

Raw materials for lubricants & metalworking



SASOL

Sasol Performance Chemicals



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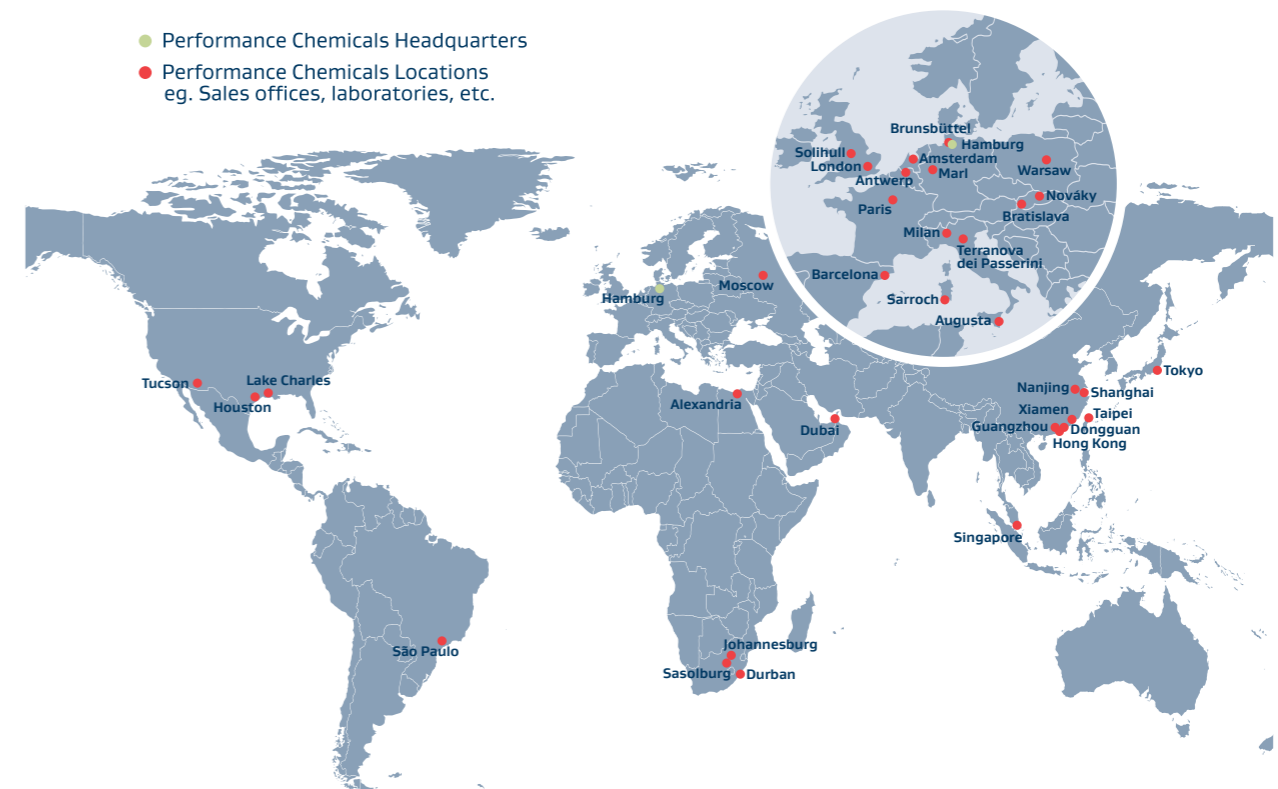
About us

Sasol's Performance Chemicals business unit markets a broad portfolio of organic and inorganic commodity and speciality chemicals. Our business consists four key business divisions: Organics, Inorganics, Wax and PCASG (Phenolics, Carbon, Ammonia and Speciality Gases). About 6300 people (incl. employees from Regional Operating Hubs) in offices in 18 countries serve customers around the world with a multi-faceted portfolio of state-of-the-art chemical products and solutions for a wide range of applications and industries.

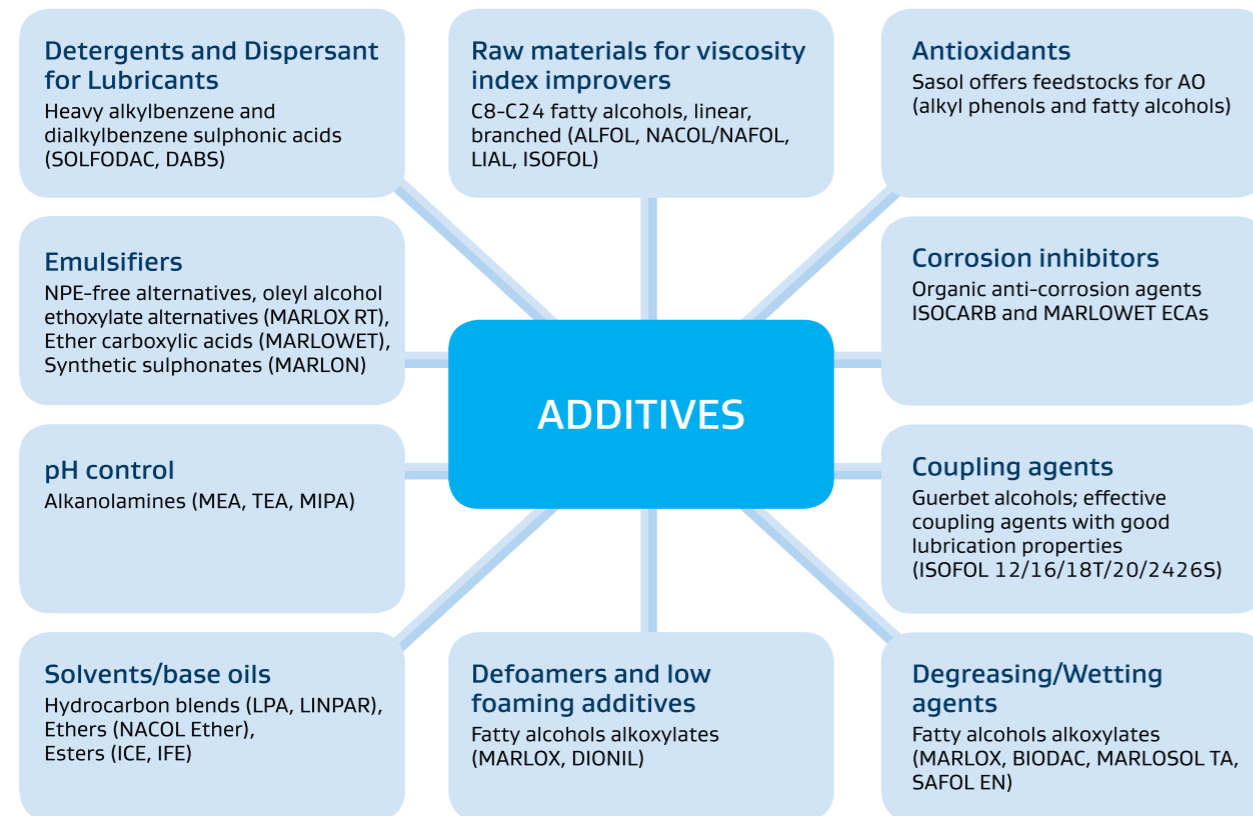
Our key products include surfactants, surfactant intermediates, fatty alcohols, linear alkyl benzene (LAB), short-chain linear alpha olefins, ethylene, petrolatum, paraffin waxes, synthetic waxes, cresylic acids, high-quality carbon solutions as well as high-purity and ultra-high-purity alumina. Our speciality gases sub-division supplies its customers with high-quality ammonia, hydrogen and CO2 as well as liquid nitrogen, liquid argon, krypton and xenon gases.

Our products are as individual as the industrial applications they serve, with tailor-made solutions creating real business value for customers. Ongoing research activities result in a continuous stream of innovative product concepts that help our customers position themselves successfully in future markets.

Our products are used in countless applications in our daily lives to add value, security and comfort. Typical examples include detergents, cleaning agents, personal care, construction, paints and coatings, leather and metal processing, hot-melt adhesives, bitumen modification and catalyst support for automotive catalysts and other diverse specialty applications including oil and gas recovery, aroma production, plastic stabilisation, and polymer production. Every day, our researchers explore ways to improve our products and develop innovations that improve the quality of people's lives.



1. Main products for Lube/MWF applications



2. Alcohol product portfolio

Description	Structure	Process & Product name
<ul style="list-style-type: none"> • 100% linear • Even numbered • C6 to C22+ 		Ziegler, oleochemical ALFOL NAFOL, NACOL
<ul style="list-style-type: none"> • Monomethyl branched • C8 isomers 	<p>representation of one possible isomer</p>	Isooctyl alcohol LINCOL 8i
<ul style="list-style-type: none"> • Blends of linear and C2-monobranched alcohol ranging from 5% to 95% linear • Odd and even numbered • C11 to C17 	<p>representation of one possible isomer</p>	Oxo alcohol ISALCHEM LIAL, ALCHEM
<ul style="list-style-type: none"> • C2-monobranched alcohol • Even numbered • C12 to C32 		Guerbet alcohol ISOFOL
<ul style="list-style-type: none"> • Blends of linear and branched alcohol • C12 to C32 	<p>representation of one possible isomer</p>	FT-Oxo alcohol SAFOL
<ul style="list-style-type: none"> • Multi-methyl branched • C13 	<p>representation of one possible isomer</p>	Isotridecyl alcohol MARLIPAL 013 (TDA)

3. Group V base oil

Esters for compressor oils, gear oils, transmission fluids, greases, MWF, chain lubricants and engine oils

3.1 Esters

Product name	Characteristics				
	SG @ 25 °C	KV @ 40 °C (cSt)	KV @ 100 °C (cSt)	VI	Pour point (°C)
ISOCARB Ester 1605	0.908	78	12	140	<-55
LINPLAST 810TM	0.972	50	8	123	-48
ISOFOL Ester 1202	0.843@ 40 °C	14	4	155	-3
REPROXAL 13 XAN	0.910	24	5	137	-54

3.2 Oil soluble polyalkylene glycols

Product name	Characteristics			
	SG @ 25 °C	KV @ 40 °C (cSt)	KV @ 100 °C (cSt)	VI
MARLOWET M 20 VG *	0.910	20	5	150
MARLOWET M 32 VG *	0.940	30	6	140
MARLOWET M 46 VG *	0.950	48	9	180
MARLOWET M 68 VG *	0.965	68	12	185
MARLOWET M 100 VG	0.970	90	16	180
MARLOWET M 320 VG *	0.980	310	50	225

^{a)} Test conditions: stainless steel, Rotations : 100 m, Weight: 1,5 kg, T=25±5°C, Load 294 N

* Developmental product



Characteristics				
Flash point (°C)	Water (%)	TAN (mg KOH/g)	Iodine value (g I/100g)	TSCA
310	≤0.10	≤0.5	≤1.0	positive listing
275	≤0.10	≤0.2	≤0.5	not listed; PMN started
240	≤0.10	≤0.1	≤0.5	not listed
≥245	≤0.05	≤0.1	≤0.5	not listed; PMN started

Characteristics				
Pour point (°C)	Flash point (°C)	Water (%)	Reichert wear test ^{a)} (mg)	TSCA
-11	>125	≤0.1	8.9	not listed
-55	>125	≤0.1	11.9	not listed
-54	>125	≤0.5	7.3	positive listing
-54	>125	≤0.5	6.4	positive listing
-50	>125	≤0.1	6.1	positive listing
-40	>125	≤0.1	2.7	positive listing



4. Water soluble polyalkylene glycols for MW

Product name	Characteristics			
	SG @ 25 °C	KV @ 40 °C (cSt)	KV @ 100 °C (cSt)	VI
GLICERODAC	1.153	90	10	110
GLICERODAC 20	1.133	110	16	160
GLICERODAC PO 70	1.030	214	33	180
GLICERODAC 35 PO*	1.016 @ 40 °C	292	44	180
PLURODAC 44	1.052	230	33	188
PLURODAC 64	1.044	240	40	221
PLURODAC 68	na - solid	na - solid (320 @ 70 °C)	n.a.	n.a.

* developmental product

5. Coupling agents

Product name	Characteristics			
	KV @ 20 °C (cSt)	KV @ 40 °C (cSt)	Pour Point (°C)	Flash Point (°C)
ISOFOL 12	28	12	<-30 (melting range)	120
ISOFOL 16	46	20	-21 to -15 (melting range)	156
ISOFOL 18T	60	23	-10 to -6 (melting range)	170
ISOFOL 20	72	28	-1 to 1 (melting range)	180
ISOFOL 24265	141	49	≈ -31	>200
ISALCHEM 145 Y	31	15	-9	148
ISALCHEM 145	30	15	-30	140
MARLOWET M 32 VG *	70	30	-55	>125
MARLOWET M 46 VG *	124	48	-54	>125
MARLIPAL VS18	20800	1350	<-50	155
NACOL Ether 8	4,5	3	-7	141
MARLOSOL PHE	40	20	14	119

* developmental product

Characteristics			
Pour point (°C)	Flash point (°C)	Water (%)	TSCA
-45	>125	≤0.50	positive listing
-21	>125	≤0.25	positive listing
-36	>125	≤0.10	positive listing
-33	>125	≤0.25	not listed
-3	>125	4 - 6	positive listing
18	>125	≤0.50	positive listing
n.a.	>125	≤0.80	positive listing

Characteristics		
Water (%)	Iodine Value (g I/100g)	Application comments
≤0.10	≤0.5	Suitable for soluble oil
≤0.10	≤0.5	Suitable for soluble oil MQL
≤0.10	≤0.5	Suitable for soluble oil
≤0.10	≤0.5	Suitable for soluble oil
≤0.10	≤0.7	Suitable for soluble oil MQL
≤0.20	(Bromine Index ≤100 mg Br/100g)	Suitable for soluble oil
≤0.10	(Bromine Index ≤100 mg Br/100g)	Suitable for soluble oil
≤0.10	n.a.	Suitable for lubricants
≤0.50	n.a.	Suitable for lubricants
≤0.30	n.a.	Suitable for lubricants
≤0.10	n.a.	Solvent
≤0.50	n.a.	Solvent

6. Solvents

Product name	Characteristics		
	Flash point (°C)	Boiling point (°C)	Viscosity @ 20 °C (mPa*s)
LPA 142	63 (145 °F)	192-212 (378-414 °F)	1.5 (1.8 cSt)
LPA 170	78 (172 °F)	214-230 (418-446 °F)	2.0 (2.4 cSt)
LPA 210	96 (205 °F)	240-280 (464-536 °F)	3.4 (4.0 cSt)
LINPAR 1416 V	118 (244 °F)	248 - 284 (478 - 544 °F)	2.3 (3.0 cSt)
PARAFOL 12-97	71	216	1.5
PARAFOL 14-97	115	253	2.3
PARAFOL 16-97	135	287	2.3
DIONIL P3-E *	>200	n.a.	≈ 13
DIONIL P4 *	>200	>215	14
NACOL Ether 6	97	206	1.7
NACOL Ether 8	141	286	3.6
NACOL Ether 10	180	n.a.	6.9

* developmental product

7. Emulsifiers

Product name	Mineral oils		Vegetable oils	Synthetic oils		
	Naphtenic oils	Paraffinic oil		Esters	PAO	PAGs
MARLOX RT 42	x	x		x	x	x
MARLOX RT 64	x	x		x	x	x
MARLOX FK 64	x	x		x	x	x
MARLOX RT 45	x	x		x	x	x
MARLOWET CPO	x	x		x		
MARLOWET 4750 M	x	x		x		
MARLOWET 5001	x	x				
MARLOWET LVS			x	x		x
MARLOWET R11			x	x		x
EMULGANTE EL-65/ MARLOWET R40			x			x
MARLOWET 45-- Series	x	x	x	x	x	x
MARLON AMI 80	x	x		x	x	x
SOLFODAC 117H						
DABS						
MARLON OS 85						
MARLON OS 80 H	x	x		x	x	x

Characteristics	Pour point (°C)	Aromatic content (%)	Origin	Production
-70(<-94 °F)	<0.3	mineral	USA	
-59(-72 °F)	<1.0	mineral	USA	
4 (39 °F)	<0.5	mineral	USA	
-10.5 (onset temperature)	free	renewable	Germany	
4.5 (onset temperature)	free	renewable	Germany	
16.5 (onset temperature)	free	renewable	Germany	
<-10 °C	free	synthetic	Slovakia	
<-75 °C	free	synthetic	Slovakia	
-42	free	synthetic	Germany	
-7	free	synthetic	Germany	
17	free	synthetic	Germany	

Characteristics	Foaming	Hazardous for environment	Hard water stability	Lubricity improver	Anti-corrosion	HLB
low	no		x	x		10
low	no					10
low	no		x	x		11.5
low	no					7
low	no			x		10
low	H400, H412					10
low	no			x		6.9
medium	no			x		6.9
high	no					13.1
low	no		x		x	anionic
high	no				x	anionic
low					x	anionic
low					x	anionic
high				x	x	anionic
low				x	x	anionic

8. Anticorrosion additives: acids & emulsifiers

Product name	Characteristics			
	Acid value (mg KOH/g)	Appearance @ 20 °C	Foam	Ferrous metal
ISOCARB 11	295-305	liquid	medium	x
ISOCARB 12	273-283	liquid	medium	x
ISOCARB 16	212-222	liquid	low	x
MARLON AMI 80	n.a.	viscous liquid	medium	x
MARLON OS 85*	n.a.	viscous liquid	medium	x
MARLON OS 80 H*	n.a.	viscous liquid	low	x
Ethercarboxylic acids low chloride				
MARLOWET 4538	73-78	liquid	medium	x
MARLOWET 4539	107-114	liquid	medium	x
MARLOWET 4539 LF	107-114	liquid	low	x
MARLOWET 4541	97-102	liquid	medium	x
MARLOWET 4560	60 - 70	pasty	low	x
MARLOWET 4561	55 - 65	pasty	low	x
MARLOWET 4562	75 - 80	liquid	low	x
MARLOWET 4563	60 - 65	liquid	low	x
MARLOWET 4570	55 - 60	liquid	low	x
MARLOWET 4570 LF	55 - 60	liquid	low	x

9. Low foaming additives and defoamers/air releaser

Product name	Characteristics			
	Appearance @ 20 °C	Solubility in water	Cloud point (°C)	Density @ 25 °C (kg/l)
MARLOWET CPO	clear liquid	no	44-50 (1a)	0.88
MARLOX B35	clear liquid	no	55-65 (1b)	0.92
NACOL ETHER 6	clear liquid	no	n.a.	0.79
DIONIL P3-E*	clear liquid	no	n.a.	0.93
DIONIL P4*	clear liquid	no	n.a.	0.93

Non ferrous metal	Lubricity improver ¹⁾	Application
		x
x	+++	Stable in hard water
x	+++	Suitable alternative to long chain fatty acid
		Emulsifier and anticorrosion for synthetic and semi-synthetic MWF and cleaners
		Emulsifier and anticorrosion for soluble oils and semi-synthetic fluids
		O/W emulsifier with anticorrosion property
x	+	Multipurpose wetting agent
x	+	Strong corrosion inhibitor, very efficient in hard water, active also at extreme pH, strong defoaming properties
x	+	Strong corrosion inhibitor, very efficient in hard water, active also at extreme pH, strong defoaming properties
x	+	Co-emulsifier and corrosion inhibitor in water based metalworking fluids, alkaline emulsion cleaner
x	+++	Water soluble lubricant, cutting fluid
x	+++	Water soluble lubricant, cutting fluid, suitable for soft water
x	++	Emulsifier for naphthenic and paraffinic base oils, co-emulsifier in water based metalworking fluids
x	++	Hydrophilic emulsifier for water based metalworking fluids, high lime soap dispersing properties
x	++	Emulsifier for naphthenic base oils, co-emulsifier in water based metalworking fluids
x	++	Emulsifier for naphthenic base oils, co-emulsifier in water based metalworking fluids, strong defoaming properties

Product name	Characteristics			
	Appearance @ 20 °C	Solubility in water	Cloud point (°C)	Density @ 25 °C (kg/l)
DIONIL RT 23*	clear liquid	yes	31 (2)	0.98
DIONIL RT 27*	turbid liquid	yes	63 (2)	1.02
MARLOWET 5056	clear liquid	yes	70-74 (3)	1.00
MARLOSOL 4702	clear liquid	no	n.a.	1.00

* developmental product, (1a) 5% in BDG 25%, (1b) 10% in BDG 50%, (1c) 10% in BDG 25%, (2) 1% in water, (3) 2% in water

10. Nonionic emulsifiers - NPE replacement

Product name	Characteristics			
	% Active content	Appearance @ 20 °C	Cloud point (°C)	Moles of EO
Nonylphenol ethoxylate 3 mole	100	clear liquid	42-46(2)	3
MARLOSOL TA 30	100	hazy liquid	48-51(1)	3
NOVEL TDA-3	100	hazy liquid	49(1)	3
NOVEL 23E2	100	hazy liquid	54(1)	2
NOVEL 23E3	100	hazy liquid	66(1)	3
Nonylphenol ethoxylate 4 mole	100	clear liquid	54-56(1)	4
NOVEL TDA-4	100	hazy liquid	58(1)	4
Nonylphenol ethoxylate 5 mole	100	clear liquid	60-62(1)	5
MARLOSOL TA 50	100	hazy liquid	64-66 (1)	5
NOVEL TDA-5	100	hazy liquid	64(2)	5
NOVEL 23E5	100	hazy liquid	77(2)	5
SAFOL EN 50	100	hazy liquid	69-73 (1)	5
Nonylphenol ethoxylate 6 mole	100	clear liquid	68-70(1)	6
MARLOSOL TA 60	100	hazy liquid	69-71 (1)	6
Nonylphenol ethoxylate 7 mole	100	clear liquid	71-74 (1)	7
NOVEL 23E6.5	100	hazy liquid	50(2)	6.5
MARLOSOL TA 70	100	hazy liquid	73-75 (1)	7
NOVEL 23E7	100	hazy liquid	60(2)	7
SAFOL EN 70	100	hazy liquid	51-55 (2)	7
Nonylphenol ethoxylate 8 mole	100	clear liquid	30-34(2)	8
MARLOSOL TA 80	100	hazy liquid	76-78 (1)	8
Nonylphenol ethoxylate 9 mole	100	clear liquid	51-56(2)	9
Nonylphenol ethoxylate 10 mole	100	clear liquid	62-67(2)	10
NOVEL 23E9	100	hazy liquid	83(2)	9
NOVEL TDA-9	100	hazy liquid	58(2)	9
MULTISO 13/90	100	hazy liquid	57-59 (3)	9
SAFOL EN 90	100	hazy liquid	49-53 (4)	9
Nonylphenol ethoxylate 12 mole	100	clear liquid	79-84(2)	12
NOVEL TDA-12	100	hazy liquid	85(2)	12

(1) 10% in BDG 25%, (2) 1% in water, (3) 2% in water, (4) 1% in 10% NaCl

Characteristics					
HLB value	Solidification point (°C)	Hydroxyl number (mg KOH/g)	Density @ 20 °C (kg/l)	KV @ 40 °C (cSt)	Production
7.3	<-20		1.03		
7.9	<-4	169	0.93	18	China
7.9	<-20	169	0.93	18	USA
6.3	<-20	198	0.91	15	USA
8.2	-17	172	0.93	15	USA
8.9	<-20		1.03		
9.3	-14	150	0.95	21	USA
10	<-20		1.04		
10.5	<-4	134	0.97	24	China
10.4	-12	134	0.97	24	USA
10.7	-3	135	0.97	21	USA
10.6	<-4	135	0.97	21	China
10.7	<-20		1.04		
11.4	<- 4	121	0.98	23	China
11.7	<-20		1.05		
12	5	117	0.99	26	USA
12.1	<-4	110	0.98	33	China
12.4	5	111	0.99	27	USA
12.2	~ 2	111	0.99	31	China
12.3	-10		1.05		
12.8	-2	102	1.00	35	China
12.7	-5		1.06		
13.3	4		1.06		
13.5	13	94	1.01	32	USA
13.2	3	93	1.01	41	USA
13.3	-6	94	1.01	41	China
13.4	~ 8	95	1.01	41	China
14	12		1.07		
14.4	12	76	1.03	51	USA

11. Metal processing

Product name	Iron & steel					
	Rolling	Cutting	Drawing	Forming	Die-casting	Finishing & cleaning
LINPAR 1416, 1417, 1314	x	x	x	x		
ALFOL/NAFOL 1214, ALFOL/NAFOL 1416, ALCHEM 123						
NACOL Ether 6, NACOL Ether 8		x	x	x		x
ISALCHEM 145	x	x	x	x	x	
ISOFOL 12, 16, 18T, 20, 2426S*						
ISOFOL Ester 1202		x	x	x	x	
ISOCARB 11, 12, 16	x	x	x	x		x
MARLOWET 45-- Series						
MARLOWET M		x	x	x	x	
ISOCARB Esters 1605		x	x	x		
LINPLAST 810 TM		x	x	x		
REPROXAL 13XAN		x	x	x		
MARLOX FK 64, FK 86		x				x
MARLOX RT 42, RT 64, RT 45		x	x	x		x

* developmental product



Aluminium					All metals
Cutting	Extrusion	Die-casting	Rolling	Finishing & cleaning	MQL
x			x		
			x	x	
x	x			x	x
x	x	x			x
x	x	x	x	x	
x	x	x			x
x	x	x			x
x				x	
x				x	



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