/ H413 Aquatic Ch.4
Molybdenum (compounds, soluble (compounds, insoluble	7439-98-7	5 10			
Silica, amorphous Fume (thermally generated) (respirable dust)	-	6			
Antimony oxide	7440-36-0	0.5			H373 spec org tox 2
Titanium dioxide (inspirable dust)	13463-67-7	10			
Aluminium Inhalable dust Respirable dust	1344-28-1	10 4			
Zinc oxide Fume	1314-13-2	10			
Calcium Oxide	1305-78-8	2			
Calcium Silicate (inspirable dust)	1344-95-2	10			
Fluoride, inorganic (as F)		2.5			
Nitrogen dioxide	10102-44-0	5.6	9.4		
Nitrogen monoxide	10102-43-9	31	0		

Ozone	10028-15-6	0,2 peak limitation	
Carbon dioxide	124-38-9	9000	54000
Carbon Monoxide	630-08-0	31	

1. **Extracted from Safework Australia, Hazardous Substances Information System (HSIS) & Worksafe New Zealand Table of workplace exposure standards**

8.2 Exposure controls

Environmental Exposure Control – Refer to Section 6 of this SDS

Technical precaution measures	General ventilation and local fume extraction must be adequate to keep fume concentrations within safe limits.
Eye / face protection	Workers should always have their eyes, face and/or head protected whenever they are welding. For further information refer to: AS/NZS 1338: (series) Filters for eye protectors, AS/NZS 1338.1: Filters for eye protectors - Filters for protection against radiation generated in welding and allied operations and *AS/NZS 1336: Recommended practices for occupational eye protection* and *AS/NZS 1337: Eye protectors for industrial applications*
Hand/Arm protection	Gloves should be fire resistant and protect exposed skin on the hands and wrists. For further information refer to: *AS/NZS 2161: (series) Occupational protective gloves*.
Other skin protection	Avoid clothing that has the potential to capture hot sparks and metals, for example in pockets or other folds. Clothing should be made of natural fibres. For further information refer to: *AS/NZS 4502: (series) Methods for evaluating clothing for protection against heat and fire*. Foot protection should be non-slip and be heat and fire resistant. Avoid using foot protection that has the potential to capture hot sparks and metal debris, for example in laces or in open style shoes. For further information refer to: *AS/NZS 2210: (series) Occupational protective footwear* and *AS/NZS 2210.1: Safety, protective and occupational footwear - Guide to selection, care and use*.
Respiratory protection	Respirators should be fitted for each person individually and if one is to be used by another operator, it must be disinfected and refitted before use. The tightness of all connections and the condition of the face piece, headbands and valves should be checked before each use. Air supplied respirators may be required in some situations, e.g. confined spaces. For further information refer to: *AS/NZS 1716: Respiratory protective devices* and be selected in accordance with *AS/NZS 1715: Selection, use and maintenance of respiratory protective equipment.*
Eye / face protection	Workers should always have their eyes, face and/or head protected whenever they are welding. For further information refer to: AS/NZS 1338: (series) Filters for eye protectors,

AS/NZS 1338.1: Filters for eye protectors - Filters for protection against radiation generated in welding and allied operations and *AS/NZS 1336: Recommended practices for occupational eye protection* and *AS/NZS 1337: Eye protectors for industrial applications*

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance, colour	Grey
Appearance, physical state	Rod
Auto-ignition temperature	Not applicable
Auto-inflammability	Not auto-flammable
Decomposition temperature	Not applicable
Evaporation rate	Not applicable
Explosive properties	Not explosive
Flammability (solid gas)	Not applicable
Flash point	Not applicable
Form	Metal wire with flux coating
Initial boiling point and boiling range	Not applicable
Melting point / Freezing point	Not applicable
Odour	Odourless
Odour threshold	Not applicable
Oxidising properties	Not applicable
Partition coefficient: n-octanol / water	Not applicable
pH value	Not applicable
Relative density	Not applicable
Solubility	Not applicable
Solubility in water	Insoluble
Upper / lower flammability or explosive limits	Not applicable
Vapour density	Not applicable
Vapour pressure	Not applicable
Viscosity	Not applicable

9.2 Other information

Not applicable

Other

Density	7.96g/cm^3

Section 10. STABILITY AND REACTIVITY

10.1 Reactivity

Reactive with incompatible materials such as strong acids/corrosives

10.2 Chemical stability

Stable at normal conditions.

10.3 Possibility of hazardous reactions

Hazardous polymerisation will not occur

10.4 Conditions to avoid

None under normal conditions

10.5 Incompatible materials

Strong acids and metal corrosives

10.6 Hazardous decomposition products

Welding fumes and gases. Additional fume may arise from coatings and contaminants on the base material.

Welding fume component	CAS No.	Classification (67/548EEC)	CLP (1272/2008)		Concentration of classified fume components
Aluminium oxide (Al)	1344-28-1	-	-	-	1.8 to 1.2
Barium (Ba)	7440-39-3	-	-	-	≤0.1
Bismuth oxide (Bi)	12640-40-3	-	-	-	≤0.1
Calcium (Ca)	1305-78-8	-	-	-	0.1 to 11.6
Cobalt oxide (Co)	1307-96-6	R22: Harmful if swallowed R43: May cause sensitisation by contact	Acute tox 4 (oral) Skin sens. 1	H302 H317	≤0.1
Chromium III compounds (as Cr)	24613-89-6	R45: May cause cancer R35: Causes severe burns R43: May cause sensitisation by skin contact	Carc. 1B Skin Corr. 1A Skin Sens. 1	H350 H314 H317	≤0.1
Copper oxide (Cu)	1317-38-0	-	-	-	≤0.1

Iron oxide (Fe)	1332-37-2	-	-	-	11.9 to 54.9
Potassium (K)	7440-09-7	R34: Causes burns	Skin Corr. 1B	H314	0.6 to 23.8
Lithium (Li)	7439-93-2	R34: Causes burns	Skin Corr. 1B	H314	0.1 to 0.8
Magnesium oxide (Mg)	1309-48-4	-	-	-	0.1 to 5.3
Manganese (Mn)	7439-96-5	-	-	-	0.7 to 8.2
Molybdenum (Mo)	7439-98-7	Molybdenum trioxide R36/37: Irritating to eyes and respiratory system R40: Limited evidence of carcinogenic effect	Molybdenum trioxide Carc. 2 Eye Irrit. 2 STOT SE 3	H351 H319 H335	≤0.1
Sodium (Na)	7440-23-5	R34: Causes burns	Skin Corr. 1B	H314	0.5 to 8.7
Nickel (Ni)	7440-02-0	R40: Limited evidence of carcinogenic effect R43: May cause sensitisation by skin contact R48/23: Toxic danger of serious damage to health by prolonged exposure through inhalation R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment	Carc. 2 Skin sens 1 STOT RE 1	H351 H317 H372	0.1 to 0.2
Lead (Pb)	7439-92-1	-	-	-	0.1 to 1.8
Silicon (Si)	7440-21-3	-	-	-	2.1 to 16.3
Titanium dioxide (Ti)	13463-67-7	-	-	-	0.1 to 3.2
Vanadium (V)	7440-62-2	-	-	-	≤0.1
Zinc (Zn)	7440-66-6	-	-	-	0.1 to 3.5
Fluoride (F-)	16984-48-8	-	-	-	0.1 to 21.4

Final Fume classification		
Classification	**H phrase**	**Text**
Acute Toxicity (Inhal): Category 3	H331	Toxic if inhaled

Acute Toxicity (Oral/Dermal): Category 4	H302/H312	Harmful if swallowed or in contact with skin
Skin corrosion/irritation: Category 1A	H314	Causes severe skin burns and eye damage
Skin sensitisation: Category 1	H317	May cause an allergic skin reaction
Respiratory sensitisation: Category 1	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
Carcinogenicity: Category 1A	H350	May cause cancer
Mutagen: Category 1B	H340	May cause genetic defects
Reproductive toxicity: Category 2	H361f	Suspected of damaging fertility
Specific Target Organ Toxicity: Single exposure Category 3	H335	May cause respiratory irritation
Specific Target Organ Toxicity: Repeated exposure Category 2	H373	May cause damage to organs through prolonged or repeated exposure

Elemental analysis of the Fumes is shown below

Component	wt %	Component	wt %
Aluminium	0.6 to 2.2	Nickel	0.2 to 1.3
Calcium	0.5 to 1.9	Manganese	1.9 to 4.7
Iron	3.1 to 8.1	Silicon	5,9 to 13.6
Potassium	13.6 to 40.4	Titanium	0.9 to 4.3
Fluoride	7.1 to 18.2	Zinc	0.1 to 3.5
Sodium	0.5 to 8.7	Cr (VI)	2.6 to 5.5

Section 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

	Conditions to avoid: none in the form supplied When welding, fumes and gases generated can be dangerous to health.
Acute toxicology	Welding operations may evolve fumes that may be irritating to the respiratory tract and harmful if inhaled . Aspiration may cause pulmonary oedema and pneumonitis Short-term overexposure can cause dizziness, nausea and irritation of the nose, throat or eyes.
Irritation	Manganese fumes – Eye (rabbit) 500 mg/24hr Mild - Skin (rabbit) 500 mg/24 hr Mild
Corrosive effects	Not available
Sensitisation	May cause sensitisation by skin contact
Mutagenicity	Not available
Carcinogenicity	Welding fumes are possibly carcinogenic to humans and have been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans
Repeated dose toxicity	Based on the human evidence including "pulmonary damage, if exposed to Antimony metal vapour or Antimony metal oxide powder for a long period of time" (HSDB (2005)), and the evidence from animal studies including "interstitial fibrosis, enlargement and hyperplasia of the alveolar wall, metaplasia of the cuboidal/columnar epithelium" (HSDB (2005)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 2.
Reproductive toxicity	Not available

Section 12. ECOLOGICAL INFORMATION

12.1 Toxicity

	The welding process can effect the environment if fume is released directly into the atmosphere. Residues from welding consumables could degrade and accumulate into soils and ground water.
Aquatic	Cr(VI) is suspected of being very toxic to aquatic organisms and may cause long term adverse effects in the aquatic environment.
Acute fish toxicity	LC50 Fish 96h: Manganese: 2,91 mg/l Aluminiumoxide: >100 mg/l Salmo trutta
Acute algae toxicity	IC50 Algae 72h: Manganese: 0,55 mg/l Aluminiumoxide: >100 mg/l Selenastrum capricornatum (green algae)

Acute crustacean toxicity	EC50 Daphnia 48h: Manganese: 5,2 mg/l Aluminiumoxide: >100 mg/l Daphnia magna (Water flea)

12.2 Persistence and degradability

Not available

12.3 Bio accumulative potential

Not available

12.4 Mobility in Soil

Not available

12.5 Results of PBT and vPvB assessment

Not available

12.6 Other adverse effects

Not available

Section 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Disposal considerations	Recycle packing materials. Dispose of any product, residue or packing material according to national and local regulations. Spent ;fume extraction filters shall be disposed of as hazardous waste.

Section 14. TRANSPORT INFORMATION

14.1 UN number

Not applicable

14.2 UN proper shipping name

Not applicable

14.3 Transport hazard class(es)

Not applicable

14.4 Packing group

Not applicable

14.5 Environmental hazards

Not applicable

14.6 Special precautions for user

Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

Other

Dangerous goods	Not classified as a dangerous good for transport by air, land, or sea

Section 15. REGUATORY INFORMATION

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

EU regulations	*Dangerous Goods Regulations/2014 (IATA)* *International Maritime Dangerous Goods/2012 (IMO)* *Regulation (EC) No 1271/2008 [CLP]* *Dangerous Substances Directive (67/548/EEC)*
National regulations	*Model Work and Safety Regulations 2014 (Safework Australia)* *Hazardous Substances [Classification] Regulations 2001 [New Zealand]* *Australian Code for the transport of Dangerous Goods by Road and Rail Volume 7/2011 (NTC)* *Land Transport Rule 45001/1 (New Zealand)* *Local laws and regulations should be carefully observed.*

15.2 Chemical safety assessment

Not applicable

Section 16. OTHER INFORMATION

References to key literature and data sources	Regulation (EC) No 1907/2006 of the European Parliament and of the Council, (REACH). Regulation (EC) No 1272/2008 of the European Parliament and of the Council. Safework Australia: Hazardous Substances Information System (HSIS) Worksafe New Zealand: Table of workplace exposure standards Annex VI CLP Regulation (EC) 1272/2008

Phrase meaning	Safework Australia: Code of Practice : Welding Processes/2012

Other

Manufacturer's notes	*Read this Safety Data Sheet carefully and become aware of hazards implied and the safety information.*
Details of Hazards relating to fumes	As a result of intended normal use, decomposition products that are classified as Hazardous may be released.
GHS Classification	Acute Toxicity – Inhalation (Hazard Category 4) Sensitisation – Skin (Hazard Category 1) Carcinogenicity (Hazard Category 2) Specific Target Organ Toxicity (repeated Exposure) (Hazard category 2) Chronic Aquatic Toxicity (Hazard Category 4)
Hazard statement(s)	H317 - May cause an allergic skin reaction H332 – Harmful if inhaled H351 – Suspected of causing cancer H373 – May cause damage to respiratory organs through prolonged or repeated exposure to metal vapour or metal oxide powder H413 - May cause long lasting harmful effects to aquatic life

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