

Version number: 1 Replaces SDS: 2009-11-23 Issued: 2014-02-11

Not for sale in the USA

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

1.1 Product identifier

Trade name	HARDFACING E	HARDFACING ELECTRODES								
	(Afrox 300, Afrox	x 350, Afrox 40	0, Afrox 452, Af	rox 600, Afrox	650A, Afrox CrM	In, Afrox				
	NiMn, Afrox CR7	NiMn, Afrox CR70, Afrox CR70 MR, Azucar 80, Azucar 100, Afrox Cobalarc 1, Afrox								
	Cobalarc 9)									
Article-no	Product	Diameter	Electrode	Current	Pack Mass	ltem				
	packaging	(mm)	Length	(A)	(kg)	Number				
	data		(mm)							
	Afrox 300	3,15	350	110-145	4,0	W075603				
		4,0	350	140-180	4,0	W075604				
		5,0	450	180-240	6,0	W075605				
	Afrox 350	5,0	450	170-250	6,0	W075609				
	Afrox 400	4,0	350	120-160	5,0	W075634				
	Afrox 452	4,0	350	110-170	5,0	W075674				
		5,0	450	170-270	6,0	W075675				
	Afrox 600	3,15	350	110-145	4,0	W075613				
		4,0	450	140-180	6,0	W075614				
		5,0	450	180-240	6,0	W075615				
	Afrox 650A	3,15	350	80-120	4,0	W075623				
		4,0	350	120-160	4,0	W075624				
	Afrox CrMn	4,0	350	130-170	4,0	W075628				
		5,0	350	170-220	4,0	W075629				



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Afrox NiMn	4,0	350	130-170	4,0	W075664
	5,0	450	170-220	6,0	W075665
Afrox CR70	4,0	450	140-180	5,0	W075644
	5,0	450	170-210	5,0	W075645
Afrox CR70	4,0	450	140-180	5,0	W075648
MR					
Azucar 80	3,15	350	110-160	5,0	W189653
	4,0	450	140-180	5,0	W189654
	5.0	450	170-210	5,0	W189655
	0,0	400	110 210	0,0	11100000
Azucar 100	4,0	450	160-200	5,0	W189644
Afrox	4,0	450	160-200	5,0	W075684
Cobalarc 1	5,0	450	160-240	5,0	W075685
Afrox	3,15	350	100-145	5,0	W075593
Cobalarc 9	4,0	450	160-200	5,0	W075594
	5.0	450	160-240	5.0	W075595
	5,0	430	100-240	3,0	*****

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

Article type

typeSMAW Hardfacing electrodes Classification: DIN 8555UseElectric Arc welding

1.3 Details of the supplier of the safety data sheet

Supplier	Afrox
Street address	23 Webber Street, Selby
	Johannesburg, 2001
	South Africa
Telephone	+27 (0) 11 490 0400
Fax	+27 (0) 860 020201
Email	Customer.service @afrox.linde.com



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1.4 Emergency telephone number

Available outside office hours Yes

Emergency phone number 0860 02 02 02

Other

Additional product information Web site: www.afrox.co.za

Section 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) 1271/2008 [CLP] applicable

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 can be dangerous to health.

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	%N	۸n	%Cr	%Ni	%Мо	%Fe
Cas Number	7440-44-0	7440-21-3	7439-	-96-5	7440-47-3	7440-02-0	7439-98-7	7439-89-6
Ranges	.020.09	0.1max	0.35-	0.60	0.04max	0.06max	0.02 max	balance
Flux coating			CAS No.					
Limestone and/or Calcium Carbonat	e	0-3	5	13 [,]	17-65-3			



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Mica (total inhalable dust) (respirable dust)	0-10	12001-26-2
Kaolin (respirable dust)	0-10	1332-58-7
Graphite (total inhalable dust) (respirable dust)	0-5	7440-44-0
Mineral Silicates (total inhalable dust) (respirable dust)	0-20	1332-58-7 1344-95-2
Inorganic Fluorides (as F)	0-30	16984-48-8
Manganese and its Inorganic compounds (as Mn)	0-30	7439-96-5 and others
Aluminium (total inhalable dust) (respirable dust)	0-5	7429-90-5
Rutile/ Titanium oxide (total inhalable dust) (respirable dust)	0-40	13463-67-7
Nickel and its inorganic compounds (soluble, as Ni) (insoluble, as Ni)	0-5	7440-02-0
Silicon and Silicon alloys, (as Si) (total inhalable dust) (respirable dust)	0-10	7440-21-3
Molybdenum compounds (as Mo) (soluble compounds) (insoluble compounds)	0-8	7439-98-7
Chromium Chromium III compounds Chromium VI compounds	0-40	7440-47-3
Cobalt	0-2	7440-36-0
Silicate Binders	0-35	1344-09-8
Ferro Vanadium	0-6	
Ferro Boron	0-23	
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



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	comfortable for breathing. Call a physician if symptoms occur.			
Skin contact	Burns should be treated by a doctor.			
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	Inhalation of vapours may cause irritation of the respiratory system in very susceptible			

4.3 Indication of any immediate medical attention and special treatment needed

Not applicable

persons.

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

Not applicable

5.3 Advice for fire fighters

Special protective equipment for Wear self contained breathing apparatus fire fighters

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

Not applicable



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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 without 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.	WEL 8hr TWA	STEL 15min TWA
Iron oxide fume (as Fe)	1309-37-1	5	10
Manganese and its inorganic compounds (as Mn)	7439-96-5	0.5	
Copper			
(fume)	7440-50-8	0.2	
(dust and mist)		1	
Nickel and its inorganic compounds			
(water soluble)		0.1	
(water insoluble)		0.5	
Silica, amorphous			
(total inhalable dust)	-	6	
(respirable dust)		2.4	
Titanium dioxide			
(total inhalable dust)	13463-67-7	10	
(respirable dust)		4	
Calcium Oxide	1305-78-8	2	



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Calcium Silicate (total inhalable dust) (respirable dust)	1344-95-2	10 4	
Fluoride, inorganic (as F)	16984-48-8	2.5	
Carbon Monoxide	630-08-0	30ppm	200ppm
Carbon Dioxide	124-38-9	5000ppm	15000ppm
Nitrogen dioxide (NO ₂)	10102-44-0	0.5 ppm	0.95 ppm
Ozone (O ₃)	10028-15-6		0.2 ppm
Nitrogen monoxide (NO)	10102-43-9	0.5 ppm	0.63 ppm

8.2 Exposure controls

I	Environmemtal 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	Wear eye protection appropriate for welding.				
Safety gloves	Skin contact should be avoided to prevent possible allergic reactions.				
Other skin protection	Wear body protection which helps to prevent injury from radiation, sparks and electric				
	shock.				
Respiratory protection	Use respiratory equipment when welding in a confined space. Wear protective clothing				
	and eye protection appropriate to arc welding.				

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	Not applicable
range	
Melting point / Freezing point	Not applicable



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Odour Odourless **Odour threshold** Not applicable **Oxidising properties** Not applicable Partition coefficient: n-octanol / Not applicable water pH value Not applicable **Relative density** Not applicable Solubility Not applicable Solubility in water Insoluble Upper / lower flammability or Not applicable explosive limits Vapour density Not applicable Vapour pressure Not applicable Viscosity Not applicable 9.2 Other information Not applicable Other Density 7.98g/cm³

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Section 10. STABILITY AND REACTIVITY

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10.1 Reactivity
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Not applicable

10.2 Chemical stability Stable at normal conditions.

10.3 Possibility of hazardous reactions

Not applicable

10.4 Conditions to avoid None under normal conditions

10.5 Incompatible materials

Not applicable

10.6 Hazardous decomposition products

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



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Welding fume component	CAS No.	Classification (67/548EEC) CLP (12				2008)	Concentration of classified fume components
Aluminium oxide (Al)	1344-28-1	-	-	-	1.0 to 1.1		
Barium (Ba)	7440-39-3	-	-	-	<0.1		
Bismuth oxide (Bi)	12640-40-3	-	-	-	<0.1		
Calcium (Ca)	1305-78-8	-	-	-	1.0 to 1.2		
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	9.6 to 10.3		
Copper oxide (Cu)	1317-38-0	-	-	-	<0.1		
Iron oxide (Fe)	1332-37-2	-	-	-	42.1 to 42.5		
Potassium (K)	7440-09-7	R34: Causes burns	Skin Corr. 1B	H314	4.2 to 5.9		
Lithium (Li)	7439-93-2	R34: Causes burns	Skin Corr. 1B	H314	<0.1		
Magnesium oxide (Mg)	1309-48-4	-	-	-	<0.1		
Manganese (Mn)	7439-96-5	-	-	-	<0.1		
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	H355 H314	1.1 to 1.7		



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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	Carc. 2 Skin sens 1 STOT RE 1	H351 H317 H372	0.2
		aquatic organisms, may cause long-term adverse effects in the aquatic environment			
Lead (Pb)	7439-92-1	-	-	-	<0.1
Silicon (Si)	7440-21-3	-	-	-	7.4 to 7.8
Titanium dioxide (Ti)	13463-67-7	-	-	-	0.8 to 0.9
Vanadium (V)	7440-62-2	-	-	-	<0.1
Zinc (Zn)	7440-66-6	-	-	-	<0.1
Fluoride (F-)	16984-48-8	-	-	-	3.1 to 4.3
		R45: May cause cancer	Carc 1A	H350	1.5 to 2.3
		R46: May cause heritable genetic damage	Muta 1B	H340	
		R24/25Toxic in contact with skin and if	Repr. 2	H361f	
		swallowed R26: Very Toxic by	Acute tox 2 (inhal)	H330	
		inhalation R35: Causes severe burns	Acute tox 3 (oral/dermal)	H311 H301	
Chromium (VI) (Cr (VI))	1333-82-0	R42/43: May cause sensitisation by inhalation	STOT RE 1	H372	
	and skin contact R48/23: Toxic danger of serious damage to health		Skin corr 1A	H314	
			Resp sens 1	H334	
		through inhalation	Skin Sens 1	H317	
		R62 Possible risk of impaired fertility	STOT SE 3 (C≥1%)	H335	



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					Acute tox 2 (Inh	nal)	H330	0.00002		1
Nitrogen dioxide (gas) 101	1010	10102-44-0	R26: Ver inhalatio	ry toxic by n	Skin Corr 1B		H314			
			R34: causes burns		STOT SE 3 (C≥0.5%)		H335			
Nitrogen monoxide (gas)	1010	02-43-9 -			-		- 0.00076			1
Welding fume compor	Welding fume component CAS N		No.	Classification	(67/548EEC)		CLP	(1272/200	08)	Conce
Aluminium oxide (Al))	1344-28-1	l	-		-		-	1.0 to	
Barium (Ba)		7440-39-3	3	-		-		-	<0.1	
Bismuth oxide (Bi)		12640-40-	-3	-		-	-		-	<0.1
Calcium (Ca)		1305-78-8	}	-		-	-		-	1.0 to
				R22: Harmful if swallowed		Acu	ite tox 4 (or	al)	H302	<0.1
Cobalt oxide (Co)		1307-96-6		R43: May cause sensitisation by contact			n sens. 1		H317	
Chromium III compounds (as Cr)		24613-89	-6	R45: May cause R35: Causes seve R43: May cause s skin contact	re burns	Skiı	c. 1B n Corr. 1A n Sens. 1		H350 H314 H317	9.6 to
Copper oxide (Cu)		1317-38-0		-		-			-	<0.1
Iron oxide (Fe)		1332-37-2		-		-			-	42.1 t
Potassium (K)		7440-09-7		R34: Causes burns		Skin Corr. 1B		H314	4.2 to	
Lithium (Li)		7439-93-2		R34: Causes burns		Skin Corr. 1B			H314	<0.1
Magnesium oxide (Mg	g)	1309-48-4	۱ <u> </u>	-					-	<0.1
Manganese (Mn)		7439-96-5	;	-		-				<0.1
Molybdenum (Mo)		7439-98-7	7	Molybdenum tri R36/37: Irritatin respiratory syste R40: Limited carcinogenic effe	ng to eyes and em evidence of	Care Eye	lybdenum t c. 2 Irrit. 2 DT SE 3	rioxide	H351 H319 H335	<0.1
Sodium (Na)		7440-23-5	5	R34: Causes bur	'ns	Ski	n Corr. 1B		H314	1.1 to



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		R40: Limited evidence of	Carc. 2	H351	0.2
		carcinogenic effect	Skin sens 1	H317	
		R43: May cause sensitisation by skin contact			
		R48/23: Toxic danger of serious	STOT RE 1	H372	
Nickel (Ni)	7440-02-0	damage to health by prolonged			
		exposure through inhalation			
		R52/53: Harmful to aquatic organisms, may cause long-			
		term adverse effects in the			
		aquatic environment			
Lead (Pb)	7439-92-1	-	-	-	<0.1
Silicon (Si)	7440-21-3	-	-	-	7.4 to
Titanium dioxide (Ti)	13463-67-7	-	-	-	0.8 to
Vanadium (V)	7440-62-2	-	-	-	<0.1
Zinc (Zn)	7440-66-6	-	-	-	<0.1
Fluoride (F-)	16984-48-8	-	-	-	3.1 to
			Carc 1A	H350	1.5 to
Chromium (VI) (Cr (VI))	1333-82-0	R45: May cause cancer	Muta 1B	H340	
		R46: May cause heritable			
		genetic damage R24/25Toxic in contact with	Repr. 2	H361f	
		skin and if swallowed	Acute tox 2 (inhal)	H330	
		R26: Very Toxic by inhalation			
		R35: Causes severe burns	Acute tox 3 (oral/dermal)	H311 H301	
		R42/43: May cause sensitisation	(oral/dermal)	11501	
		by inhalation and skin contact	STOT RE 1	H372	
		R48/23: Toxic danger of serious damage to health by prolonged exposure through inhalation	Skin corr 1A	H314	
		R62 Possible risk of impaired	Resp sens 1	H334	
		fertility	Skin Sens 1	H317	
			STOT SE 3 (C≥1%)	H335	
			Acute tox 2 (Inhal)	H330	0.000
Nitrogen dioxide (gas)	10102-44-0	R26: Very toxic by inhalation	Skin Corr 1B	H314	
The offen monine (200)		R34: causes burns		11.17	
			STOT SE 3 (C≥0.5%)	Н335	
Nitrogen monoxide (gas)	10102-43-9	-	-	-	0.000

The classification information above relates to the fume during use.



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Analysis wt %	
AI 0.2 to 1.8	Ni 0.1 to 1.5
Ca 0.8 to 9.3	Mn 1.1 to 33.5
Fe 21.8 to 50.3	Si 2.1 to 16.3
K 2.8 to 23.7	Ti 0.1 to 1.3
Cr 0.1 to 11.7	F- 1.5 to 13.9
Na 0.5 to 8.7	Cr (VI) 1.1 to 3.2

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	Excessive exposures may affect human health, as follows: Aspiration may cause pulmonary		
	oedema and pneumonitis Short-term overexposure can cause dizziness, nausea and irritation		
	of the nose, throat or eyes.		
Irritation	Not applicable		
Corrosive effects	Not applicable		
Sensitisation	May cause sensitisation by skin contact		
Mutagenicity	Not applicable		
Carcinogenicity	Welding fumes are possibly carcinogenic to humans		
Repeated dose toxicity	Not applicable		
Reproductive toxicity	Not applicable		

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			



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	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	
, in the second s	Not applicable
12.3 Bio accumulative potential	
Bioconcentration factor (BCF):	
Iron: 140000	
Manganese: 59052	
12.4 Mobility in Soil	
	Not applicable
12.5 Results of PBT and vPvB asses	ssment
	Not applicable
12.6 Other adverse effects	
	Not applicable
Section 13. DISPOSAL CON	SIDERATIONS
13.1 Waste treatment methods	
Disposal considerations	Dispose of any product, residue or packing material according to national and local
	regulations. Spent ;fume extraction filters shall be disposed of as dangerous waste.
Other	
Waste code (EWC)	12 01 13 – welding waste
Section 14. TRANSPORT IN	FORMATION
14.1 UN number	
	Not applicable
	Not applicable
14.2 UN proper shipping name	Not applicable
14.2 UN proper shipping name	Not applicable



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	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 A	Annex II of MARPOL 73/78 and the IBC Code
	Not applicable

Other

Dangerous goods No

Section 15. REGUATORY INFORMATION

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

EU regulations	The product does not need to be labelled in accordance with EC directives or respective
	national laws.
National regulations	EH40/2005 Workplace exposure limits
	The Waste Regulations 2011 No. 988
	Local laws and regulations should be carefully observed.

15.2 Chemical safety assessment

Not applicable

Section 16. OTHER INFORMATION

References to key literature and	Regulation (EC) No 1907/2006 of the European Parliament and of the Council, (REACH).			
data sources	Regulation (EC) No 1272/2008 of the European Parliament and of the Council.			
	EH40/2005 Workplace exposure limits.			
	The Waste regulations 2011 No.988			
	C&L Inventory database			
	Annex VI CLP Regulation (EC) 1272/2008			
Phrase meaning	H314 – Causes severe skin burns and eye damage			
	H350 – May cause cancer.			



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Other

Manufacturer's notes

Read this Safety Data Sheet carefully and become aware of hazards implied and the safety information.

End of Document