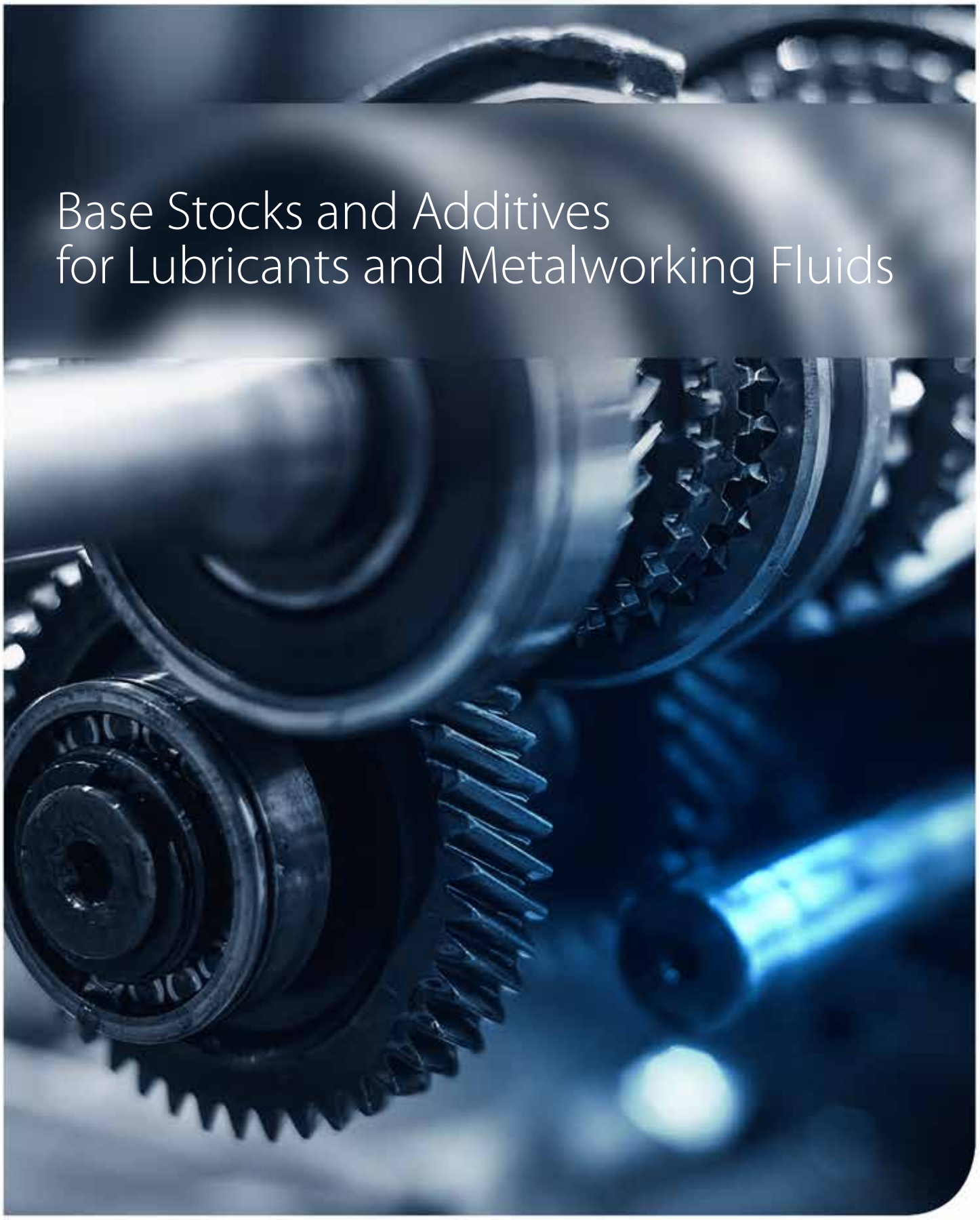
Base Stocks and Additives for Lubricants and Metalworking Fluids



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More than Chemistry

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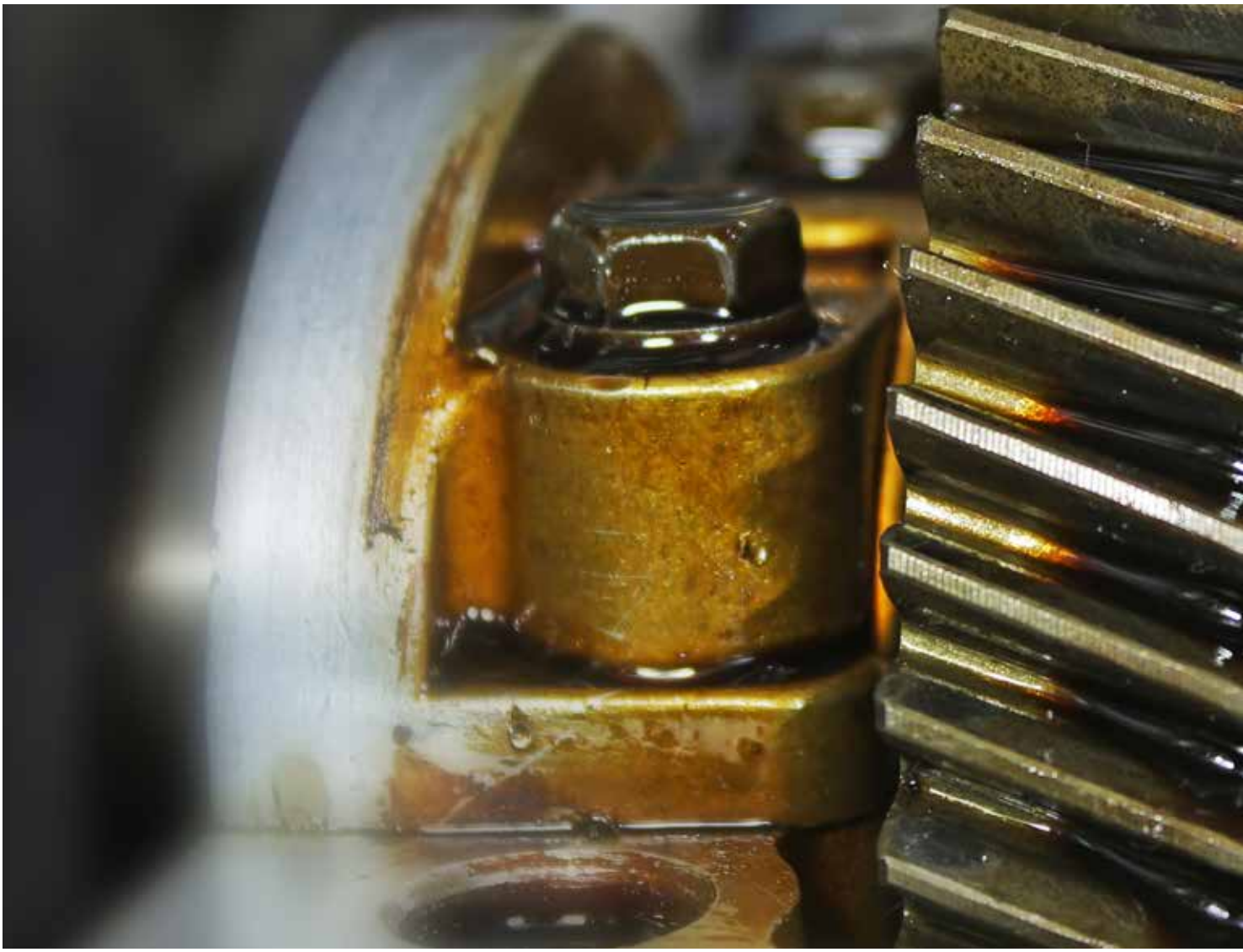

Polyalkylene Glycols (PAG) Base Stocks

ROKOLUB series synthetic base stocks produced by the PCC Group are high-performance lubricants based on Polyalkylene glycols (PAG), which provide excellent lubrication for gears, bearings and circulating lubrication systems which work at temperatures mineral oils are unable to cope with. They are resistant to shear, highly resistant to thermal degradation, oxidation and the formation of sludge and deposits. Rokolub oil bases have a very high Viscosity Index of >180, do not contain paraffins and have a very low pour point. PAG-based lubricating products deliver excellent performance in the toughest industrial conditions. Their use is recommended by the leading producers of calenders in the manufacture of plastics, bearings for paper machines, compressors and gears. It is preferred that these products are used in severe operating conditions.

Features, advantages and benefits of PAG

- good thermo-oxidative stability and resistance to formation of deposits and sludge
- extended oil service life, increased production efficiency and shorter planned and unplanned downtime
- lower costs of repair and parts replacement
- low friction coefficients
- lower operating temperatures, greater productivity of equipment and ability to reduce energy consumption as well as extended use of seals
- very high thermal conductivity that reduces the operating temperatures and extends the life of oil batch
- excellent fluidity at low temperatures
- lower energy consumption and more uniform productivity of machines with faster warm up at low ambient temperature

Water Soluble PAGs - Application

PRODUCT NAME	DESCRIPTION		ISO VG	Compressor Lubricants	Industrial Gear Oil	Hydraulic Fluids
Lubricants PAG Base Stock						
Rokolub 50-B-32	EO/PO random copolymers	Water soluble	32		•	•
Rokolub 50-B-46	EO/PO random copolymers	Water soluble	46		•	•
Rokolub 50-B-100	EO/PO random copolymers	Water soluble	100		•	•
Rokolub 50-B-150	EO/PO random copolymers	Water soluble	150	•	•	
Rokolub 50-B-330	EO/PO random copolymers	Water soluble	330		•	
Rokolub 50-B-460	EO/PO random copolymers	Water soluble	460	•	•	
Rokolub 60-D-68	EO/PO random copolymers	Water soluble	68			•
Rokolub 60-D-150	EO/PO random copolymers	Water soluble	150	•	•	
Rokolub 60-D-220	EO/PO random copolymers	Water soluble	220	•	•	
Rokolub 60-D-320	EO/PO random copolymers	Water soluble	320	•	•	
Rokolub 60-D-460	EO/PO random copolymers	Water soluble	460		•	
Rokolub 60-D-1000	EO/PO random copolymers	Water soluble	1000		•	

Excellent lubrication properties that reduces operating temperatures in a variety of applications.

Textile Lubricants	High Temp. Lubricants	Heat Transfer Fluids	Metalworking Fluids	Non-ferrous metals Processing	Mill&Calender	Features and Benefits
		•				Rokolub 50-B series are alcohol started polymers containing equal amounts of ethylene oxide and propylene oxide available in a variety of molecular weights and viscosities. They are high performance cold water soluble base stock commonly used in industrial gear, bearing and calender, textile lubricants and compressors. These synthetic base stocks offer high viscosity index, often above 200, provide a very low rate of viscosity change with wide range of temperatures. The lubricity and performance make it suitable also for use as industrial hydraulic fluids for equipment operating in a wide temperature range. Their excellent low temperature properties make them very suitable for year-round outdoor use. Their high flash point (up to 257°C) is important in the selection of heat transfer fluids and calender lubricants. They may be also used in heat-treatment or processing of rubbers, elastomers or fabricated parts where compatibility of the heat transfer fluid with the processed part is important. High molecular weight lubricant may be used for a variety of applications, including: plasticizers, modifiers and surfactants, antifoam agents – in boiler water and fermentation processes.
		•	•	•		
	•		•		•	
•			•	•	•	
•			•	•		
•			•	•		
	•		•			Rokolub 60-D series are diol started random alkoxylated copolymers of ethylene oxide and propylene oxide. They are water soluble at ambient temperature and are available in a variety of molecular weights and viscosities. (Their reverse solubility in higher temperature allows achieving a lubricant film on hot metal surface, what makes them extremely useful in metal working fluids). They offer superior performance, including: low friction coefficients, excellent lubricity and EP/AW properties for improved cutting performance and increased tool lifespan, low pour point temperatures and long fluids lifetime. Rokolub 60-D consistently maintain water solubility within a higher temperature range and thermo-oxidative stability. These are high performance base stocks used in industrial gear, bearing, calender and textile lubricants, compressor and metal working formulations.
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•	•		•			
•	•		•	•		
•			•			

Water Insoluble PAGs - Application

PRODUCT NAME	DESCRIPTION		ISO VG	Compressor Lubricants	Industrial Gear Oil
Lubricants PAG Base Stock					
Rokolub P-B-32	PO homopolymer	Water insoluble	32	•	
Rokolub P-B-46	PO homopolymer	Water insoluble	46	•	
Rokolub P-B-50	PO homopolymer	Water insoluble	50	•	
Rokolub P-B-68	PO homopolymer	Water insoluble	68	•	
Rokolub P-B-100	PO homopolymer	Water insoluble	100	•	
Rokolub P-B-150	PO homopolymer	Water insoluble	150	•	
Rokolub PO-D-460	PO homopolymer	Water insoluble	460		•
Rokolub PO-D-700	PO homopolymer	Water insoluble	680		•
Rokolub 32	PO homopolymer	Water insoluble	32		
Rokolub 68	PO homopolymer	Water insoluble	68	•	•
Rokolub 100	PO/EO random copolymers	Water insoluble	100		
Rokolub 150	PO homopolymer	Water insoluble	150		•
Rokolub 220	PO/EO random copolymers	Water insoluble	220		•
Rokolub 220VI	PO/EO random copolymers	Water insoluble	220	•	•
Rokolub 320F	PO/EO random copolymers	Water insoluble	320	•	•
Rokolub 320K	PO/EO random copolymers	Water insoluble	320		•
Rokolub 460D	PO/EO random copolymers	Water insoluble	460		•
Rokolub 680	PO/EO random copolymers	Water insoluble	680		•

Hydraulic Fluids	Textile Lubricants	High Temp. Lubricants	Heat Transfer Fluids	Metalworking Fluids	Non-ferrous metals Processing	Mill&Calender	Features and Benefits
•							These water insoluble Rokolubs are applicable where waterless systems of lubricating machines and mechanical equipment are required. These are products with a high viscosity index. Applied as PAG synthetic base oil, they offer excellent inherent lubricity without the use of external lubricity additives. Their excellent low temperature properties make them highly suitable for year-round outdoor use and ensure cleanliness of the lubrication system against sludge, varnish, lacquer, and they also provide a higher level of thermal conductivity. The lubricity and performance make it ideal for use as industrial hydraulic fluids for equipment that must operate dependably over a wide temperature range.
•							
•							
•							
•							
•							
	•						A high performance water insoluble base stock used in gear and metal working formulations.
	•						
•			•				High performance water insoluble ase stock used in air conditioning fluids and hydraulic fluids.
•	•						
•			•				
•						•	
				•			A high performance water insoluble base stock used in gear and metal working formulations.
	•			•			
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Water Soluble PAGs - Properites

PRODUCT NAME	DESCRIPTION		MW [g/mol]	Viscosity 40°C [cSt] -ASTM D445	Viscosity 100°C [cSt] -ASTM D445	Viscosity Index -ASTM 2270	Cloud Point [1%AQ] °C	Pour Point [°C] - ASTM D97	Flash Point [°C] - ASTM D92	Refractive index 20°C-DIN 51423	Density [g/cm³] 20°C DIN51757
Lubricants PAG Base Stock											
Rokolub 50-B-32	EO/PO random copolymers	Water soluble	700	34	7.4	190	71	< -43	252	1.454	1.03
Rokolub 50-B-46	EO/PO random copolymers	Water soluble	1075	53	12	211	59	< -43	249	1.455	1.034
Rokolub 50-B-100	EO/PO random copolymers	Water soluble	1200	95	17	218	59	<-40	250	1.457	1.041
Rokolub 50-B-150	EO/PO random copolymers	Water soluble	1880	153	29.6	234	56	< -43	257	1.458	1.049
Rokolub 50-B-460	EO/PO random copolymers	Water soluble	2500	455	78.5	255	50	-35	245	1.459	1.051
Rokolub 60-D-68	EO/PO random copolymers	Water soluble	850	65	12.2	188	95	-35	220		
Rokolub 60-D-150	EO/PO random copolymers	Water soluble	1800	155	27	212	95	-35	230		
Rokolub 60-D-220	EO/PO random copolymers	Water soluble	2000	230	42	238	86	-38	230		
Rokolub 60-D-320	EO/PO random copolymers	Water soluble	2400	315	56	246	80	-35	241		
Rokolub 60-D-460	EO/PO random copolymers	Water soluble	3500	470	79	251	73	-33	253		
Rokolub 60-D-1000	EO/PO random copolymers	Water soluble	5600	900	150	270	72	<-26	>220		1.070

PAG-based lubricating products deliver excellent performance in the toughest industrial conditions.

Water Insoluble PAGs - Properites

PRODUCT NAME	DESCRIPTION		MW [g/mol]	Viscosity 40°C [cSt] -ASTM D445	Viscosity 100°C [cSt] -ASTM D445	Viscosity Index -ASTM 2270	Cloud Point [1%Aq] °C	Pour Point [°C] - ASTM D97	Flash Point [°C] - ASTM D92	Refractive index 20°C-DIN 51423	Density [g/cm³] 20°C DIN51757
Lubricants PAG Base Stock											
Rokolub P-B-32	PO homopolymer	Water insoluble	750	25	4.9	180	-	< -43	>210		
Rokolub P-B-46	PO homopolymer	Water insoluble	1050	50	9.6	180	-	< -42	225	1.447	0.988
Rokolub P-B-50	PO homopolymer	Water insoluble	1100	50	9	190	-	< -42	>220		0.988
Rokolub P-B-68	PO homopolymer	Water insoluble	1200	57	10	190	-	< -30	>220		
Rokolub P-B-100	PO homopolymer	Water insoluble	1400	90	18	220	-	< -36	>220		0.995
Rokolub P-B-150	PO homopolymer	Water insoluble	1600	135	23	220	-	< -36	>220	1.449	0.995
Rokolub PO-D-460	PO homopolymer	Water insoluble	4000	420	63	220	-	< -32	>230		1.003
Rokolub PO-D-700	PO homopolymer	Water insoluble	6000	760	114	220	-	< -30	>220		~1
Rokolub 32	PO homopolymer	Water insoluble	450	33	4.7	22	~82	-40	>220	1.454	1.073
Rokolub 68	PO homopolymer	Water insoluble	1000	66	10.5	147	-	-36	>200	1.449	1.007
Rokolub 100	PO/EO random compolymer	Water insoluble	550	95	11	100	n/o*	-31	>230	1.454	1.075
Rokolub 150	PO homopolymer	Water insoluble	2000	151	22	173	-	-34	~200	1.45	1.004
Rokolub 220	PO/EO random homopolymer	Water insoluble	2000	220	35.5	211	-	-35	210	1.45	0.998
Rokolub 220VI	PO/EO random copolymers	Water insoluble	3600	260	38.5	194	-	-30	>250	1.454	1.022
Rokolub 320F	PO/EO random copolymers	Water insoluble	2500	270	47	235	~96	-20	>260	1.463	1.084
Rokolub 320K	PO/EO random copolymers	Water insoluble	5000	360	54	217	-	-30	>200	1.454	1.024
Rokolub 460D	PO/EO random copolymers	Water insoluble	4000	420	63	226	-	-32	>230	1.449	1.003
Rokolub 680	PO/EO random copolymers	Water insoluble	5000	600	104	268	n/o*	-7	>250	1.466	1.095

* n/o - not observed (range at norm is from 10-90°C

Hydraulic Fluids

Phosphate ester based hydraulic fluids (HFDR)

Rokolub FR series are synthetic, non aqueous, fire resistant, triaryl phosphate, ester-based hydraulic fluids. This product range is classified as HFDR hydraulic fluids according to ISO 6743-4 and meets the requirements of ISO VG 32, 46, 68. Rokolub FR fluids, due to unique fire resistance properties, are the best available option for applications with a high potential risk of fire. Furthermore, Rokolub FR series is preferable for high temperatures owing to its perfect oxidation and thermal stability. They are especially suitable for the power generation industry as well as in many general industrial applications.

Main features

- self-extinguishing fire resistant performance
- superior oxidation and thermal stability
- excellent lubrication
- excellent air release and low chlorine content
- good emulsification

Hydraulic Fluids HFDR - Applications

PRODUCT NAME	DESCRIPTION	ISO VG	Hydraulic Fluids	High Temp. Lubricants	Reciprocating air compressors	Steel&aluminium furnace hydraulics	Die cast hydraulics	Gas Turbine Lubrication	Steam Turbine hydraulic and lubrication	Features and Benefits
HFDR Hydraulic Fluids										
Rokolub FR I-32	triaryl phosphate ester	32	•	•	•	•	•			Fire resistant hydraulic fluids especially dedicated for industrial applications where special fire resistance properties are required.
Rokolub FR I-46	triaryl phosphate ester	46	•	•	•	•	•			
Rokolub FR T-32	triaryl phosphate ester	32	•	•	•	•	•	•	•	Rokolub FR T-32 qualifies for use in the power generation industry. This product is especially designed for stationary gas turbine lubrication where ISO VG 32 is required.
Rokolub FR T-46	triaryl phosphate ester	46	•	•	•	•	•			Fire resistant hydraulic fluid is especially dedicated for applications with extremely high requirements concerning fire resistance. Rokolub FR T-46 meets ISO VG 46 requirements.
Rokolub FR T-46 ultra	triaryl phosphate ester	46	•	•	•	•	•	•	•	Rokolub FR T-46 ultra is especially designed for steam turbine electro-hydraulic control system applications. Its high fire resistance performance meets Steam Turbine OEMS requirements. Product achieves better air relase value than other Rokolub FR fluids.
Rokolub FR T-68	triaryl phosphate ester	68	•	•	•	•	•			Fire resistant hydraulic fluid is especially dedicated for high temperature applications. Rokolub FR T-68 meets ISO VG 68 requirements.

Rokolub FR T-46 ultra and Rokolub FR T-32 qualify for use in the power generation industry. These products meet the requirements of the turbine manufacturers. Phosphate ester-based hydraulic fluids are the only type of hydraulic fluids capable for use by steam turbine users due to fire safety at power station. Rokolub FR T-46 ultra is especially designed for steam turbine control systems. Rokolub FR T-32, by contrast, is especially designed for stationary gas turbine lubrication.

Hydraulic Fluids HFDR - Properties

PRODUCT NAME	DESCRIPTION	APPEARANCE	ISO VG	Water Content [%]	Acid Number [mg KOH/g]	Density at 25°C [g/cm³] - DIN 51757	Pour Point [°C] - ASTM D97	Flash Point [°C] - ASTM D92	Fire Point [°C] - ASTM D92	Autoignition Temp. [°C] - ASTM D 2155
HFDR Hydraulic Fluids										
Rokolub FR I-32	triaryl phosphate ester	clear liquid	32	< 0.1	< 0.1	1.12	-22	> 240	> 330	> 500
Rokolub FR I-46	triaryl phosphate ester	clear liquid	46	< 0.1	< 0.1	1.11	-18	> 245	> 330	> 500
Rokolub FR T-32	triaryl phosphate ester	clear liquid	32	< 0.1	< 0.1	1.16	-23	> 230	> 330	> 500
Rokolub FR T-46	triaryl phosphate ester	clear liquid	46	< 0.1	< 0.1	1.15	-18	> 230	> 330	> 500
Rokolub FR T-46 ultra	triaryl phosphate ester	clear liquid	46	< 0.1	< 0.1	1.15	-18	> 230	> 330	> 500
Rokolub FR T-68	triaryl phosphate ester	clear liquid	68	< 0.1	< 0.1	1.13	-15	> 230	> 330	> 500

Hydraulic Fluids - HFDU

PRODUCT NAME	DESCRIPTION		ISO VG
Hydraulic Base Fluids, Water Soluble			
Rokolub 50-B-32	EO/PO random copolymers	Water soluble	32
Rokolub 50-B-46	EO/PO random copolymers	Water soluble	46
Rokolub 50-B-100	EO/PO random copolymers	Water soluble	100
Hydraulic Base Fluids, Water Insoluble			
Rokolub 32	PO homopolymer	Water insoluble	32
Rokolub P-B-46	PO homopolymer	Water insoluble	46
Rokolub P-B-68	PO homopolymer	Water insoluble	68
Rokolub 68	PO homopolymer	Water insoluble	68
Rokolub P-B -100	PO homopolymer	Water insoluble	100

Main properties of PAG based, water free hydraulic fluids (HFDU)

Hydrolytic stability: PAGs keep hydrolytic stability, which can be seen as a major advantage of hydraulic fluids based on this solution. In many industrial applications, contamination with water cannot be completely avoided. When this appears, the PAG absorbs water partially and does not change the hydraulic efficiency.

Deposit control: A unique benefit of water soluble hydraulic PAG base fluids is their superior deposit control characteristics over all other base oil solution. It provides excellent oxidation resistance and thermal stability at high temperatures to minimize deposit formation and provide long service life. It also protects hydraulic system components against rust and corrosion.

Wear protection: PAGs deliver superior protection against shearing and wear over extended operating periods, optimising oil film durability and offering maximum equipment protection. Excellent anti-corrosion results can be achieved, even in very hot or very wet operations. These fluids outperform many other technologies and can provide equipment reliability for all seasons.

MW [g/mol]	Viscosity 40°C [cSt] -ASTM D445	Viscosity 100°C [cSt] -ASTM D445	Viscosity Index -ASTM 2270	Cloud Point [1%Aq] °C	Pour Point [°C] - ASTM D97	Flash Point [°C] - ASTM D92	Refractive index 20°C-DIN 51423	Density [g/cm³] 20°C DIN51757	Features and Benefits
700	34	7.4	190	71	< -43	252	1.454	1.03	The lubricity and performance make them ideal for use as industrial hydraulic fluids for equipment that must operate dependably over a wide temperature range. Their great lubricity and performace make them perfect for machinery working in wide range of temperatures and suitable for outdoor use. Additional value - hydrolitic stability.
1075	53	12	211	59	< -43	249	1.455	1.034	
1200	85	17	218	59	<-40	250	1.457	1.041	
450	33	4.7	22	~82	-40	>220	1.454	1.073	Product with a high viscosity index, insoluble in water. The lubricity and performance make it ideal for use as industrial hydraulic fluids for equipment where waterless systems of lubricating machineries and mechanical equipment are required. It has excellent inherent lubricity without use of external lubricant additives. Cleanliness: no sludge, very good deposit control characteristics over all other base oil. It provides a higher level of thermal conductivity.
1050	50	9.6	263	-	< -43	220	1.447	0.988	
1200	57	10	190	-	< -30	>220			
1000	66	10.5	147	-	-36	>200	1.449	1.007	
1400	90	18	220	-	< -36	>220		0.995	

Additives for lubricants

Anti-wear/Extreme Pressure

Rokolub AD series are phosphate ester-based ashless anti-wear and extreme pressure additives for lubricants and functional fluids. Because of their excellence in reducing friction and wear, these products are a perfect choice in high loads conditions.

AW/EP additives - Applications

PRODUCT NAME	DESCRIPTION	Industrial Gear Oil	Turbine Oil	Compressor Oil	High Temp. Lubricants	Metalworking Fluids	Hydraulic Oil	Features and Benefits
AW/EP Lubricant Additives								
Rokolub AD 132	triaryl phosphate ester	•	•	•	•	•	•	Rokolub AD series prevent sliding surfaces from welding under severe conditions. These products provide protection against excessive tool wear from scoring or galling and ensure that lubricating film on the metal surface is deposited.
Rokolub AD 146	triaryl phosphate ester	•	•	•	•	•	•	
Rokolub AD 232	triaryl phosphate ester	•	•	•	•	•	•	
Rokolub AD 246	triaryl phosphate ester	•	•	•	•	•	•	
Rokolub AD 246 plus	triaryl phosphate ester	•	•	•	•	•	•	
Rokolub AD 246 ultra	triaryl phosphate ester	•	•	•	•	•	•	

AW/EP additives - Properties

PRODUCT NAME	DESCRIPTION	APPEARANCE	Kinematic Viscosity at 40°C [cSt]	Water Content [%]	Acid Number [mg KOH/g]	Density at 20°C [g/cm³] - DIN 51757	Pour Point [°C] - ASTM D97	Flash Point [°C] - ASTM D92
AW/EP Lubricant Additives								
Rokolub AD 132	triaryl phosphate ester	clear liquid	32	< 0.1	< 0.1	1.12	-23	> 240
Rokolub AD 146	triaryl phosphate ester	clear liquid	46	< 0.1	< 0.1	1.11	-18	> 245
Rokolub AD 232	triaryl phosphate ester	clear liquid	32	< 0.1	< 0.1	1.16	-23	> 230
Rokolub AD 246	triaryl phosphate ester	clear liquid	46	< 0.1	< 0.1	1.15	-20	> 230
Rokolub AD 246 plus	triaryl phosphate ester	clear liquid	46	< 0.1	< 0.1	1.14	-17	> 230
Rokolub AD 246 ultra	triaryl phosphate ester	clear liquid	46	< 0.1	< 0.1	1.15	-17	> 230

Additives for lubricants

Anti-wear/Extreme Pressure

Chemfacs series are anionic phosphate esters specially developed for use as extreme pressure and antiwear additives for metalworking fluids. They are optimized mixtures of monoesters and diesters. They are incorporated into lubricants in order to reduce friction in high load applications. They work by reacting with the metal surfaces under extreme friction conditions, producing a protective film that prevents welding and surface damage.

AW/**EP** additives - Applications
PB 264 recommended for aluminium machining

PRODUCT NAME	DESCRIPTION	Industrial Gear Oil	Turbine Oil	Compressor Oil	High Temp. Lubricants	Metalworking Fluids	Hydraulic Oil	Features and Benefits
AW/EP Lubricants Additives								
Chemfac PB 184	POE (4) Oleyl Phosphate					•		Multifunctional additive providing low-foaming and good emulsification performance. Also provides anti-wear, corrosion and staining inhibitor for all types of metalworking formulations. Product used in metal-working, textile and hard surface cleaner formulations. Recommended for neat oils, soluble oils, semisynthetics. Compatible with paraffine and napthenic base oils. PB 264 recommended for aluminium moulding.
Chemfac PB 264	POE (4) Lauryl Phosphate					•		

AW/**EP** additives - Properties
PB 264 recommended for aluminium machining

PRODUCT NAME	DESCRIPTION	APPEARANCE	Kinematic Viscosity at 40°C [cSt]	Water Content [%]	Phosphorus content	Density at 20°C [g/cm³] - DIN 51757	Pour Point [°C] - ASTM D97	Flash Point [°C] - ASTM D92
AW/EP Lubricants Additives								
Chemfac PB 184	POE (4) Oleyl Phosphate	viscous liquid	355	max. 1%	5%	1.03	—	>100
Chemfac PB 264	POE (4) Lauryl Phosphate	viscous liquid	271	max. 2%	6,1%	1.05	—	>100

Additives for Metalworking Fluids

The metalworking industry continues to change, driven by demand for high quality products to deliver better performance at lower cost. PCC EXOL SA products have many uses and applications across a broad spectrum of metalworking fluids market. Our focus is the development of additives, which enhance the performance of our customers' formulations.

PCC EXOL SA - specialized chemicals for the metalworking industry

PCC EXOL SA is a supplier of fluid components of specialty surface-active fluids, solubilizers used in formulating straight oils, soluble oils, semi-synthetic, and synthetic metal working fluids. We offer a wide range of foam control agents, emulsifiers, and corrosion inhibitors as well as chemical and technological know-how for metalworking fluid formulators. PCC EXOL SA has the ability to formulate new products, develop products in a variety of specialty chemistries, and also provide contract manufacturing for customers.

Functions of metalworking fluids

Metalworking fluids play a critical role in most machining processes. The main functions of metalworking fluids are:

Cooling: Reducing heat build-up in the cutting zone and in the work piece.

Lubrication: Reducing friction between the tool and the chips being removed.

Chip removal: Flushing chips away from the cutting zone, carrying them back to the sump.

Corrosion control: Protects the machine workpiece and tool from damage due to corrosion.

Emulsifiers & Surfactants
Alcohol Ethoxylates - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	Lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Alcohol Ethoxylates										
Rokanol O3	Fatty alcohol ethoxylate	127036-24-2	26	•		•			•	Excelent emulsifiers for soluble oils and semisynthetic metalworking fluids. Particulary suitable for mineral base oils (paraffinics and naphtenics) and hydrocarbons. Excelent environmental profile. Low foaming. Blends with high and low HLB give best performance.
Rokanol O5	Fatty alcohol ethoxylate	127036-24-2	26	•		•			•	
Rokanol O100	Fatty alcohol ethoxylate	127036-24-2	26	•		•			•	
Rokanol K3	Fatty alcohol ethoxylate	9005-04-03	26	•		•				Standard emulsifiers for soluble oils and semisynthetic cutting fluids. Suitable for parrafinic and naphtelenic base oils
Rokanol K5	Fatty alcohol ethoxylate	9005-04-03	28	•						
Rokanol K7	Fatty alcohol ethoxylate	9005-04-03	31	•						
Rokanol DB3	Fatty alcohol ethoxylate	68131-39-5	27	•	•					Emulsifiers for mineral oils, vegetable and ester-base base stocks. Great wetting agents, especially recommended for water-based metal cleaning formulations.
Rokanol DB5	Synthetic alcohol ethoxylate	68131-39-5	28	•	•					
Rokanol DB7	Synthetic alcohol ethoxylate	68131-39-5	29	•	•					
Rokanol NL 3	Synthetic alcohol ethoxylate	68439-46-3	26	•						Prime wetting agents for water-based metal cleaners. Apart from cleaning and degreasing power, they are great emulsifiers for metalworking formulations.
Rokanol NL 6	Synthetic alcohol ethoxylate	68439-46-3	27	•						
Rokanol NL 8	Fatty alcohol ethoxylate	68439-46-3	29	•	•					
Rokanol NL 9	Fatty alcohol ethoxylate	68439-46-3	30	•	•					

Emulsifiers & Surfactants
Alcohol Ethoxylates - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	Hydroxyl value [mg KOH/g] *	pH **	Density [g/ml]	Cloud point [°C] ***	Solidification point, [°C]
Alcohol Ethoxylates										
Rokanol O3	Fatty alcohol ethoxylate	9004-98-2	Liquid	7.1	100%	135-150	5.5-8.5	0.907 (at 20°C)	37-41 E	approx. 0
Rokanol O5	Fatty alcohol ethoxylate	9004-98-2	Liquid	9.1	100%	120-135	5.0-7.0	0.93 (at 20°C)	—	approx. -4
Rokanol O100	Fatty alcohol ethoxylate	9004-98-2	Wax	18.8	100%	22-32	5.5-8.5	1 (at 60°C)	87-92 B	below 48
Rokanol K3	Fatty alcohol ethoxylate	9005-04-03	Semi-liquid paste	7.0	min. 99.0	144-154	5.5-8.5 a)	approx. 0.90 (at 50°C)	49-56 D	approx. 15
Rokanol K5	Fatty alcohol ethoxylate	9005-04-03	Liquid/ Paste	9.2	min. 99.0	120-135	5.5-8.5 a)	approx. 0.95 (at 50°C)	60-66 D	approx. 18
Rokanol K7	Fatty alcohol ethoxylate	9005-04-03	Semi-liquid paste	10.8	min. 99.5	115-122	5.5-8.5 a)	approx. 1.02 (at 30°C)	68-72 D	approx. 20
Rokanol DB3	Fatty alcohol ethoxylate	68131-39-5	Liquid/ Paste	7.8	min. 99.7	164-172	4.6-7.4 a)	approx. 0.93	55-60 D	approx. 10
Rokanol DB5	Fatty alcohol ethoxylate	68131-39-5	Liquid/ Paste	10.2	min. 99.5	130-140	4.6-7.4 a)	approx. 0.96	65-72 D	approx. 10
Rokanol DB7	Fatty alcohol ethoxylate	68131-39-5	Liquid/ Paste	12.0	min. 99.0	100-114	4.6-7.4 a)	approx. 0.97 (at 40°C)	76-81 D	approx. 20
Rokanol NL 3	Fatty alcohol ethoxylate	68439-46-3	Liquid	8.5	min. 99.5	185-193	5.5-7.5 a)	approx. 0.93	—	approx. -5
Rokanol NL 6	Fatty alcohol ethoxylate	68439-46-3	Liquid	12.3	min. 99.5	119-130	5.5-7.0 d)	approx. 0.99 (at 25°C)	50-57 A	approx. 5
Rokanol NL 8	Fatty alcohol ethoxylate	68439-46-3	Liquid	13.8	min. 99.0	99-110	5.5-7.0 d)	approx. 1.00 (at 25°C)	78-85 A	approx. 10
Rokanol NL 9	Fatty alcohol ethoxylate	68439-46-3	Liquid	14.1	min. 99.0	—	5.0-7.0 a)	approx. 1.01 (at 25°C)	82-85 D	approx. 15

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Emulsifiers & Surfactants
Alcohol Ethoxylates - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	Lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Alcohol Ethoxylates										
Rokanol IT3	Synthetic alcohol ethoxylate	69011-36-5	28		•	•	•			Prime wetting agents for water-based metal cleaners. Apart from cleaning and degreasing power, they are great emulsifiers for metalworking formulations. Provides solubilizing properties.
Rokanol IT5	Synthetic alcohol ethoxylate	69011-36-5	29		•	•	•			
Rokanol IT8W	Synthetic alcohol ethoxylate	69011-36-5	28		•	•	•			
Rokanol IT8	Synthetic alcohol ethoxylate	69011-36-5	28		•	•	•			
Rokanol IT12	Synthetic alcohol ethoxylate	69011-36-5	31		•	•	•			
Rokanol L4	Ethoxylated lauryl alcohol	68439-50-9	27	•	•					Emulsifiers for mineral base oils in metalworking formulations. Components for industrial cleaners and deagreasing agents.
Rokanol L7	Ethoxylated lauryl alcohol	68439-50-9	29	•	•					
Rokanol L3A	Ethoxylated lauryl alcohol	68551-12-2	27	•	•					
Rokanol L5A	Ethoxylated lauryl alcohol	68551-12-2	28	•	•					

Emulsifiers & Surfactants
Alcohol Ethoxylates - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	Hydroxyl value [mg KOH/g] *	pH **	Density [g/ml]	Cloud point [°C] ***	Solidification point, [°C]
Alcohol Ethoxylates										
Rokanol IT3	Synthetic alcohol ethoxylate	69011-36-5	Liquid	8.0	min. 99.0	152-167	5.0-7.0 a)	approx. 0.93 (at 30°C)	48-51 D	approx. -20
Rokanol IT5	Synthetic alcohol ethoxylate	69011-36-5	Liquid	10.5	min. 99.0	125-132	5.0-7.0 a)	approx. 0.96 (at 30°C)	60-62 E	approx. -5
Rokanol IT8W	Synthetic alcohol ethoxylate	69011-36-5	Liquid	12.8	min. 90.0	—	5.0-7.0 a)	approx. 1.00 (at 30°C)	75-79 D	approx. -20
Rokanol IT8	Synthetic alcohol ethoxylate	69011-36-5	Paste	12.8	min. 99.5	95-104	5.0-7.0 a)	approx. 1.00 (at 30°C)	76-78 D	approx. 8
Rokanol IT12	Fatty alcohol ethoxylate	69011-36-5	Liquid/ Paste	14.5	min. 99.0	74-83	5.0-7.0 a)	approx. 1.02 (at 30°C)	79-85 A	approx. 20
Rokanol L4	Ethoxylated lauryl alcohol	68002-97-1	Liquid	10	min. 99.5	146-157	5.0-7.0	approx. 0.91 (at 50°C)	59-63 E	approx. 8
Rokanol L7	Ethoxylated lauryl alcohol	103819-01-8	Liquid	12.9	min. 99.5	100-112	4.6-7.4 a)	approx. 0.97 (at 30°C)	30-40 C	approx. 10
Rokanol L3A	Ethoxylated lauryl alcohol	68551-12-2	Liquid	8.0	min. 99.7	162-172	6.0-8.0 b)	approx. 0.93 (at 20°C)	53-55 E	approx. 5
Rokanol L5A	Ethoxylated lauryl alcohol	68551-12-2	Liquid	10.5	min. 99.0	130-140	5.0-7.0 c)	approx. 0.96 (at 25°C)	66-75 D	approx. 15

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Emulsifiers & Surfactants
Alcohol Ethoxylates - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	Lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Alcohol Ethoxylates										
Rokanol GA3	Fatty alcohol ethoxylate	160875-66-1	28	•	•					Excellent wetting action and good degreasing properties. Can be used as components for professional cleaning formulations, very effective solubilizers. Perform very good as emulsifiers in metalworking formulations.
Rokanol GA5	Fatty alcohol ethoxylate	160875-66-1	27	•	•					
Rokanol GA7	Fatty alcohol ethoxylate	160875-66-1	27	•	•					
Rokanol GA7W	Fatty alcohol ethoxylate	160875-66-1	27	•	•					
Rokanol GA8	Fatty alcohol ethoxylate	160875-66-1	28	•	•					
Rokanol GA8W	Fatty alcohol ethoxylate	160875-66-1	28	•	•					
Rokanol GA9	Fatty alcohol ethoxylate	160875-66-1	28	•	•					
Rokanol GA9W	Fatty alcohol ethoxylate	160875-66-1	29	•	•					

Emulsifiers & Surfactants
Alcohol Ethoxylates - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	Hydroxyl value [mg KOH/g] *	pH **	Density [g/ml]	Cloud point [°C] ***	Solidification point, [°C]
Alcohol Ethoxylates										
Rokanol GA3	Fatty alcohol ethoxylate	160875-66-1	Liquid	—	min. 99.5	190	5-7	0.95 (at 25°C)	30-33 E	0
Rokanol GA5	Fatty alcohol ethoxylate	160875-66-1	Liquid	—	min. 99.5	150	5-7**	0.97 (at 25°C)	54-57 E	approx. 10
Rokanol GA7	Fatty alcohol ethoxylate	160875-66-1	Liquid	—	min. 99.5	125	5-7	1.01 (at 25°C)	67-70 E	< 20
Rokanol GA7W	Fatty alcohol ethoxylate	160875-66-1	Liquid	—	min. 84-87	—	5-7	1.01 (at 25°C)	67-70 E	< -10
Rokanol GA8	Fatty alcohol ethoxylate	160875-66-1	Liquid	—	min. 99.5	110	5-7	0.97 (at 30°C)	54-57 A	< 20
Rokanol GA8W	Fatty alcohol ethoxylate	160875-66-1	Liquid/ Paste	—	min. 84-86	—	5-7	1.01	54-58 A	< -10
Rokanol GA9	Fatty alcohol ethoxylate	160875-66-1	Liquid	—	min. 99.5	100	5-7	1.02 (at 30°C)	67-70 A	approx. 20
Rokanol GA9W	Fatty alcohol ethoxylate	160875-66-1	Liquid/ Paste	—	min. 84-86	—	5-7	1.02 (at 30°C)	67-70 A	< -10

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Emulsifiers & Surfactants

Ethoxylated fatty acids - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Ethoxylated fatty acids										
Rokacet RZ17	Vegetable oil based	70914-02-2	35	•		•				Environmental friendly emulsifier based on vegetable raw material for mineral base stocks and for natural oils. Non corriosive.
Rokacet R11	Castor oil ethoxylate	61791-12-6		•		•				Biodegradable and non corrosive emulsifiers for mineral base stocks and vegetable oils. Recommended for soluble oils and semisynthetic cutting fluids.
Rokacet R26	Castor oil ethoxylate	61791-12-6	32	•		•				
Rokacet R36	Castor oil ethoxylate	61791-12-6		•		•				
Rokacet R40	Castor oil ethoxylate	61791-12-6	39	•		•				
Rokacet 07	Oleic acid etoxylate	9004-96-0		•		•				Standard emulsifier and lubricant for soluble oils; most aliphatic solvents and cutting oils. Non corrosive. Biodegradable.

Ethoxylated fatty acids - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	pH **	Density [g/ml]	Cloud point [°C] ***	Solidification point, [°C]	Surface tension at 25°C [mN/m]
Ethoxylated fatty acids										
Rokacet RZ17	Fatty acid glycerol ester	70914-02-2	Oily liquid	—	min. 99.0	min. 9.0 (12% solution)	approx. 1.00 (at 20°C)	80 E	approx. 0	35
Rokacet R11	Castor oil ethoxylate	61791-12-6	Liquid	6.9	min. 99.0	5.0-7.0 [a)]	approx. 0.996	—	approx. -20	35
Rokacet R26	Castor oil ethoxylate	61791-12-6	Liquid	11.0	min. 99.0	7.5-9.5 [d)]	approx. 1.03 (at 30°C)	—	approx. 0	32
Rokacet R36	Castor oil ethoxylate	61791-12-6	Liquid/ Paste	12.6	min. 99.0	5.0-7.0 [d)]	approx. 1.04 (at 40°C)	—	approx. 8	40
Rokacet R40	Castor oil ethoxylate	61791-12-6	Paste	13.0	min. 99.0	6.5-8.0 [a)]	approx. 1.04 (at 30°C)	—	—	39
Rokacet 07	Castor oil ethoxylate	9004-96-0	Liquid	10.6	min. 99.0	5.5-8.5	approx. 0.95 (at 50°C)	—	approx. 0	—

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Emulsifiers & Surfactants

Fatty amines ethoxylated - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	Lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Fatty amines ethoxylated										
Rokamin SR5	Tallow amine ethoxylated	61791-26-2		•					•	Emulsifier used in formulations of soluble oils and semisynthetic cutting fluids. Provide corrosion inhibition.
Rokamin SR8 CONC.	Tallow amine ethoxylated	61791-26-2		•					•	
Rokamin SR15	Tallow amine ethoxylated	61791-26-2		•					•	
Rokamin SR22	Tallow amine ethoxylated	61791-26-2	44	•					•	
Rokamin K15	Cocoamine ethoxylated	61791-14-8		•					•	Emulsifier agent, corrosion inhibitor, specyfic surfactant for industrial cleaners to dispersants.
Rokamin K5	Cocoamine ethoxylated	61791-14-8		•					•	

Fatty amines ethoxylated - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	pH **	Density [g/ml]	Solidification point, [°C]	Surface tension at 25°C [mN/m]
Fatty amines ethoxylated									
Rokamin SR5	Tallow amine ethoxylated	61791-26-2	Liquid/paste	9.8	100	—	approx. 0.95 (at 25°C)	approx. 3	—
Rokamin SR8 CONC.	Tallow amine ethoxylated	61791-26-2	Liquid	12.4	min. 99.0	—	approx. 0.98 (at 50°C)	approx. 10	37
Rokamin SR15	Tallow amine ethoxylated	61791-26-2	Liquid/Slip paste	14.2	min. 99.0	9.0-11.5 c)	approx. 1.02 (at 25°C)	approx. -3	—
Rokamin SR22	Tallow amine ethoxylated	61791-26-2	Paste	16.1	min. 99.0	—	approx. 1.024 (at 50°C)	approx. 20	44
Rokamin K15	Cocoamine ethoxylated	61791-14-8	Liquid	15.5	min. 97.0	—	approx. 1.02 (at 30°C)	approx. -8	—
Rokamin K5	Cocoamine ethoxylated	61791-14-8	Liquid	10.4	min. 99.0	9.0-11.5	approx. 0.96 (at 25°C)	approx. -20	—

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Emulsifiers & Surfactants

Sorbitan esters and sorbitan esters ethoxylates - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Sorbitan esters and sorbitan esters ethoxylates										
Rokwin 60	Sorbitan monostearate	1338-43-6		•						Co-emulsifiers for soluble oil formulations
Rokwin 80	Sorbitan monostearate	1338-43-8		•		•				
Rokwinol 60	Ethoxylated sorbitan monostearate	9005-67-8		•		•				Standard emulsifiers for vegetable, ester-based and mineral base oils. Can also be used as lubricant and antistat additive.
Rokwinol 80	Ethoxylated sorbitan monostearate	9005-67-6		•		•				

Sorbitan esters and sorbitan esters ethoxylates - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	Density [g/ml]	Solidification point, [°C]
Sorbitan esters and sorbitan esters ethoxylates							
Rokwin 60	Sorbitan monostearate	1338-43-6	Solid wax	4.7	min. 99	0.92 (at 60°C)	—
Rokwin 80	Sorbitan monostearate	1338-43-8	Liquid/semi-liquid paste	4.3	min. 99	0.97 (at 60°C)	—
Rokwinol 60	Ethoxylated sorbitan monostearate	9005-67-8	Liquid/paste	14.9	min. 99	1.05 (at 40°C)	25-31
Rokwinol 80	Ethoxylated sorbitan monostearate	9005-67-6	Liquid/semi-liquid paste	15.0	min. 99	1.06 (at 57°C)	24-28

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Lubricity Additives
Fatty acid amide ethoxylated - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	Lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Fatty acid amide ethoxylated										
Rokamid KAD	Cocoamide DEA	—	27	•					•	Emulsifiers and corrosion inhibitors for cutting fluids. Thickener for detergent formulations.
Rokamid RAD	Oleamide DEA	68603-38-3	29	•					•	
Rokamid MRZ4	Rapamide MEA	85536-23-8	29	•					•	Emulsifier and thickening agent with anticorrosion properties.

Lubricity Additives
Fatty acid amide ethoxylated - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	Hydroxyl value [mg KOH/g] *	pH **	Density [g/ml]	Solidification point, [°C]	Surface tension at 25°C [mN/m]
Fatty acid amide ethoxylated										
Rokamid KAD	Cocoamide DEA	—	Liquid	—	100.0	—	7.5-10.5 [a)]	approx. 0.98	approx. 0°C	27
Rokamid RAD	Oleamide DEA	68603-38-3	Liquid	—	90.0	—	7.5-10.5 [a)]	approx. 0.98	approx. 0°C	29
Rokamid MRZ4	Rapamide MEA	85536-23-8	Liquid	—	min. 90	—	9.2 - 10[a)]	approx. 1.00 (at 25°C)	approx. 0°C	approx. 0°C

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Lubricity Additives
PEG polyethyleneglycols - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	Lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Water soluble polyethylene glycols with diffrent molar masses* (MW 200÷6000)										
Polikol 200	Polyoxyethylene Glycol	25322-68-3	49			•	•	•		
Polikol 300	Polyoxyethylene Glycol	25322-68-3	70			•	•	•		
Polikol 400	Polyoxyethylene Glycol	25322-68-3	69			•	•	•		
Polikol 600	Polyoxyethylene Glycol	25322-68-3	67			•	•	•		
Polikol 800	Polyoxyethylene Glycol	25322-68-3	67			•	•	•		Very versatile range of products. Depending on their molar mass, they can be used as solubilizers, lubricants, dispersing agents and mould-release agents.
Polikol 1500	Polyoxyethylene Glycol	25322-68-3	62			•	•	•		
Polikol 2000	Polyoxyethylene Glycol	25322-68-3				•	•	•		Recommended for semisynthetic and synthetic metal working fluids. Improve detergency. Enhance viscosity.
Polikol 3000	Polyoxyethylene Glycol	25322-68-3				•	•	•		
Polikol 4500	Polyoxyethylene Glycol	25322-68-3	61			•	•	•		
Polikol 6000	Polyoxyethylene Glycol	25322-68-3	60			•	•	•		
Polikol 8000	Polyoxyethylene Glycol	25322-68-3	41			•	•	•		

*) this products are availble with diffrent MW. Starting from 200 and ending at 6000

Lubricity Additives
PEG polyethyleneglycols - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	Hydroxyl value [mg KOH/g] *	pH **	Density [g/ml]	Average molar mass [g/mol]	Solidification point, [°C]
Water soluble polyethylene glycols with diffrent molar masses										
Polikol 200	Polyoxyethylene Glycol	25322-68-3	Liquid	—	min. 99.0	530-590	4.6-7.4 [d)]	approx. 1.12 (at 20°C)	200	approx. 0
Polikol 300	Polyoxyethylene Glycol	25322-68-3	Liquid	—	min. 99.0	360-390	4.6-7.4 [d)]	approx. 1.13 (at 20°C)	300	approx. 0
Polikol 400	Polyoxyethylene Glycol	25322-68-3	Liquid	—	min. 99.0	290	4.6-7.4 [d)]	approx. 1.13 (at 20°C)	400	approx. 5
Polikol 600	Polyoxyethylene Glycol	25322-68-3	Liquid	—	min. 99.0	170-200	4.6-7.4 [d)]	approx. 1.12 (at 25°C)	600	approx. 20
Polikol 800	Polyoxyethylene Glycol	25322-68-3	Paste or wax	—	min. 99.0	132-148	4.6-7.4 [d)]	approx. 1.11 (at 40°C)	800	approx. 30
Polikol 1500	Polyoxyethylene Glycol	25322-68-3	Wax	—	min. 99.0	70-80	4.6-7.4 [d)]	approx. 1.08 (at 70°C)	1500	approx. 42-48
Polikol 2000	Polyoxyethylene Glycol	25322-68-3	Wax	—	min. 99.0	51-63	4.6-7.4 [d)]	approx. 1.20 (at 70°C)	2000	approx. 50
Polikol 3000	Polyoxyethylene Glycol	25322-68-3	Wax	—	min. 99.0	34-42	4.6-7.4 [d)]	—	3000	approx. 55
Polikol 4500	Polyoxyethylene Glycol	25322-68-3	Wax	—	min. 99.0	23-28	4.6-7.4 [d)]	approx. 1.08 (at 70°C)	4500	approx. 55
Polikol 6000	Polyoxyethylene Glycol	25322-68-3	Wax	—	min. 99.0	16-23	4.6-7.4 [d)]	approx. 1.08 (at 70°C)	6000	approx. 52-58
Polikol 8000	Polyoxyethylene Glycol	25322-68-3	Wax	—	min. 99.0	12-16	4.6-7.4	approx. 1.08 (at 70°C)	8000	approx. 55

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Foam control agents
Alcohol alkoxylates - Application

PRODUCT NAME	DESCRIPTION	CAS	Emulsifier	Wetting agent	Lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
Low foaming surfactants - Alcohol alkoxylates									
Rokanol L5P5	Alkoxylated fatty alcohol	68439-51-0					•		Low foaming nonionic surfactant based on vegetable oil. Product shows degreasing properties.
Rokanol L4P5	Alkoxylated fatty alcohol	68439-51-0					•		Low foaming nonionic surfactant based on vegetable oil.
Rokanol LP200	Alkoxylated fatty alcohol	68439-30-5					•		Low foaming nonionic surfactant with good wetting properties.
Rokanol LP400	Alkoxylated fatty alcohol	102782-43-4					•		Low foaming nonionic surfactant. Product is based on branched, synthetic alcohol which increases wetting properties on hard surfaces.
Rokanol LP700	Alkoxylated fatty alcohol	—					•		Efficient, low foaming wetting agent with low cloud point.
Rokanol LP3135	Alkoxylated fatty alcohol	154518-36-2					•		Efficient, low foaming wetting agent with low cloud point.
Rokanol LP2023	Alkoxylated fatty alcohol	68002-96-0					•		Defoaming nonionic surfactant.
Rokanol LP2024	Alkoxylated fatty alcohol	37251-67-5					•		Efficient, low foaming wetting agent with low cloud point.
Rokanol LP2126	Alkoxylated fatty alcohol	68002-96-0					•		Defoaming nonionic surfactant.
Rokanol LP2529	Alkoxylated fatty alcohol	68551-13-3					•		Defoaming nonionic surfactant with improved dispersability.
Rokanol LP3943	Alkoxylated fatty alcohol	68551-13-3					•		Defoaming nonionic surfactant with improved dispersability.
Rokanol RZ4P11	Alkoxylated fatty alcohol	68002-96-0					•		Defoaming nonionic surfactant.
Rokanol LP27	Alkoxylated fatty alcohol	68439-51-0					•		Low foaming surfactants.
Rokanol LP3034	Alkoxylated fatty alcohol	68551-13-3					•		Low foaming surfactants.
Rokanol GA9LA	Alkoxylated fatty alcohol	166736-08-9	•				•		Low foaming surfactants with degreasing proporties.
Rokanol L10|80	Alkoxylated fatty alcohol	68439-51-0	•				•		Low foaming surfactant used as wetting agents and emulsifier.

Foam control agents
Alcohol alkoxylates - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	Hydroxyl value [mg KOH/g] *	pH **	Density [g/ml]	Cloud point [°C] ***	Solidification point, [°C]
Low foaming surfactants - Alcohol alkoxylates										
Rokanol L5P5	Alkoxylated fatty alcohol	68439-51-0	Liquid	6.0	min. 99.0	76-86	5.0-7.0 a)	approx. 0.97 (at 25°C)	27-31 A	approx. -9
Rokanol L4P5	Alkoxylated fatty alcohol	68439-51-0	Liquid	5.3	min. 99.0	98-108	5.5-8.5 c)	approx. 0.91-0.99 (at 20°C)	25 A	approx. -10
Rokanol LP200	Alkoxylated fatty alcohol	68439-51-0	Liquid	7.3	min. 99.5	—	5.0-7.0 d)	approx. 1.00	37-41 E	approx. -15
Rokanol LP400	Alkoxylated fatty alcohol	68439-51-0	Liquid	9.4	min. 99.5	—	5.0-7.0 d)	approx. 1.00	39-42 A	approx. -5
Rokanol LP700	Alkoxylated fatty alcohol	68439-51-0	Liquid	9.7	min. 99.5	—	5.0-7.0 a)	approx. 0.98 (at 25°C)	54.0 57.5 D	approx. -10
Rokanol LP3135	Alkoxylated fatty alcohol	68439-51-0	Liquid	7.9	min. 99.0	—	5.0-7.0 a)	approx. 1.00	31-35 A	approx. -20
Rokanol LP2023	Alkoxylated fatty alcohol	68439-51-0	Liquid	3.0	min. 99.5	—	5.0-7.0 a)	approx. 0.97 (at 25°C)	20-23 E	approx. -10
Rokanol LP2024	Alkoxylated fatty alcohol	68439-51-0	Liquid	6.3	min. 99.0	—	5.0-7.0 a)	approx. 0.97 (at 25°C)	20-24 A	approx. -15
Rokanol LP2126	Alkoxylated fatty alcohol	68439-51-0	Liquid	1.3	min. 99.5	—	4.0-6.0 1% solution ethanol: water	approx. 0.98 (at 25°C)	21-26 D	approx. -20
Rokanol LP2529	Alkoxylated fatty alcohol	68439-51-0	Liquid	3.5	min. 99.0	—	5.0-7.0	approx. 0.95 (at 25°C)	25-29 E	approx. -15
Rokanol LP3943	Alkoxylated fatty alcohol	68439-51-0	Liquid	3.0	min. 99.0	—	5.0-7.0 a)	approx. 0.95 (at 25°C)	39-43 E	approx. -20
Rokanol RZ4P11	Alkoxylated fatty alcohol	68439-51-0	Liquid	12.5	min. 99.0	—	5.5-8.5 a)	approx. 0.97 (at 20°C)	23-27 E	approx. 0
Rokanol LP27	Alkoxylated fatty alcohol	68439-51-0	Clear/ slightly turbid liquid	—	min. 99.0	—	5-7 (1%rr)	approx. 0.97 (at 25°C)	25-31 A	approx. -9
Rokanol LP3034	Alkoxylated fatty alcohol	68551-13-3	Liquid	—	min. 99.0	—	5-7 (1%rr)	approx. 0.97 (at 25°C)	30-34	(-20)
Rokanol GA9LA	Alkoxylated fatty alcohol	166736-08-9	Liquid	—	min. 99.0	—	5-7 (0.5%rr)	1.01 (at 25°C)	67-70 A	approx. 13
Rokanol L10|80	Alkoxylated fatty alcohol	103819-01-8	Clear liquid	14.1	77-81	—	4.6-7.4 (1%rr)	approx. 0.98-1.0 (at 50°C)	59-63 C	approx. 2

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

Foam control agents
EO/PO block copolymers - Applications

PRODUCT NAME	DESCRIPTION	CAS	Surface tension at 25°C [mN/m]	Emulsifier	Wetting agent	Lubricant	Coupling agent	Low-foaming	Corrosion inhibitor	Features and Benefits
EO/PO block copolymers										
Rokamer 2000	PEG/PPG Copolymer	9003-11-06	33			•		•		Low foaming nonionic surfactant with good wetting, low cloud point. Shows lubricating and emulsifying properties.
Rokamer 2600	PEG/PPG Copolymer	9003-11-06	37			•		•		Low foaming nonionic surfactant with low cloud point. Shows lubricating and emulsifying properties. It acts also as a defoamer. Applied as a detergent and defoamer in cleaning formulations.
Rokamer 1010|50	PEG/PPG Copolymer	9003-11-06	46			•		•		Low foaming nonionic surfactant.
Rokamer 2100	PEG/PPG Copolymer	9003-11-06	41			•		•		Low foaming nonionic surfactant.
Rokamer 2330	PEG/PPG Copolymer	9003-11-06	41			•		•		An effective low foaming agent with great wetting performance, recommended for metal cleaning applications (especially mechanical cleaning processes).
Rokamer 2950	PEG/PPG Copolymer	9003-11-06	42			•		•		Product with high detergency power and low foaming properties used in cutting and grinding fluids as a lubricant and coolant.
Rokamer R 2800	PEG/PPG Copolymer	6003-11-6	36			•		•		Low foaming nonionic surfactant.

Foam control agents
EO/PO block copolymers - Properties

PRODUCT NAME	DESCRIPTION	CAS	APPEARANCE	HLB	Active content [%]	pH **	Density [g/ml]	Cloud point [°C] ***	Solidification point, [°C]	Surface tension at 25°C [mN/m]
EO/PO block copolymers										
Rokamer 2000	PEG/PPG Copolymer	9003-11-06	Liquid	2.4	min. 99.0	4.6-7.4 a)	approx. 1.01 (at 25°C)	23-27 A	approx. -20	33
Rokamer 2600	PEG/PPG Copolymer	9003-11-06	Liquid	5.6	min. 99.0	4.6-7.4	approx. 1.02 (at 25°C)	16-20 A	approx. -22	37
Rokamer 1010|50	PEG/PPG Copolymer	9003-11-06	Liquid	16.6	min. 49-51%	7-9	approx. 1.07 (at 25°C)	approx. 89 B	approx. -5	46
Rokamer 2100	PEG/PPG Copolymer	9003-11-06	Liquid	3.4	min. 99	4.6-7.4	approx. 1.02 (at 25°C)	approx. 25 A	approx. 0	41
Rokamer 2330	PEG/PPG Copolymer	9003-11-06	Liquid	4.9	min. 99	4.6-7.4	approx. 1.03 (at 25°C)	approx. 30 A	approx. 10	41
Rokamer 2950	PEG/PPG Copolymer	9003-11-06	Liquid/ paste	8.1	min. 99	4.6-7.4	approx. 1.04 (at 25°C)	approx. 53 A	approx. 15	42
Rokamer R 2800	PEG/PPG Copolymer	6003-11-6	Liquid	2.8	›99%	4-7	approx. 1.01 (at 50°C)	approx. 21 A	approx. -20	36

*) Hydroxyl value method:
Hydroxyl value according to PN-88/C-04838, method B
**) pH determination methods:
a - pH of a 1% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
b - pH of a 5% solution according to PN-EN 1262:2000, solution C
c - pH of a 5% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
d - pH of a 10% aqueous solution at 20°C, the potentiometric method according to PN-89/C-04963
***) Cloud point method:
Cloud point according to PN-EN 1890:2000

PCC EXOL SA has the ability to formulate new products, develop products in a variety of specialty chemistries, and also provide contract manufacturing for customers.

Notes for guidance concerning the functional parameters and notation used in the catalogue

HLB (Hydrophilic-Lipophilic Balance)

The hydrophilic-hydrophobic balance is a parameter that determines the ratio of the content of the hydrophilic group and that of the hydrophobic group in a particle. The validity scope of the HLB number for non-ionic surface-active compounds is included within the range of 0 to 20 and is the measure of the share of the hydrophilic group in the particle.

$$HLB = 20 \cdot \frac{\text{molecular mass of hydrophilic part}}{\text{molecular mass of compound}}$$

On the other hand, for aqueos solution of ionic surface active agents acquire additional transformations increasing their degree of hydrophilicity, the value of the HLB number goes up to 40.

HLB for ester type compounds (polyoxyethylenated fatty acids):

$$HLB = 20 \cdot \left(1 - \frac{LZ}{LK}\right)$$

where:

LZ saponification number of oxyethylenation product, mgKOH/g

LK acid number of acids subjected to oxyethylenation, mgKOH/g

On the basis of the HLB scale, the range of the utility fitness of surface-active agents can be determined.

Cloud point

Cloud point is an indicator determining the behaviour of water or other organic solutions of nonoionic surfactants. Solutions of surfactants become cloudy during heating and revert to a clear solution at a certain temperature when cooled - this temperature is defined as 'cloud point'.

Depending on the temperature range at which the solution becomes cloudy, five determination methods are discriminated:

Method A – aqueous solution (10 - 90°C)

Method B – solution of NaCl 50g/l (>90°C)

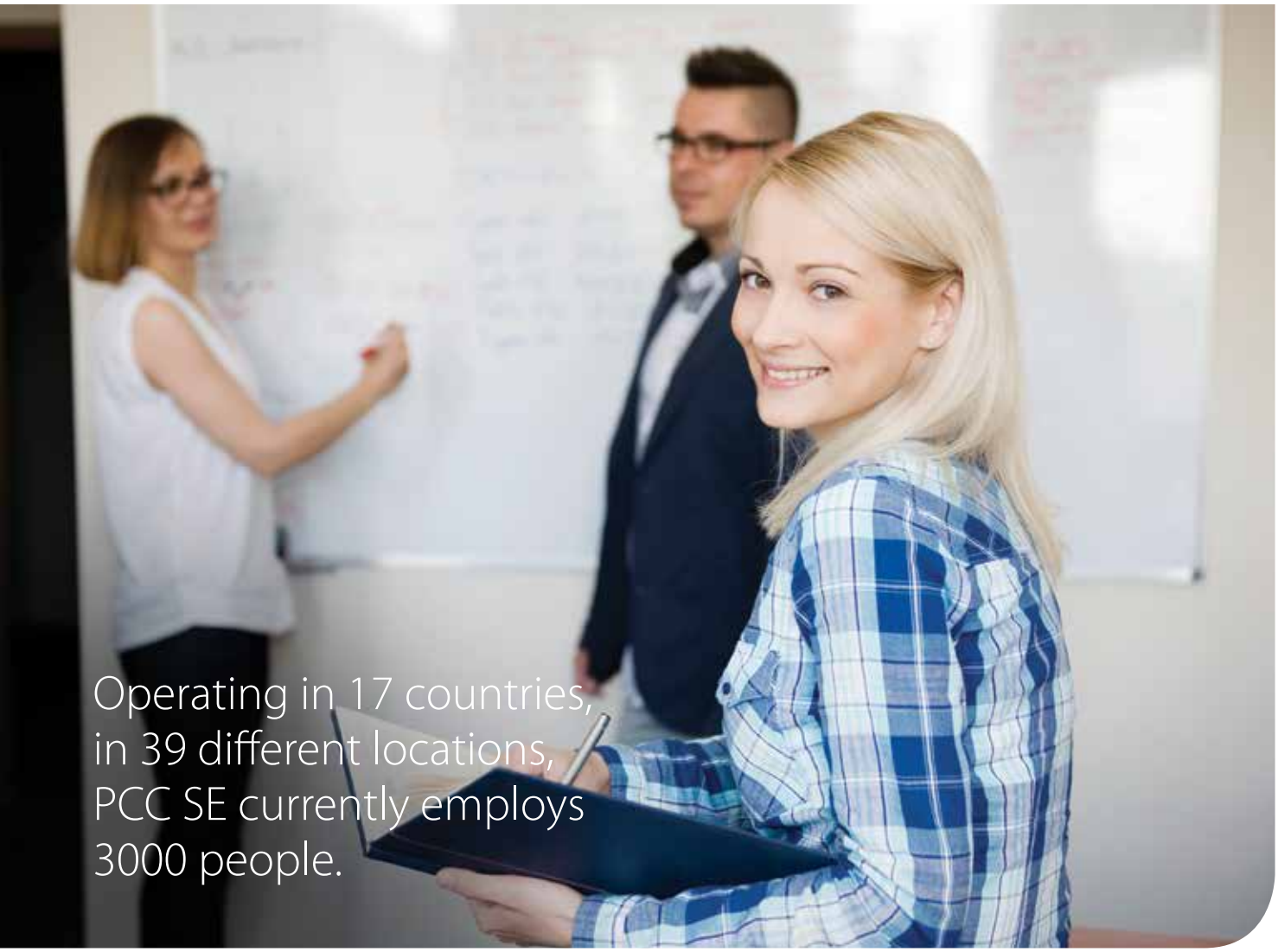
Method C – solution of NaCl 100g/l (>90°C)

Method D – solution 45g of butyl diglycol/water (<10°C)

Method E – solution 25 g of butyl diglycol/water (<10°C)

HLB NUMBER	EO CONTENTS IN PRODUCT, %	PRODUCT APPLICATION
1-3	5-15	Anti-foaming agent
4-6	20-30	Emulsifier W/O
7-11	35-55	Wetting agent
8-18	40-90	Emulsifier W/O
10-15	50-75	Detergent
10-18	50-90	Solubilizer

PCC Group
We build value through sustainable innovation



Each project or venture with a long-term success story shares one common thing – it's based on in-depth market research and on the knowledge acquired through years of experience. It is knowledge and experience that enables us to constantly aim higher and deliver greater value through dynamic and sustainable world-wide development of the PCC Group.

The companies, operating as a part of the PCC Group, act with responsibility and care. We only embark on new business challenges when we are certain that we have the skills and knowledge to achieve success. We operate in three major markets: chemicals, energy and logistics. Several dozen business units, managed by PCC SE, work in synergy to generate the greatest possible competitive advantage in both local and international markets. Each day nearly three thousand professionals contribute their energy, and effort, to secure the sustainable develop-

ment of the PCC Group. The key element of our strategy is to ensure the development of each individual business unit through taking advantage of innovative technology and new market applications. We achieve our goals in a sustainable and responsible way – we care about the environment and the society within which we operate.
We are always ready to reach our strategic goals. Efficient and dynamic management helps our employees to fully develop their potential and therefore enhances the overall PCC Group value. Joint enterprises and individual initiatives of our companies are the results of the entrepreneurship culture promoted within the PCC Group.

Our philosophy is built on simple values - integrity, trust and reliability. We believe that following those principles is the only way to build a long-term competitive advantage.

The PCC Group currently employs nearly 3000 people. We operate in 17 countries, in 39 different locations around the world. Our portfolio includes eight basic segments. Individual operational responsibility is assigned to seven of them - Polyols, Surfactants, Chlorine, Specialty Chemicals, Consumer Products, Energy and Logistics. Each of these segments is supported by 19 business units, all under the management of the PCC Group.

The divisions, segments and business units of the PCC Group

Divisions	Segments	Business units
Chemicals	Polyols	• Polyols • Polyurethane Systems
	Surfactants	• Anionic Surfactants • Non-ionic Surfactants • Amphoteric Surfactants (Betaines)
	Chlorine	• Chlorine • MCAA • Other Chlorine Downstream Products
	Speciality Chemicals	• Phosphorus and Naphthalene Derivatives • Alkylphenols • Chemicals and Commodities Trading • Quartzite
	Consumer Products	• Household and Industrial Cleaners, Detergents and Personal Care Products • Matches and Firelighters
Energy	Energy	• Renewable Energies • Conventional Energies
Logistics	Logistics	• Intermodal Transport • Road Haulage • Rail Transport
Holding	Holding	• Portfolio Management • Projects • Services

PCC Group - Industrial Park in Brzeg Dolny, Poland

PCC Rokita SA

PCC Rokita Capital Group, 22 companies, including:
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PCC Prodex Sp. z o.o.
PCC Prodex GmbH (Germany)
PCC PU Sp. z o.o.
IRPC PCC Co. Ltd. (Thailand)
PCC Therm Sp. z o.o.

PCC EXOL SA

PCC EXOL Capital Group, 5 companies, including:
PCC EXOL SA
PCC Chemax Inc. (the USA)
PCC EXOL Kimya Sanayi Ve Ticaret Limited Şirketi (Turkey)

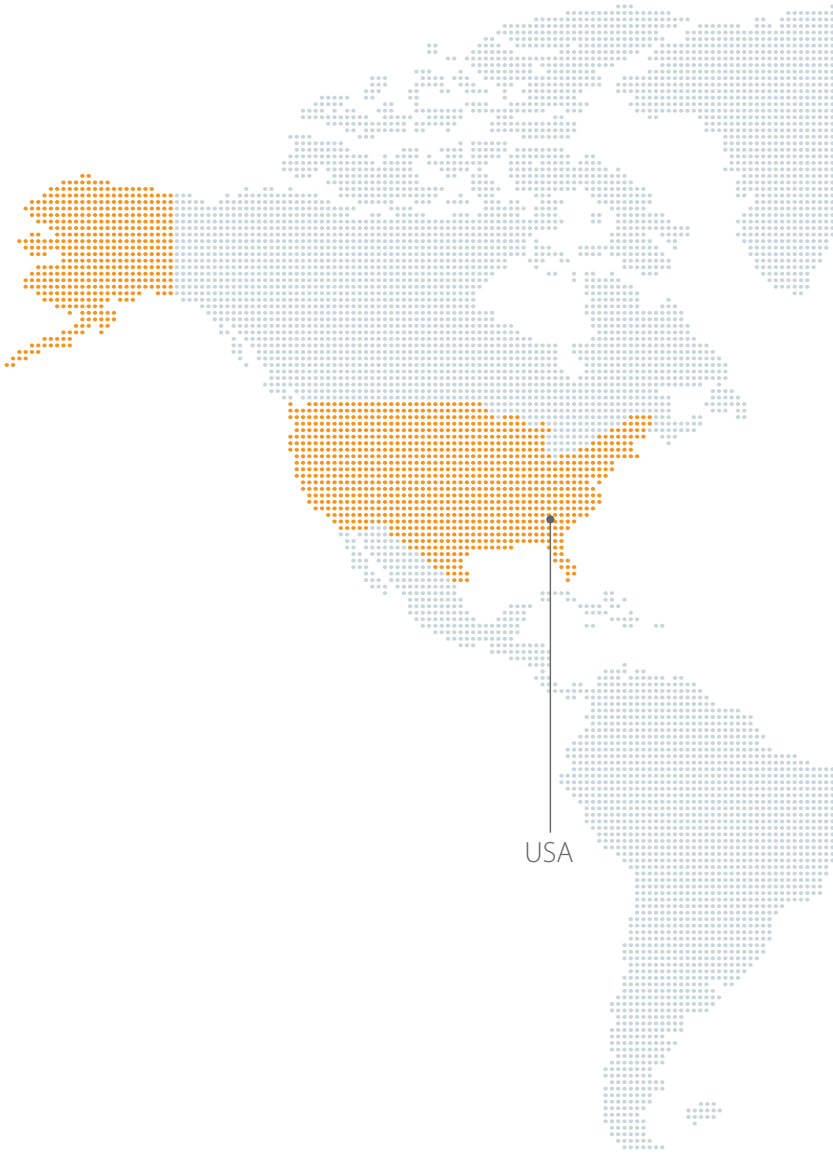
PCC CP Kosmet Sp. z o.o.

Capital Group PCC CP Kosmet, 3 companies, including:
PCC CP Kosmet Sp. z o.o.
OOO PCC Consumer Products Navigator (Belarus)
OOO PCC Consumer Products (Russia)

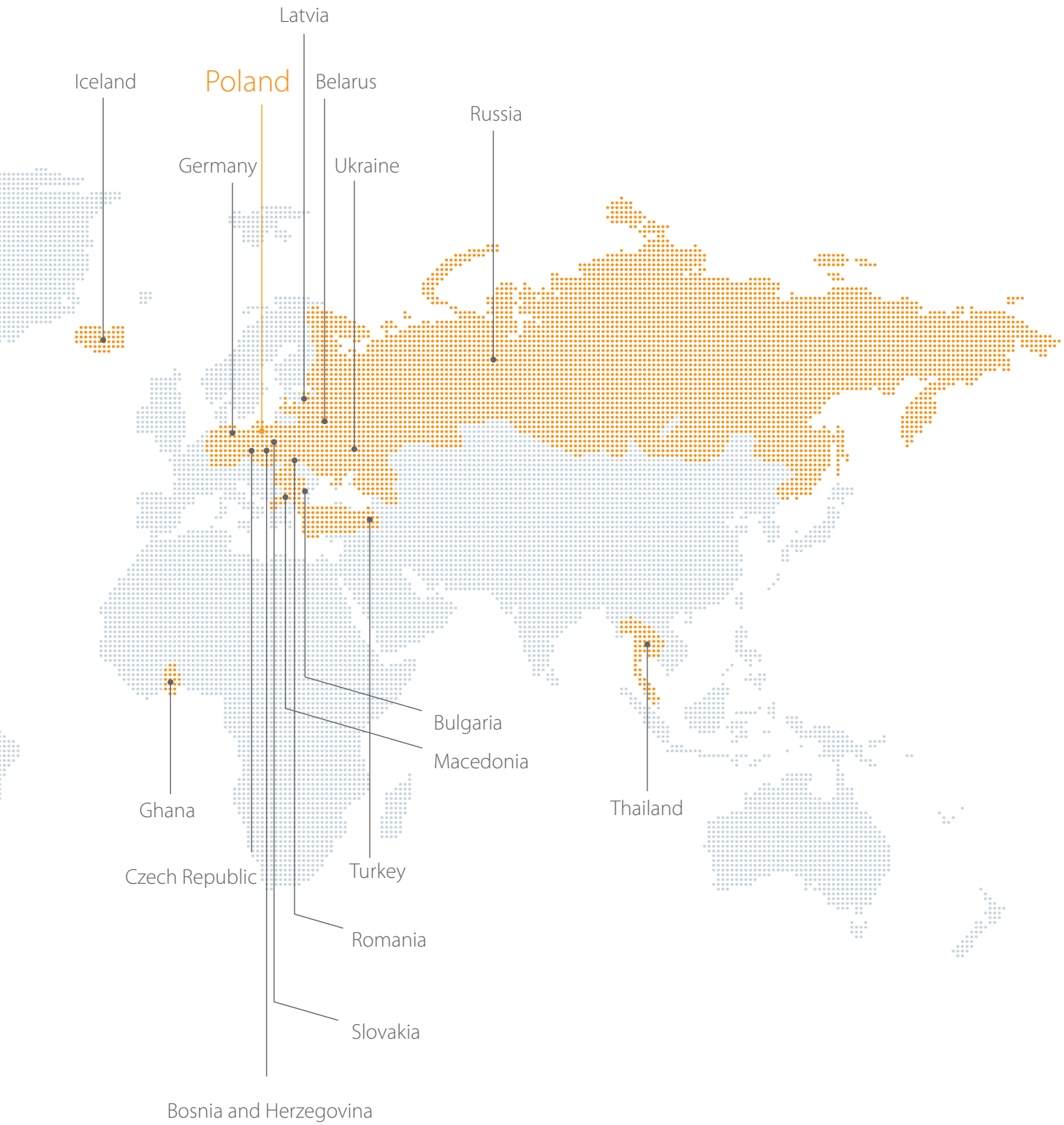
PCC MCAA Sp. z o.o.

PCC Autochem Sp. z o.o.

PCC Intermodal SA



PCC Group in the world



In accordance with our environmental concerns, this publication from the PCC Group was printed on Cocoon Silk - an ecological double-sided-coated matt paper. This paper is made of 100% waste paper via environment-friendly technology. The FSC® Certificate confirms that the raw materials used during the paper production process come from well-managed forests or other certified and controlled sources.

TEXT PAGES	
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COVER PAGES	
Brand	Cocoon Silk
Grammage	250
Number of pages	4
PUBLICATION	
Size (cm)	21 x 29.7
Quantity	200

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43	kg of landfill
6	kg CO_2 and greenhouse gases
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1679	litres of water
99	kWh of energy
70	kg of wood

Carbon footprint data evaluated by Labelia Conseil in accordance with the Bilan Carbone® methodology. Calculations are based on a comparison between recycled paper used versus a virgin fibre paper - according to the latest European BREF data (virgin fibre paper) available.

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January 2018

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More than Chemistry