SURFACTANS FOR PERSONAL CARE PRODUCTS

Surfactants Everywhere

EXOLcareline ™
version 2015.1

PCC EXOL

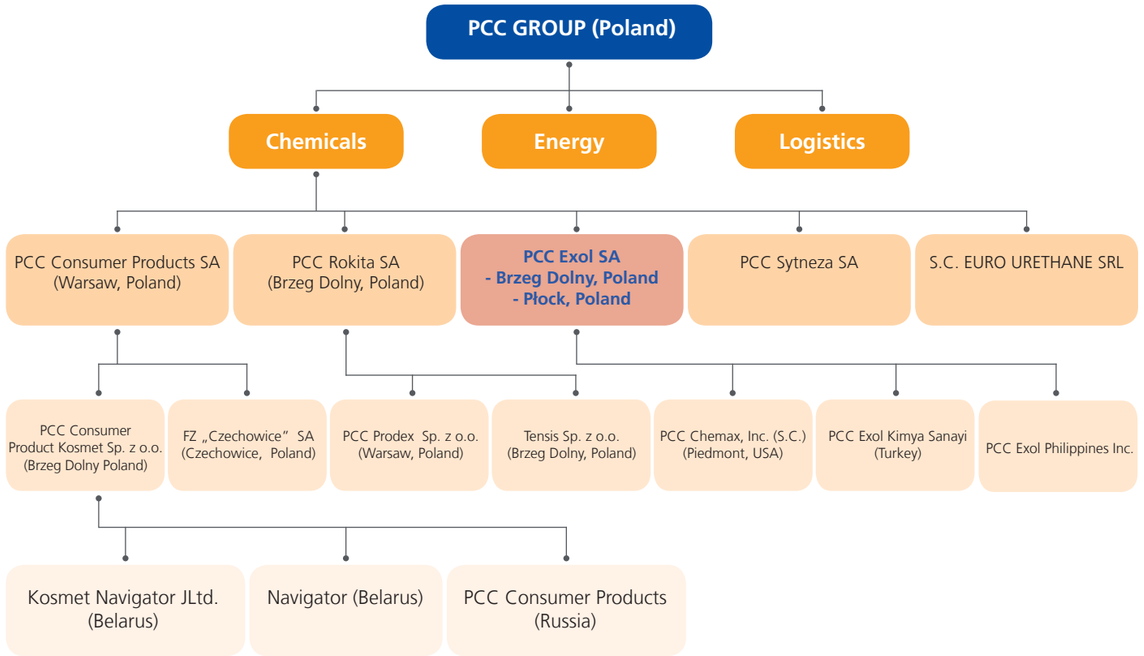
Specialized surfactants used in the production of personal care products and cosmetics.

Surfactant...sounding strange, sophisticated word. Besides, hides so many surprising contents. Accompanies us in everyday life, making them better, healthier, more enjoyable. Surfactants are an integral part of our lives and influence its quality. They are used in composing various goods, being indicators of modern lifestyle. We use them during daily activities such as bathing or relaxing care of body and hair. This is the part of the world of chemistry that surrounds us from all sides, always...

INTRODUCTION

PCC Exol SA was created by merge of PCC Exol SA and Surfactants Business Unit of PCC Rokita SA. The Company's core scope of operation is the manufacture and sale of surfactants. The company is headquartered in Brzeg Dolny, where is located manufacturing unit of anionic and nonionic surfactants. Moreover, in 2011, there was start-up of new production unit of nonionic surfactants (ethoxylation plant) in Płock. The flexibility of production allows to offer a wide range of anionic and nonionic surfactants according to the current needs of our customers. As one of the leading manufacturers of chemical products, the company is continuing to undertake investment activities with using modern technologies and based on the principle of sustainable development.

Our strategic investor is the German company PCC SE, which operates internationally in three divisions: Chemicals, Energy and Logistics. Today, more than 70 subsidiaries and associated companies working within the PCC Group employ about 2,500 staff in 16 countries. Group strategy is focused on growth and profitability in the core activities as well as on diversification into new segments.



Surfactants offered by our company are widely used in various industries applications. In addition to use in personal care and cosmetics industry, our surfactants are used in different branches such as: household chemicals, textile, agrochemicals, metalworking, oilfield industry, construction industry, paints & coatings, pulp and paper, and the other.

Over the years, PCC Exol has developed core competencies in manufacturing specialty surfactants. We meet our customers' needs with a unique and versatile product portfolio, a broad expertise in surfactants chemistry and a high degree of flexibility. Through intimate customer relationships and by maximising synergies of customers' application experience and our chemistry knowledge, we continuously strive to offer tailor-made products and system solutions that contribute to your success. We are continuously expanding our product range with new surfactants, focusing on safe chemistry, friendly to people and environment. One of the most important goals of PCC Exol is to make agrochemical formulations more efficient for the mutual benefit of manufacturers, end-users on a lot of the world's markets.

PCC Exol. The solid platform of chemical business!

ESSENTIAL ADDITIVES FOR EVERYDAY PRODUCTS

Personal Care market is rapidly changing. Use of wide range of personal hygiene products is nowdays inextricably linked with our lifestyle. Growing number of new type of formulations requires new range of ingredients ensuring satisfying effect in the formulation and ultimately, safety to the customer.

PCC Exols EXOLcareline range was created, and is continously expanding to enable our clients to create formulations tailor made to market trends and client needs.

ADDITIVES FOR EVERYDAY PRODUCTS

Product	INCI Name	Hair		Body			Face		Others
		Shampoo	Baby shampoo	Liquid Soap	Bath products	Baby Bath Wash	Face Cleansing	Shaving Cream/Foam	
ROSULFAN L	Sodium Lauryl Sulfate	●		●	●			●	
ROSULFAN D	Sodium Decyl Sulfate	●		●	●			●	
ROSULFAN A	Ammonium Lauryl Sulfate	●		●	●			●	
SULFOROKAnol L170/1	Sodium Laureth-1 Sulfate	●		●	●		●	●	
SULFOROKAnol L225/1	Sodium Laureth-2 Sulfate	●	●	●	●	●	●	●	
SULFOROKAnol L270/1	Sodium Laureth-2 Sulfate	●		●	●		●	●	
SULFOROKAnol L270/1A	Sodium Laureth-2 Sulfate	●		●	●		●	●	
SULFOROKAnol L327	Sodium Laureth-3 Sulfate	●		●	●		●	●	
SULFOROKAnol L370	Sodium Laureth-3 Sulfate	●		●	●		●	●	
SULFOROKAnol L370/1	Sodium Laureth-3 Sulfate	●		●	●		●	●	
SULFOSUCCINATE L3/40	Disodium Laureth-3 Sulfosuccinate	●	●	●	●	●	●	●	
ROKAnol LK1	Laureth-1	●	●	●	●	●	●		
ROKAnol LK2	Laureth-2	●	●	●	●	●	●		
ROKAnol LK2A	Laureth-2	●	●	●	●	●	●		
ROKAnol LK3	Laureth-3	●		●	●				
ROKAnol L3A	C12-C16 Pareth-3	●		●	●				
ROKAnol L4	Laureth-4	●		●	●				
ROKAnol L5A	C12-C16 Pareth-5	●		●	●				
ROKAnol L7	Laureth-7	●		●					
ROKAnol L7A	C12-C16 Pareth-7	●		●					
ROKAnol L7W	Laureth-7	●		●					
ROKAnol L10	Laureth-10	●		●					
ROKAnol L10/80	Laureth-10	●		●					
ROKAnol D3W	Deceth-3								●
ROKAnol DB7	C12-C15 Pareth-7	●							●
ROKAnol DB7W	C12-C15 Pareth-7	●							●
ROKAnol T6	Ceteareth-6						●	●	
ROKAnol T10	Ceteareth-10						●	●	
ROKAnol T12	Ceteareth-12						●	●	
ROKAnol T18	Ceteareth-18						●	●	
ROKAnol O3	Oleth-3	●							
ROKAnol O18	Oleth-18	●							
ROKAnol NL8P4	-						●		●

ADDITIVES FOR EVERYDAY PRODUCTS

Product	INCI Name	Hair		Body			Face		Others
		Shampoo	Baby shampoo	Liquid Soap	Bath products	Baby Bath Wash	Face Cleansing	Shaving Cream/Foam	
ROKAnol LP27	-						●		●
ROKAnol LP2024	-						●		●
ROKAnol LP2529	-						●		●
ROKAnol L4P5	PPG-4 Laureth-5						●		●
ROKAnol L5P5	PPG-5 Laureth-5	●	●	●	●		●		
ROKAnol LN75/50	PEG-75 Lanolin	●	●						
ROKAcet S7	PEG-7 Stearate	●		●					
ROKAcet S24	PEG-24 Stearate	●		●					
ROKAcet KO300G	PEG-7 Glyceryl Cocoate	●	●	●	●		●		
ROKwin 60	Sorbitan monostearate	●				●	●	●	
ROKwin 80	Sorbitan monooleate	●				●	●	●	
ROKwinol 60	PEG-20 sorbitan monostearate	●				●	●	●	
ROKwinol 80	PEG-20 sorbitan monooleate	●				●	●	●	
POLIkol 200	PEG-4	●						●	
POLIkol 300	PEG-6	●						●	
POLIkol 400	PEG-8	●						●	
ROKAmid KAD	Cocamide DEA	●		●	●				
ROKAmid RAD	Oleamide DEA			●	●				
ROKAmina K30	Cocamidopropyl Betaine	●	●	●	●	●	●	●	
ROKAmina K30B	Coco Betaine	●	●	●	●	●	●	●	
ROKAmina K30E	Cocamidopropyl Betaine	●	●	●	●	●	●	●	
ROKAmina K40	Cocamidopropyl Betaine	●	●	●	●	●	●	●	
ROKAmina K40HC	Cocamidopropyl Betaine	●	●	●	●	●	●	●	
EXOpearl	Sodium Laureth Sulfate, Cocamide DEA, Glycol Distearate	●	●	●	●		●		
EXOcare PC60	Sodium Laureth Sulfate, Cocamidopropyl Betaine, Coco-Glucoside	●	●	●	●	●	●	●	●
ExoAlc 1618 pills	Cetearyl alcohol	●	●						●
ExoAlc 1698 pills	Cetyl alcohol	●	●						●

The specific function of the surfactant in the formulation steems from its chemical structure. Portion and structure of hydrophilic and lypophilic parts of surfactant - intrictic for every surface active agent enables classification into different application function. Below table divides main surfactants classes, that form PCC Exol portfolio into funcion it plays in the end product.

ADDITIVES FOR EVERYDAY PRODUCTS

Product	Function in formulation												
	Base Surfactants	Co-Surfactants	O/W Emulsifier	W/O Emulsifier	Dispersant	Delivery System	Emolient	Humectant	Solubilizer	Wetting Agent	Stabilizing Agent	Foam Booster	Viscosity Modifier
Sulfated Fatty Alcohols	●											●	●
Sulfated Ethoxylated Fatty Alcohols	●											●	●
Sulfosuccinates		●											
Ethoxylated Fatty Alcohols		●	●	●	●	●	●		●	●	●	●	●
Ethoxylated Fatty Acids		●	●		●		●	●	●		●		●
Sorbitan Esters			●	●			●	●	●	●			●
Betaines		●										●	●
Polyoxyethylene Glycols (PEGs)	●		●			●	●	●			●	●	
Alcohols		●					●						

PRIMARY SURFACTANTS AND FOAMING AGENTS

Production of reach and long lasting foam accompanies all hygiene activities and is perceived as a sign of clensing action. Foamability and stability of foam is related to surfactant structure and is a domain of base surfactants. Products belonging to this class are a basic ingredient of all wash-off formulations and make cleansing products what they are.

PRIMARY SURFACTANTS AND FOAMING AGENTS

Product characteristic								Product group									
Product	CAS number	Ionic character	Physical form	HLB	Description	Active content (%)	Cloud point [°C], Cloud point Tanaka [°C][1]); Saponification value[2]) [mgKOH/g]; Amine value[3]) [mgKOH/g]; Hydroxyl value[4]) [mgKOH/g]	Alkylsulphates	Alkylethersulphates	Sulphosuccinates	Betaines	Alkoxylated fatty alcohols	Polyethylene Glycols	Ethoxylated fatty acids	Fatty acid amide ethoxylated	Fatty amines ethoxylated	Sorbitan esters
SULFOROKAnol L170/1	68891-38-3	A	Paste/liquid gel	-	Sodium Laureth Sulfate + 1 EO	68-72	-		●								
SULFOROKAnol L225/1	68891-38-3	A	Liquid	-	Sodium Laureth Sulfate + 2 EO	25-27	-		●								
SULFOROKAnol L270/1	68891-38-3	A	Paste/liquid gel	-	Sodium Laureth Sulfate + 2 EO	68-72	-		●								
SULFOROKAnol L270/1A	68891-38-3	A	Paste/liquid gel	-	Sodium Laureth Sulfate + 2 EO	68-72	-		●								
SULFOROKAnol L327	125301-92-0	A	Liquid	-	Sodium Pareth Sulfate + 3 EO	26-28	-		●								
SULFOROKAnol L327/1	13150-00-0	A	Liquid	-	Sodium Laureth Sulfate + 3 EO	27-29	-		●								
SULFOROKAnol L370	125301-92-0	A	Paste/liquid gel	-	Sodium Pareth Sulfate + 3 EO	68-72	-		●								
SULFOROKAnol L370/1	13150-00-0	A	Paste/liquid gel	-	Sodium Laureth Sulfate + 3 EO	68-72	-		●								
ROSULfan A	90583-11-2	A	Liquid	-	Ammonium Lauryl Sulfate	26-28	-	●									
ROSULfan D	142-87-0	A	Liquid	-	Sodium Decyl Sulfate	35-40	-	●									
ROSULfan L	85586-07-8	A	Liquid	-	Sodium Lauryl Sulfate	27.5 – 30.0	-	●									
SULFOSUCCINATE L3/40	68815-56-5	A	Liquid	-	Disodium Laureth Sulfosuccinate	min. 25.0	-			●							
ROKAmid KAD	-	N	Liquid	-	Cocoamide DEA	min. 90.0	-									●	

SECONDARY SURFACTANTS AND EMULSIFIERS

Differentiation of products and obtaining specific applications and aesthetic properties is achieved through use of co-surfactants. Application of secondary surfactant can have a synergistic effect on foaming, foam stability, rheology building properties and improve mildness of the formulation.

Dispersion of hydrophobic ingredients in water solution is achieved through application of surface tension reducers. Emulsifiers arrange themselves at the water/oil interfaces and allow solubilization of oils.

SECONDARY SURFACTANTS AND EMULSIFIERS

Product characteristic								Product group									
Product	CAS number	Ionic character	Physical form	HLB	Description	Active content (%)	Cloud point [°C], Cloud point Tanaka [°C][1]); Saponification value[2]) [mgKOH/g]; Amine value[3]) [mgKOH/g]; Hydroxyl value[4]) [mgKOH/g]	Alkylsulphates	Alkylethersulphates	Sulphosuccinates	Betaines	Alkoxylated fatty alcohols	Polyethylene Glycols	Ethoxylated fatty acids	Fatty acid amide ethoxylated	Fatty amines ethoxylated	Sorbitan esters
SULFOSUCCINATE L3/40	68815-56-5	A	Liquid	-	Disodium Laureth Sulfosuccinate	min. 25.0	-			●							
ROKAmina K30	-	Amph	Liquid	-	Cocamidopropyl Betaine	29-32	-				●						
ROKAmina K30B	68424-94-2	Amph	Liquid	-	Coco Betaine	29-32	-				●						
ROKAmina K30E	-	Amph	Liquid	-	Cocamidopropyl Betaine	29-32	-				●						
ROKAmina K40	-	Amph	Liquid	-	Cocamidopropyl Betaine	min. 37.0	-				●						
ROKAmina K40HC	-	Amph	Liquid	-	Cocamidopropyl Betaine	min. 37.0	-				●						
ROKAnol C7	68213-23-0	N	Liquid	11.9	Alcohols, C12-18 + 7 EO	min. 95.5	106-112 [4]					●					
ROKAnol DB3	68131-33-5	N	Liquid/ Paste	7.8	Alcohols, C12-15 + 3 EO	min. 99.7	164-172 [3]					●					
ROKAnol DB5	68131-33-5	N	Liquid	10.2	Alcohols, C12-15 + 5 EO	min. 99.5	65-72 D					●					
ROKAnol DB7	68131-39-5	N	Liquid/ Paste	12.0	Alcohols, C12-15 + 7 EO	min. 99.5	100-114 [3]					●					
ROKAnol DB7W	68131-39-5	N	Oily liquid	12.0	Alcohols, C12-15 + 7 EO	min. 90.0	100-114 [3]					●					
ROKAnol NL6	68439-45-2	N	Liquid	12.3	Alcohols, C9-11, branched and linear + 6 EO	min. 99.5	50-57 A					●					
ROKAnol NL8	68439-45-2	N	Liquid	13.8	Alcohols, C9-11, branched and linear + 8 EO	min. 99.0	78-85 A					●					
ROKAnol UD3	127036-24-2	N	Liquid	8.7	Alcohols, C11, branched + 3 EO	min. 99.0	43-48 E					●					
ROKAnol UD5	127036-24-2	N	Liquid	11.0	Alcohols, C11, branched + 5 EO	min. 99.0	60-65 E					●					

SECONDARY SURFACTANTS AND EMULSIFIERS

Product characteristic								Product group									
Product	CAS number	Ionic character	Physical form	HLB	Description	Active content (%)	Cloud point [°C], Cloud point Tanaka [°C][1]); Saponification value[2]) [mgKOH/g]; Amine value[3]) [mgKOH/g]; Hydroxyl value[4]) [mgKOH/g]	Alkylsulphates	Alkylethersulphates	Sulphosuccinates	Betaines	Alkoxylated fatty alcohols	Polyethylene Glycols	Ethoxylated fatty acids	Fatty acid amide ethoxylated	Fatty amines ethoxylated	Sorbitan esters
ROKAnol UD7	127036-24-2	N	Liquid	12.3	Alcohols, C11, branched, + 7 EO	min. 99.0	51-56 A					●					
ROKAnol LK2	68439-50-9	N	Liquid	6.3	Alcohols, C12-14 + 2 EO	min. 99.7	192-204 [4]					●					
ROKAnol LK2A	68439-50-9	N	Liquid	6.2	Alcohols, C12-14 + 2 EO	min. 99.9	196-204 [4]					●					
ROKAnol LK3	68002-97-1	N	Liquid/ Paste	8.0	Alcohols, C12-14 + 3 EO	min. 99.5	165-173 [4]					●					
ROKAnol L7	103819-01-8	N	Liquid	12.9	Alcohols, C12-14 + 7 EO	min. 99.5	30-40 C					●					
ROKAnol L7A	68551-12-2	N	Liquid	12.9	Alcohols, C12-16 + 7 EO	min. 99.5	56-62 A					●					
ROKAnol L7W	103819-01-8	N	Liquid	12.9	Alcohols, C12-14 + 7 EO	89-92	30-40 C					●					
ROKAnol L3A	68551-12-2	N	Liquid	8.0	Alcohols, C12-16 + 3 EO	min. 99.5	53-55 E					●					
ROKAnol L4	68002-97-1	N	Liquid	10.0	Alcohols, C12-14 + 4 EO	min. 99.5	59-63 E					●					
ROKAnol L10	68551-12-2	N	Paste	13.8	Alcohols, C12-16 + 10 EO	min. 99.7	59-63 C					●					
ROKAnol L10/80	6540-99-4	N	Viscous liquid	13.8	Alcohols, C12-14 + 10 EO	min. 80.0	59-63 C					●					
ROKAnol L22	68551-12-2	N	Wax	17.0	Alcohols, C12-14 + 22 EO	min. 99.7	46-52 [4]					●					
ROKAnol LN75/50	61790-81-6	N	Viscous liquid	17.8	Lanolin + 75 EO	48-52	-					●					
ROKAnol LN75K	61790-81-6	N	Solid	17.8	Lanolin + 75 EO	min. 99.0	-					●					
ROKAnol O3	9004-98-2	N	Liquid	6.6	Alcohols, C16-18 unsaturated + 3 EO	min. 99.0	37-41 E					●					
ROKAnol O18	9004-98-2	N	Paste	15.6	Alcohols, C16-18 unsaturated + 22 EO	min. 99.0	70-74 C					●					
ROKAnol T10	68439-49-6	N	Wax	11.7	Alcohols, C16-18, ethoxylated + 10 EO	min. 99.5	85-95 [4]					●					

SECONDARY SURFACTANTS AND EMULSIFIERS

Product characteristic								Product group									
Product	CAS number	Ionic character	Physical form	HLB	Description	Active content (%)	Cloud point [°C], Cloud point Tanaka [°C][1]); Saponification value[2]) [mgKOH/g]; Amine value[3]) [mgKOH/g]; Hydroxyl value[4]) [mgKOH/g]	Alkylsulphates	Alkylethersulphates	Sulphosuccinates	Betaines	Alkoxylated fatty alcohols	Polyethylene Glycols	Ethoxylated fatty acids	Fatty acid amide ethoxylated	Fatty amines ethoxylated	Sorbitan esters	Alcohols
ROKAnol T12	68439-49-6	N	Wax	13.5	Alcohols, C16-18, ethoxylated + 12 EO	min. 99.5	85-100 A					●						
ROKAnol T18	68439-49-6	N	Wax	16.3	Alcohols, C16-18, ethoxylated + 18 EO	min. 99.0	74-77 C					●						
ROKAnol T6	68439-49-6	N	Wax	10.0	Alcohols, C16-18, ethoxylated + 6 EO	min. 99.5	105-115 [4])					●						
ROKAcet S7	9004-99-3	N	Paste	10.6	Stearate + 7 EO	min. 99.0	92-97 [2])							●				
ROKAcet S24	9004-99-3	N	Wax	15.8	Stearate + 24 EO	min. 99.0	40-45 [2])							●				
ROKAcet KO300G	68201-46-7	N	Liquid	-	Glycerides, coco mono- and di-, ethoxylated	min. 99.0	90-100 [2])							●				
ROKwin 60	1338-41-6	N	Solid	4.7	Sorbitan monostearate	min. 99.0	145-160 [2])										●	
ROKwinol 60	9005-67-8	N	Liquid	14.9	PEG-20 sorbitan monostearate	min. 99.0	15-55 [2])										●	
ROKwin 80	1338-43-8	N	Liquid	4.3	Sorbitan monooleate	min. 99.0	145-170 [2])										●	
ROKwinol 80	9005-65-6	N	Liquid	15.0	PEG-20 sorbitan monooleate	min. 99.0	45-55 [2])										●	
ExoAlc 1618 pills	67762-27-0	N	Solid in pills form	-	Alcohol C16	min. 99.0	210-220 [4])											●
ExoAlc 1698 pills	36653-82-4	N	Solid in pills form	-	Alcohol C19	min. 99.0	228-233 [4])											●

THICKENERS AND RHEOLOGY MODIFIERS

For some products, due to composition of surfactant system and/or specific requirements of the formulation use of special thickeners is required. The exaple could be delicate formulations like baby care products, where low concentration of sodium chloride and Sulfate free formulations are a market standard.

Rheology modifying products find an application where high viscosity of the formulation is required in order to achieve desirable effect. These are perlizers, capsule or shimmer suspensions and soap dispensers.

THICKENERS AND RHEOLOGY MODIFIERS – PRODUCT LIST

Product characteristic								Product group									
Product	CAS number	Ionic character	Physical form	HLB	Description	Active content (%)	Cloud point [°C], Cloud point Tanaka [°C][1]); Saponification value[2]) [mgKOH/g]; Amine value[3]) [mgKOH/g]; Hydroxyl value[4]) [mgKOH/g]	Alkylsulphates	Alkylethersulphates	Sulphosuccinates	Betaines	Alkoxylated fatty alcohols	Polyethylene Glycols	Ethoxylated fatty acids	Fatty acid amide ethoxylated	Fatty amines ethoxylated	Sorbitan esters	Alcohols
ROKAnol LK2	68439-50-9	N	Liquid	6.3	Alcohols, C12-14 + 2 EO	min. 99.7	192-204 [4])					●						
ROKAnol LK2A	68439-50-9	N	Liquid	6.2	Alcohols, C12-14 + 2 EO	min. 99.9	196-204 [4])					●						
ROKAnol LK3	68002-97-1	N	Liquid/Paste	8.0	Alcohols, C12-14 + 3 EO	min. 99.5	165-173 [4])					●						
ROKAcet K7	61791-29-5	N	Liquid	11.6	Cocoate + 7 EO	min. 99.0	104-112 [4])						●					
ROKAcet R40	61791-12-6	N	Paste	13.0	Castor oil + 40 EO	min. 99.0	55-64 [4])						●					
ROKAmid KAD	-	N	Liquid	-	Cocoamide DEA	min. 99.0	-							●				
ROKAmid RAD	68603-38-3	N	Liquid	-	Oleamide DEA	min. 90.0	-							●				
ROKwin 60	1338-41-6	N	Solid	4.7	Sorbitan monostearate	min. 99.0	145-160 [2])										●	
ROKwinol 60	9005-67-8	N	Liquid	14.9	PEG-20 sorbitan monostearate	min. 99.0	15-55 [2])										●	
ROKwin 80	1338-43-8	N	Liquid	4.3	Sorbitan monooleate	min. 99.0	145-170 [2])										●	
ROKwinol 80	9005-65-6	N	Liquid	15.0	PEG-20 sorbitan monooleate	min. 99.0	45-55 [2])										●	
ExoAlc 1618 pills	67762-27-0	N	Solid in pills form	-	Alcohols, C16-18 (30/70)	min. 99.0	210-220 [4])											●
ExoAlc 1698 pills	36653-82-4	N	Solid in pills form	-	Alcohol C16	min. 99.0	228-233 [4])											●

WETTING AGENTS AND OTHER ADDITIVES

Activity in lowering surface tension between solids and liquids is achieved by application of wetting agents. This is necessary in various types of formulations such as shampoos or colourisation compositions. Better spreading of the dying product on hair ensures good pigment distribution and better final effect. From the other side, good hair wetting efficiency results in satisfying washing and supplementation as well if applied in hair care products.

WETTING AGENTS AND OTHER ADDITIVES – PRODUCT LIST

Product characteristic								Product group								
Product	CAS number	Ionic character	Physical form	HLB	Description	Active content (%)	Cloud point [°C], Cloud point Tanaka [°C][1]); Saponification value[2]) [mgKOH/g]; Amine value[3]) [mgKOH/g]; Hydroxyl value[4]) [mgKOH/g]	Alkylsulphates	Alkylethersulphates	Sulphosuccinates	Betaines	Alkoxylated fatty alcohols	Polyethylene Glycols	Ethoxylated fatty acids	Fatty acid amide ethoxylated	Fatty amines ethoxylated	Sorbitan esters
EXOpearl	-	-	Paste	-	Sodium Laureth Sulfate, Cocamide DEA, Glycol Distearate	min. 40 % (dry matter)	-	•							•		
ROKAnol D3W	68002-97-1	N	Liquid	8.6	Alcohol C10 + 3 EO	min. 90.0	190-205 [4]					•					
ROKAnol NL8P4	154518-36-2	N	Liquid	9.5	Alcohols, C9-11-iso, C10-rich + EO/PO	min. 99.0	38-48 A					•					
ROKAnol LP2024	37251-67-5	N	Liquid	6.3	Alcohols, C10 + EO/PO	min. 99.0	20-24 A					•					
ROKAnol LP2529	68551-13-3	N	Liquid	3.5	Alcohols, C12-14 + EO/PO	min. 99.0	25-29 A					•					
ROKAnol LP27	68439-51-0	N	Liquid	6.0	Alcohols, C12-14 + EO/PO	min. 99.0	27-31 A					•					
ROKAnol L4P5	68439-51-0	N	Liquid	5.3	Alcohols, C12-14 + EO/PO	min. 99.0	98-108 [4]					•					
ROKAnol L5P5	68439-51-0	N	Liquid	6.0	Alcohols, C12-14 + EO/PO	min. 99.0	27-31 A					•					
POLIkol 200	25322-68-3	N	Liquid	-	Polyoxyethylene glycol	min. 99.0	530-590 [4]						•				
POLIkol 300	25322-68-3	N	Liquid	-	Polyoxyethylene glycol	min. 99.0	360-390 [4]						•				
POLIkol 400	25322-68-3	N	Liquid	-	Polyoxyethylene glycol	min. 99.0	270-300 [4]						•				

BETAINES

Betaines are surfactants belonging to a class of amphoteric surface active agents displaying excellent skin mildness profile, very good foam characteristics and viscosity building properties.
A combination of favourable application parameters like abundant foam formation, compatibility with a wide range of surfactant systems and an increased safety made betaines one of the most widely used surfactants in all wash-off applications.

Following market trends and an ever-growing interest in surfactants displaying mildness to skin and efficiency in cosmetic formulations, Rokamina product range was developed.
A cutting edge technology applied by PCC Exol in the production process allows achieving unparalleled quality parameters that meet the highest standards of customer safety.

FUNCTION IN FORMULATION:

- CO-SURFACTANTS,
- FOAM BOOSTER,
- VISCOSITY MODIFIER.

APPLICATION:

- Shampoo,
- Baby Shampoo,
- Liquid Soap,
- Bubble Baths,
- Mild Shower Gels,
- Baby Bath Wash,
- Face Cleansing,
- Shaving Cream/Foam.

ADDED VALUE IN FORMULATING:

- Reduces irritancy of surfactants,
- Good skin compatibility in combination with anionic surfactants,
- Better skin feel, soft and smooth,
- Richer and more luxurious foam,
- High performance viscosity builder in Ether sulfate based formulations.

BENEFITS:

- Mild surfactant (cleansing effect),
- Foam boosting,
- Hair and skin conditioning effects,
- Exceptionally effective viscosity increasing agent (highly responsive to salt),
- Readily biodegradable,
- Compatible with anionic, cationic, amphoteric and nonionic surfactant.

PCC EXOL SA has developed two classes of betaines surfactants: Cocamidopropyl Betaines and Coco-Betaine whose parameters are summarized in the below table.
Rokamina K30, K30E, K40, and K40HC belong to the same chemical class, whereas Rokamina K30B is a single representative of another class. The single thing in common for Rokamina K30B, K30E and K40HC is their supreme purity making them suitable for all products where the sensitiveness of the product is paramount.
These products find application in: - cosmetics for babies,
- dermocosmetics,
- high quality cosmetics.

Product name	INCI	Active matter (%)	Physical state	pH*	Surface tension (mN/m)	Preservative	Biodegradability**	Purity
ROKAmina K30	Cocamidopropyl Betaine	29-32	Liquid	5.0-7.0	31	Free	76.3%	Market Benchmark
ROKAmina K30E	Cocamidopropyl Betaine	29-32	Liquid	4.0-5.5	28	Sodium benzoate	76.3%	Supreme Quality
ROKAmina K30B	Coco Betaine	29-32	Liquid	4.5-7.5	30	Free	Expected to be biodegradable based on the literature data	Supreme Quality
ROKAmina K40HC	Cocamidopropyl Betaine	37-42	Liquid	4.5-5.5	25	Free	76.3%	Supreme Quality
ROKAmina K40	Cocamidopropyl Betaine	37-42	Liquid	4.5-5.5	28	Free	76.3%	Market Benchmark

* 1% solution
**According EU ECC C.4-E Closed Bottle Test

THICKENING PROPERTY

Addition of betaines to a standard anionic surfactant system not only optimizes a viscosity profile and a response to salt but also improves cleansing power and mildness of the final formulation.

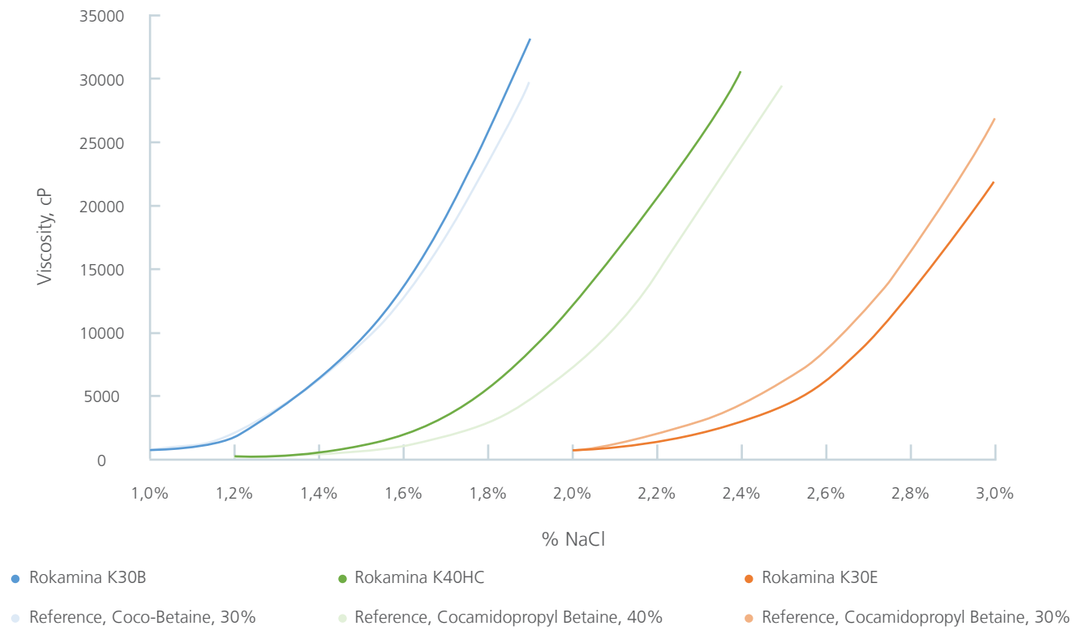
A synergistic effect of an anionic surfactant-betaines system gives a formulator a powerful tool in creating value added formulations.

Viscosity building properties of a surfactant system comprising of Sodium Laureth Sulfate and different Betaines types was plotted on the below graph as a function of salt concentration.

Basic Formulation

Sulforokanol L270/1 (Sodium Laureth Sulfate, 70%)	13%
Rokamina (K30B, K30E, K40HC) (Coco-Betaine, Cocamidopropyl Betaine)	8%
NaCl	1-3%
Water	up to 100%

Thickening ability

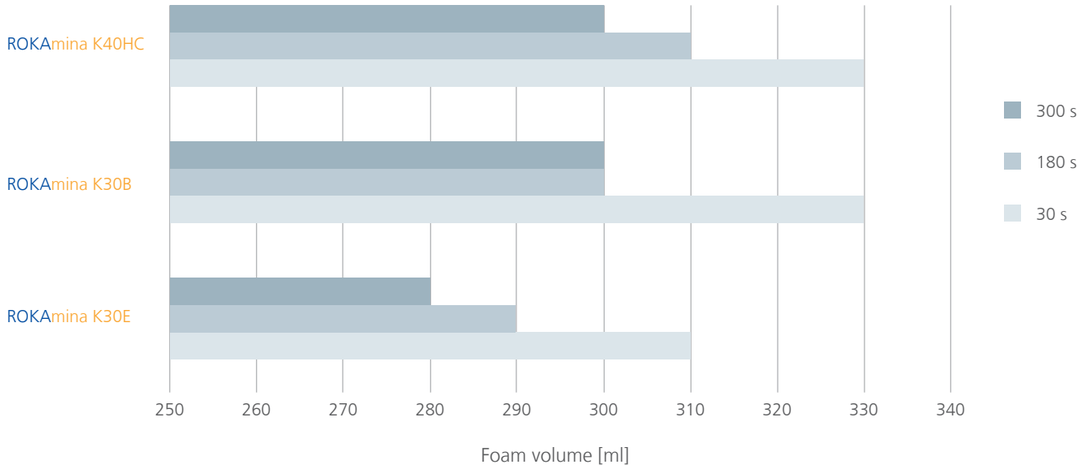


FOAMING CAPABILITY

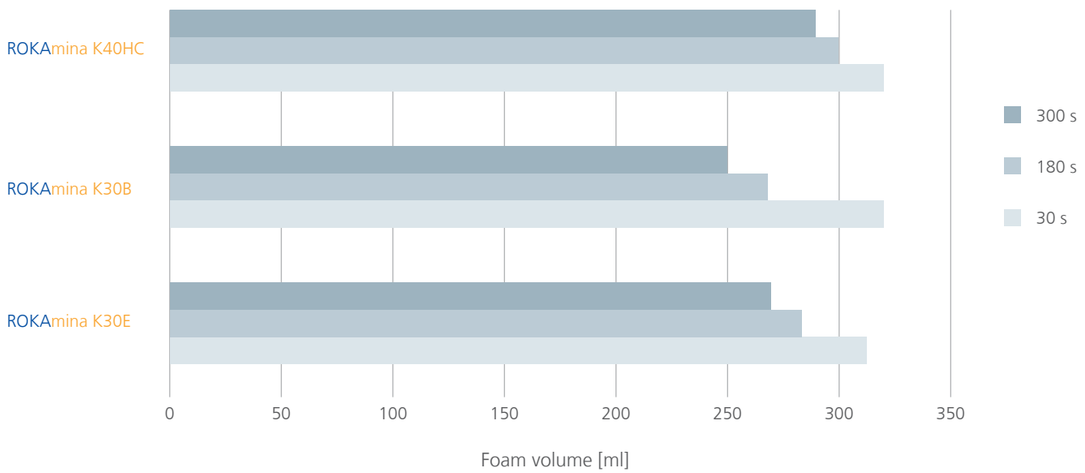
There is a wide possibility to formulate products that are characterized by outstanding foam using blends of anionic and amphoteric surfactants. It also implies that the surfactant system has different foam properties than the anionic alone. This explains why betaines are so commonly used in personal care formulation. They improve foam - an attribute that is very important to the consumer.

Determination of the foaming capability was preformed according to PN-ISO 696:1994 (the modified Ross-Miles method) for the betaines solutions with a concentration of 1.0 g/l in distilled water at a temperature of 25˚C.

Foaming capability in distilled water for betaines



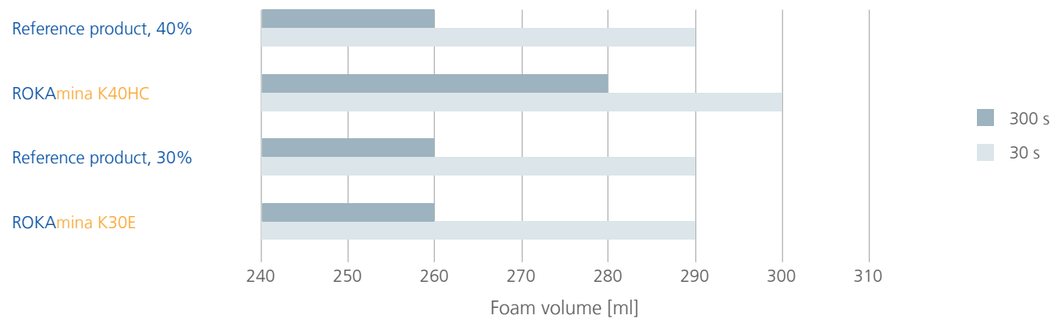
Foaming capability in hard water for betaines



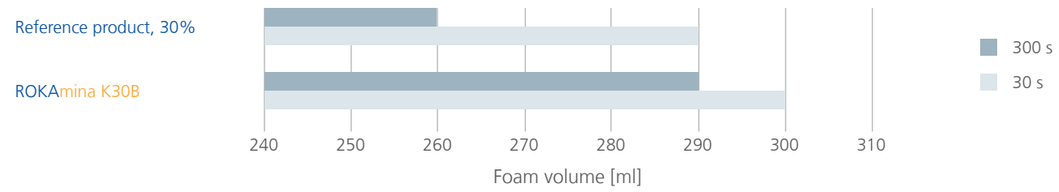
The foaming property of a basic formulation is shown in a graph below.

Basic Formulation	
Sulforokanol L270/1 (Sodium Laureth Sulfate, 70%)	13%
Rokamina (K30B, K30E, K40HC) (Coco-Betaine, Cocamidopropyl Betaine)	8%
NaCl	1.4-2.6%
Water	up to 100%

Foaming capability for basic formulation with Cocamidopropyl Betaine



Foaming capability for basic formulation with Coco-Betaine



SURFACE TENSION

Surface tension according to PN-EN 14370:2004, determined with a use of the Wilhelmy plate method, at a temperature of 25˚C, concentration of 0.1%.

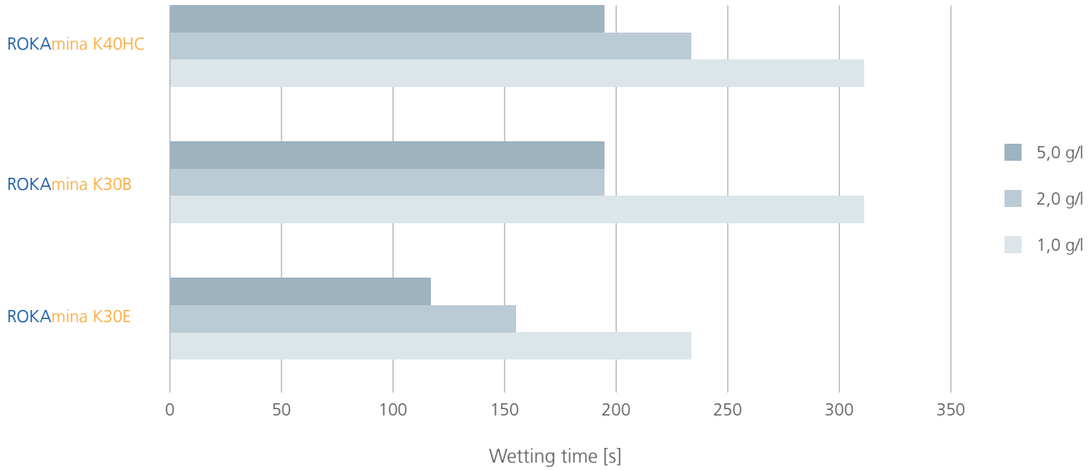
Product name	Surface tension [mN/m]	
	Demineralized water	Hard water (17°d)
ROKAmina K30E	28	28
ROKAmina K30B	30	30
ROKAmina K40HC	25	25

Pure water has a relatively high surface tension at room temperature (~72.4 mN/m) and hence cleans poorly. In the cleaning process, surface tension must be reduced so water can spread and wet surfaces. Addition of a surfactant decreases the surface tension and consequently increases solubilisation. Surfactants are said to make water "wetter." The lower the surface tension the better the wettability, hence the ability to dissolve and remove residues.

WETTING CAPABILITY

In a large number of applications (especially for shampoos) the capability of effective wetting is a desirable property of surfactants. The shorter the time of wetting the better the wetting and cleaning agent. The capability of wetting a cotton fabric was determined according to EN 1772:2001.

The wetting time (time in seconds necessary for wetting the textile material) was measured for a betaines solution with concentration of 1.0 g/l, 2.0 g/l and 5.0 g/l in deionized water at a temperature of 20°C.



Cleansing gel	
Sulforokanol L270/1 (Sodium Laureth Sulfate, 70%)	13.00 %
Rokamina K40HC (Cocamidopropyl Betaine)	6.00%
Rokamid KAD (Cocamide DEA)	1.50%
Rokacet KO300G (PEG-7 Glyceryl Cocoate)	0.30%
Glycerine	2.50%
Citric acid	0.50%
EDTA	0.20%
NaCl	1.20%
Water	74.30%
Viscosity, cP	~7 400

Liquid hand soap	
Sulforokanol L270/1 (Sodium Laureth Sulfate, 70%)	13.00 %
Rokamina K30B (Coco-Betaine)	6.00%
Rokanol LN75/50 (PEG-75 Lanolin)	3.00%
Rokamid KAD (Cocamide DEA)	2.00%
EDTA	0.10%
Urea	1.00%
NaCl	1.00%
Demineralized Water	73.90%
Viscosity, cP	2 000 - 3 000

Shampoo	
Sulforokanol L270/1 (Sodium Laureth Sulfate, 70%)	13.50 %
Rokamina K30B (Coco-Betaine)	6.00%
Rokamid KAD (Cocamide DEA)	1.50%
EDTA	0.10%
Citric acid	0.05%
NaCl	1.00%
Water	77.85%
Viscosity, cP	~6 100

EXOLcareline ™

EXOcare PC60

MULTIFUNCTIONAL SURFACTANTS BLEND FOR COSMETIC CLEANSING FORMULATION

Laureth-2 Sulfate,
Cocamidopropyl
Betaine,
Alkyl Glucoside

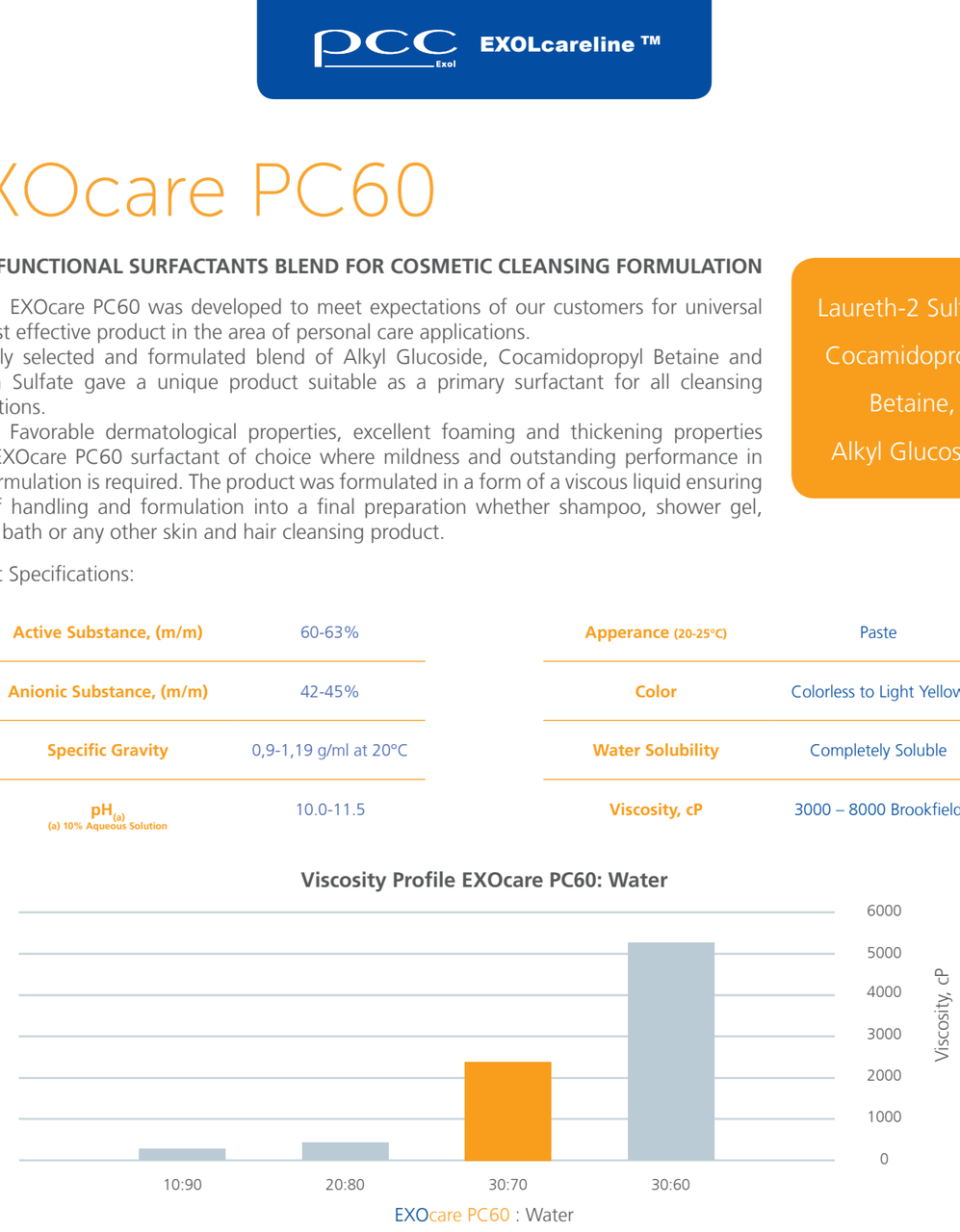
EXOcare PC60 was developed to meet expectations of our customers for universal and cost effective product in the area of personal care applications.
Carefully selected and formulated blend of Alkyl Glucoside, Cocamidopropyl Betaine and Laureth Sulfate gave a unique product suitable as a primary surfactant for all cleansing applications.

Favorable dermatological properties, excellent foaming and thickening properties make EXOcare PC60 surfactant of choice where mildness and outstanding performance in final formulation is required. The product was formulated in a form of a viscous liquid ensuring ease of handling and formulation into a final preparation whether shampoo, shower gel, bubble bath or any other skin and hair cleansing product.

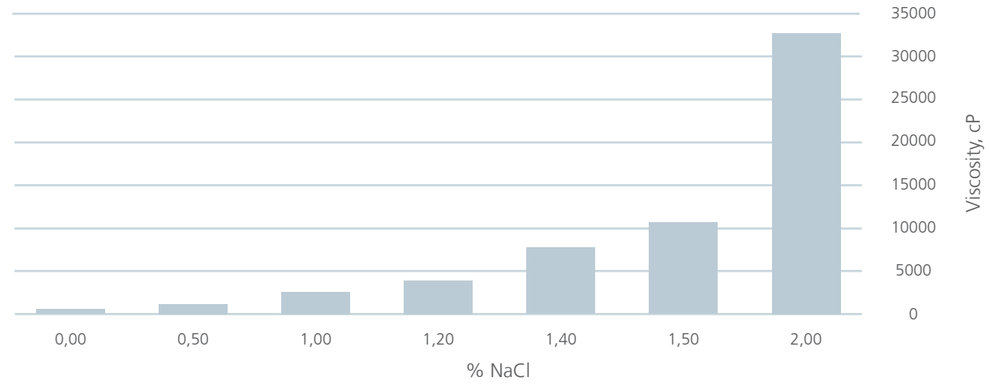
Product Specifications:

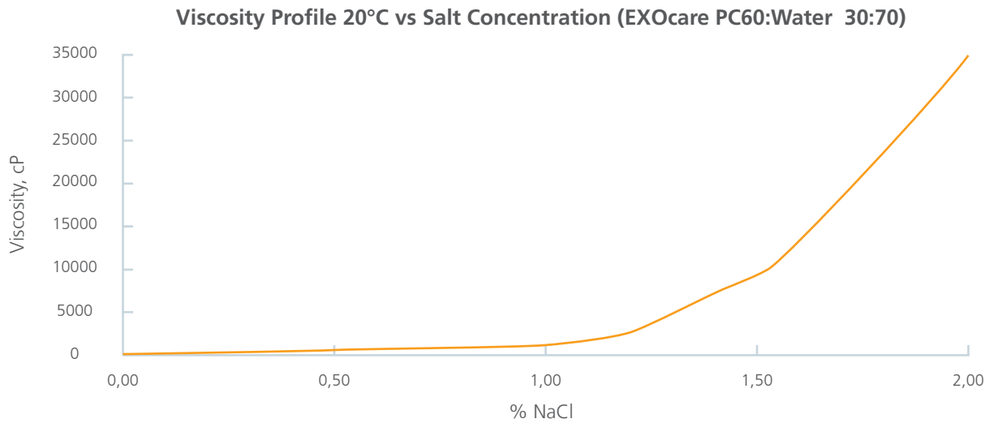
Active Substance, (m/m)	60-63%	**Apperance** (20-25°C)	Paste
Anionic Substance, (m/m)	42-45%	**Color**	Colorless to Light Yellow
Specific Gravity	0,9-1,19 g/ml at 20°C	**Water Solubility**	Completely Soluble
$pH_{(a)}$ (a) 10% Aqueous Solution	10.0-11.5	**Viscosity, cP**	3000 – 8000 Brookfield

Viscosity Profile EXOcare PC60: Water



Viscosity Profile 20°C vs Salt Concentration (EXOcare PC60:Water 30:70)





PCC Exol recommends to use EXOcare PC60 in the concentration ranging from 20-30% (w/w). The exact dose of our product depends on the individual characteristics of the product, that formulator would like to achieve.

Example Formulation: Liquid Shampoo:

Part A:	Demineralized Water	**60%**	**Part B:**	Demineralized Water	**11%**	**Part C:**	EXOcare PC60	**25%**
	Citric Acid	**0.05%**		Rokacet KO300G	**0.6%**	**Part D:**	Natural Extracts	**0.35%**
	DiSodium EDTA	**0.1%**		ExoAlc 1698	**0.6%**		Colors	**0.09%**
						Part E:	Sodium Chloride	**1.55%**

Procedure:
Add demineralized water to the mixing kettle. Begin mixing. Add remaining part A. Heat the mixing kettle contents to 77-79°C. Add part B Ingredients to the mixing kettle. Reduce mixer speed, Mix until uniform. Maintain temperature at 77-79°C. Once the batch is uniform, turn off the heat. Cool the batch to 42-47°C. Premix and separately add ingredients from part D. Add part E – mix until uniform and cool to 30-35°C

Product parameters:

pH	Viscosity (Brookfield S34, 4 RPM)
6	7500 cP

The given data are suggestions without any guarantee aimed to support customers' development. PCC Exol doesn't assume any liability or risk involved in the use of its products as the conditions of use are beyond its control. The information on product specification provided in this document is binding to the extent confirmed in a written sales agreement.

NOTES FOR GUIDANCE CONCERNING THE FUNCTIONAL PARAMETERS AND NOTATION USED IN THE CATALOGUE

HLB The Hydrophilic-Lipophilic Balance (HLB) is a parameter defining the ratio of the content of the hydrophilic and hydrophobic group of the molecule. The HLB range for non-ionic surfactants is between 0 and 20 and expresses the percentage of the hydrophilic part of the molecule.

HLB by Griffin:

$$HLB = 20 * \frac{\text{molecular weight of hydrophilic part}}{\text{molecular weight of the product}}$$

HLB for ester-type compounds (ethoxylated fatty acids):

$$HLB = 20 * \left(1 - \frac{SV}{AV}\right)$$

where:

SV - saponification value of the product of ethoxylation in mgKOH/g

AV - acid value of acids subjected to ethoxylation in mgKOH/g

HLB value	Content of EO in product %	Product application
1-3	5-15	**Antifoamer**
4-6	20-30	**W/O emulsifier**
7-11	35-55	**Wetting agent**
8-18	40-90	**O/W emulsifier**
10-15	50-75	**Detergent**
10-18	50-90	**Solubilizer**

Cloud point

An indicator determining the behaviour of nonionic surfactants (obtained in the process of condensation with ethylene oxide) in water or in mixtures consisting of water and organic solvents.

In water or in mixtures of water and organic solvents, solutions of surfactants become cloudy at certain temperature- when heated. The process is reversible and the substance becomes clear when cooled is referred to as the cloud point.

Depending on the temperature at which the solution becomes cloudy, there are five methods of determination of cloud point:

Method A – aqueous solution (10-90°C)
Method B – 50 g/l NaCl solution (>90°C)
Method C – 100 g/l NaCl solution (>90°C)
Method D – 5 g + 45 g of 25% butyldiglycol / aqueous solution (<10°C)
Method E – 5 g + 25 g of 25% butyldiglycol / aqueous solution (<10°C)

REACH

Regulation deals with the safe use of chemicals by Registration, Evaluation and in some cases Authorization and restriction of trade in some Chemicals.

REACH Regulation has already come into force. It is considered one of the greatest and most complex legal acts ever implemented in Europe. Not only did it cause significant changes in the polish chemical industry, but it also affects the activity of other users of chemicals and it obliges them to take appropriate actions.

REACH package is designed to broaden our knowledge about the chemical substances we use, oblige the manufacturersto prove that the chemical substance is safe for use and even prohibit the use of the most hazardous chemicals.

PCC Exol SA, as a large chemical company, will meet this new challenge. Not only we do provide declarations that we have already pre-registered and registered the substances we manufacture and distribute, but we also actively participate in Substance Information Exchange Forum (SIEF) and form consortia with other chemical companies with a view to joint submission of registration dossier. We are the exclusive representative of the chemical manufacturers in UE Community and we are in constant contact with our suppliers and customers.

According to Regulation (EC) No. 1907/2006 (REACH), the manufacture or import of chemical substances in volumesexceeding 1 ton per year must be registered at the European Chemicals Agency (ECHA) in Helsinki. REACH registration is related to substances and not products, e.g. preparations/formulations of substances. Production, import and marketing of a REACH-substance will be restricted to those uses evaluated in its registration dossier. The REACH process starts with preregistration (1st June 2008 until 1st December 2008), which ensures the availability of preregistered substances to the registration date. The date of registration depends on the production volume of the substance and lies between 2010 and 2018. We confirm that we will, pursuant to REACH requirements, pre-register all substances manufactured by PCC Exol SA Functional Chemicals Division in the EU or imported in the EU, that are relevant for the products listed in this brochure. However, no guarantee can be given that PCC Exol SA will offer all listed products in the future, if REACH registration requirements lead to unacceptable costs, PCC Exol SA will contact its customers to find an appropriate solution.

CERTIFICATES

IPPC – Integrated Pollution Prevention and Control – integrated approvals since 2007 (IPPC directive - EU directive - for the integrated avoidance and reduction of environmental contamination)

EN ISO 14001 – (European environmental management standard) certification since 2011

ENN ISO 9001 – (European quality management standard) certification since 2011

CESIO/CEFIC membership

RSPO membership (2-0327-12-000-00)

CLP - Classification, Labelling and Packaging of substances and mixtures

CLP Regulation - Regulation (EC) No. 1272/2008 of the European Parliament and of the Council as of 16th December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006.

The regulation entered into force 20 days after its publication, i.e. on January 20, 2009. From this moment, Title XI of the Reach Regulation ceased to be binding. Harmonized classification contained in Attachment I to the Hazardous Substances Directive was transferred to Table 3.2. in Attachment VI to the CLP Regulation.

CLP introduces the elements of GHS (Globally Harmonised System of Classification and Labelling of Chemicals).

PCC Exol SA participates actively in implementing the CLP Regulation. We classify chemicals encompassed by the above legal status and perform changes in data sheets and on labels within the required deadlines, as well as notify new classification and labelling to the Classification and Labelling Inventory of the European Chemicals Agency.

The information included in this publication reflects our up-to-date knowledge. It describes the application and basic parameters of the products, and is given as estimate values. We reserve the right to make any changes as a result of technological progress or developments.

The data should not be interpreted as guaranteed specific product qualities. The health and environmental requirements, as well as user safety instructions, are included in material safety data sheets, available at request. Guaranteed quality parameters are included in Technical Product Specifications. The sale of products included in this publication is subject to the General Sales Terms and Conditions at PCC Exol SA.

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