Surfactants for cosmetics & Personal Care products

pcc

More than Chemistry

Table of contents

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 NAME	INCI NAME	HAIR					BODY					FACE			
		SHAMPOO	BABY SHAMPOO	CONDITIONERS	HAIR COLORING AND BLEACHING	HAIR STYLING	LIQUID SOAP	BODY WASH	BABY WASH	CREAM / LOTION	BABY CREAM / LOTION	FACE CLEANSING	FACE TREATMENT	COLOR COSMETICS	SHAVING CREAM / FOAM
ROSULfan L	Sodium Lauryl Sulfate	•		•	•	•	•	•		•		•	•	•	•
ROSULfan L/PH	Sodium Lauryl Sulfate	•		•	•	•	•	•		•		•	•	•	•
ROSULfan A	Ammonium Lauryl Sulfate	•	•	•	•		•	•	•	•		•	•	•	•
SULFOROKAnol L170/1	Sodium Laureth-1 Sulfate	•	•	•	•	•	•	•	•	•		•	•	•	•
SULFOROKAnol L225/1	Sodium Laureth-2 Sulfate	•	•	•	•	•	•	•	•	•		•	•	•	•
SULFOROKAnol L227/1	Sodium Laureth-2 Sulfate	•	•	•	•	•	•	•	•	•		•	•	•	•
SULFOROKAnol L270/1	Sodium Laureth-2 Sulfate	•	•	•	•	•	•	•	•	•		•	•	•	•
SULFOROKAnol L270/1A	Sodium Laureth-2 Sulfate	•	•	•	•	•	•	•	•	•		•	•	•	•
SULFOROKAnol L327	Sodium Pareth-3 Sulfate	•					•	•				•			•
SULFOROKAnol L327/1	Sodium Laureth-3 Sulfate	•	•	•	•	•	•	•	•	•		•	•	•	•
SULFOROKAnol L370	Sodium Pareth-3 Sulfate	•					•	•				•			•
SULFOROKAnol L370/1	Sodium Laureth-3 Sulfate	•	•	•	•	•	•	•	•	•		•	•	•	•
SULFOSUCCINATE L3/40	Disodium Laureth-3 Sulfosuccinate	•	•	•			•	•	•			•	•	•	•
ROKAnol LK1	Laureth-1	•	•		•		•	•	•						

Additives for everyday products

PRODUCT NAME	INCI NAME	HAIR					BODY					FACE			
		SHAMPOO	BABY SHAMPOO	CONDITIONERS	HAIR COLORING AND BLEACHING	HAIR STYLING	LIQUID SOAP	BODY WASH	BABY WASH	CREAM / LOTION	BABY CREAM / LOTION	FACE CLEANSING	FACE TREATMENT	COLOR COSMETICS	SHAVING CREAM / FOAM
ROKAnol LK2	Laureth-2	•	•	•	•		•	•	•			•	•	•	•
ROKAnol LK2A	Laureth-2	•	•	•	•		•	•	•			•	•	•	•
ROKAnol L2	Laureth-2	•	•	•	•		•	•	•			•	•	•	•
ROKAnol LK3	Laureth-3	•			•	•	•	•				•	•	•	
ROKAnol L3A	Laureth-3	•			•	•	•	•				•	•	•	
ROKAnol L4	Laureth-4	•	•	•	•	•	•	•	•	•		•	•	•	•
ROKAnol L5A	Laureth-5	•	•												
ROKAnol L7	Laureth-7	•		•		•	•	•		•		•	•	•	•
ROKAnol L7A	Laureth-7	•		•		•	•	•		•		•	•	•	•
ROKAnol L7W	Laureth-7	•		•		•	•	•		•		•	•	•	•
ROKAnol L10	Laureth-10	•		•			•	•				•	•	•	
ROKAnol L10/80	Laureth-10	•		•			•	•				•	•	•	
ROKAnol D3W	Deceth-3				•										

Additives for everyday products

PRODUCT NAME	INCI NAME	HAIR					BODY					FACE			
		SHAMPOO	BABY SHAMPOO	CONDITIONERS	HAIR COLORING AND BLEACHING	HAIR STYLING	LIQUID SOAP	BODY WASH	BABY WASH	CREAM / LOTION	BABY CREAM / LOTION	FACE CLEANSING	FACE TREATMENT	COLOR COSMETICS	SHAVING CREAM / FOAM
ROKAnol T6	Ceteareth-6					•					•	•	•	•	•
ROKAnol T10	Ceteareth-10					•			•		•	•	•	•	
ROKAnol T12	Ceteareth-12					•			•	•	•	•	•	•	
ROKAnol T20	Ceteareth-20	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol T20 Flakes	Ceteareth-20	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol T25	Ceteareth-25	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol T25 Flakes	Ceteareth-25	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol IT3	Trideceth-3	•					•	•							
ROKAnol IT5	Trideceth-5	•		•		•									
ROKAnol IT6	Trideceth-6	•		•	•	•				•	•	•	•		
ROKAnol IT7	Trideceth-7	•		•		•									
ROKAnol IT7W	Trideceth-7	•		•		•									
ROKAnol IT8	Trideceth-8			•		•									
ROKAnol IT8W	Trideceth-8			•		•									
ROKAnol IT9	Trideceth-9	•		•		•		•					•		•
ROKAnol IT9W	Trideceth-9	•		•		•		•					•		•
ROKAnol IT10	Trideceth-10	•		•		•				•			•		
ROKAnol IT10W	Trideceth-10	•		•		•				•			•		
ROKAnol IT12	Trideceth-12	•		•	•	•		•					•	•	•
ROKAnol IT12W	Trideceth-12	•		•	•	•		•					•	•	•
ROKAnol O3	Oleth-3	•		•	•	•				•					
ROKAnol O5	Oleth-5			•	•	•									
ROKAnol O10	Oleth-10	•		•	•	•				•	•		•		
ROKAnol O20	Oleth-20	•		•	•	•				•		•	•	•	•
ROKAnol L4P5	PPG-5 Laureth-4					•		•		•			•	•	
ROKAnol L5P5	PPG-5 Laureth-5					•		•		•			•	•	
ROKAnol LN75/50	PEG-75 Lanolin	•		•		•	•	•	•	•		•	•	•	
ROKAnol LN75K	PEG-75 Lanolin	•		•		•	•	•	•	•		•	•	•	
ROKAcet K7	PEG-7 Cocoate			•		•		•							
ROKAcet S7	PEG-7 Stearate			•				•		•			•		
ROKAcet S24	PEG-24 Stearate			•				•		•			•	•	•
ROKAcet KO300G	PEG-7 Glyceryl Cocoate	•	•	•	•	•	•	•	•	•		•	•	•	•
ROKAcet HR40	PEG-40 Hydrogenated Castor Oil	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ROKAcet HR40W	PEG-40 Hydrogenated Castor Oil	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Additives for everyday products

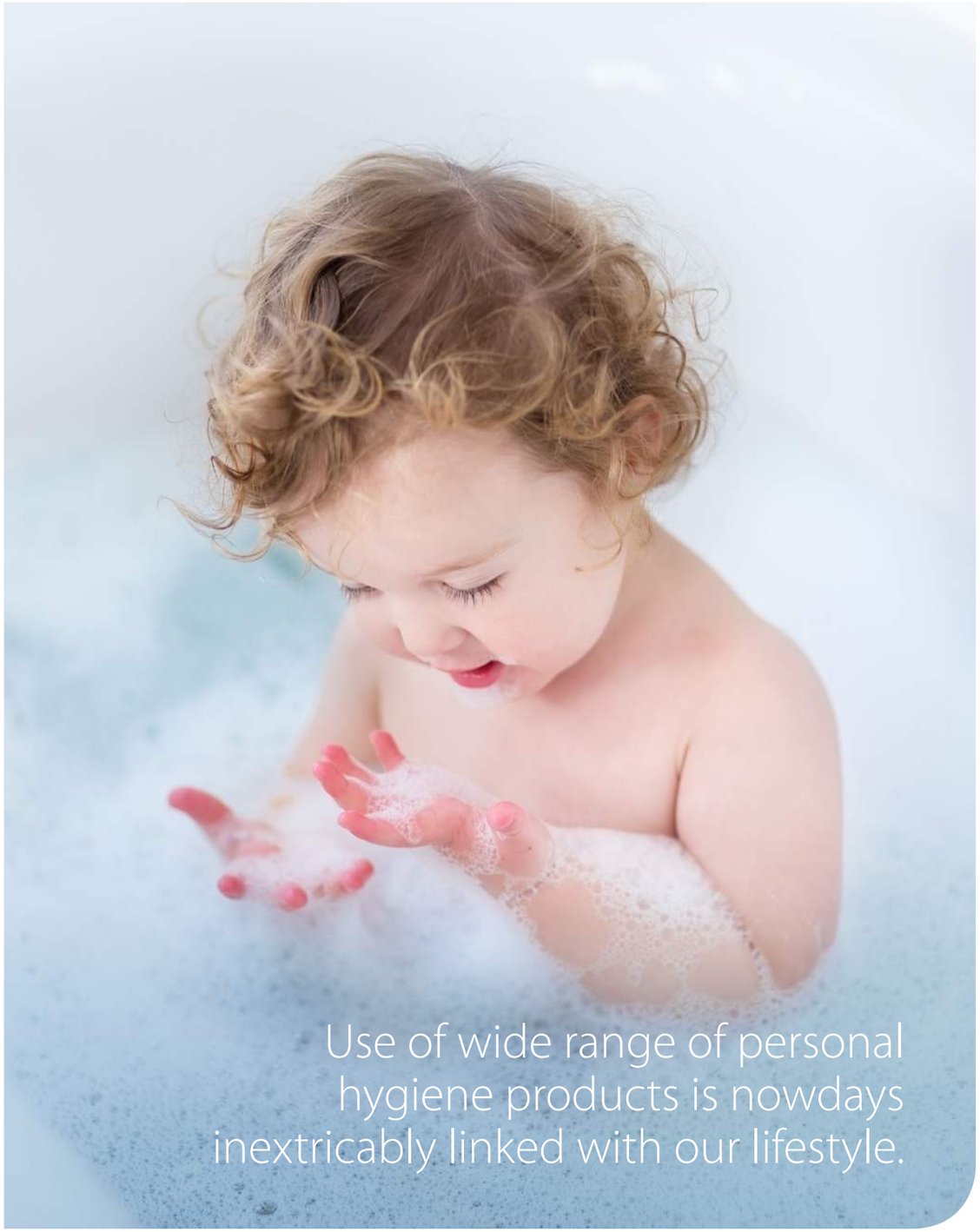
PRODUCT NAME	INCI NAME	HAIR					BODY					FACE			
		SHAMPOO	BABY SHAMPOO	CONDITIONERS	HAIR COLORING AND BLEACHING	HAIR STYLING	LIQUID SOAP	BODY WASH	BABY WASH	CREAM / LOTION	BABY CREAM / LOTION	FACE CLEANSING	FACE TREATMENT	COLOR COSMETICS	SHAVING CREAM / FOAM
ROKwin 60	Sorbitan monostearate			•	•	•		•	•	•	•	•	•	•	•
ROKwin 80	Sorbitan monooleate			•	•	•		•	•	•	•	•	•	•	•
ROKwinol 60	Polysorbate 60	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ROKwinol 80	Polysorbate-80	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ROKwinol 20	Polysorbate 20	•	•	•	•	•	•	•	•	•	•	•	•	•	•
POLIkol 200	PEG-4	•		•		•				•		•	•	•	•
POLIkol 300	PEG-6	•				•				•		•	•		•
POLIkol 400	PEG-8	•		•		•		•		•	•	•	•	•	•
POLIkol 600	PEG-12	•		•		•						•	•		•
POLIkol 800	PEG-18	•						•							
POLIkol 1500	PEG-32					•				•		•	•	•	
POLIkol 1500 flakes	PEG-32					•				•		•	•	•	
POLIkol 2000	PEG-45			•		•		•				•			
POLIkol 2000 flakes	PEG-45			•		•		•				•			
POLIkol 3000	PEG-60					•		•		•		•		•	
POLIkol 3000 flakes	PEG-60					•		•		•		•		•	
POLIkol 4500	PEG-100									•		•	•	•	
POLIkol 4500 flakes	PEG-100									•		•	•	•	
POLIkol 6000	PEG-150					•				•		•	•	•	
POLIkol 6000 flakes	PEG-150					•				•		•	•	•	
ROKAmid KAD	Cocamide DEA	•		•	•	•	•	•					•	•	
ROKAmid RAD	Oleamide DEA	•		•	•	•	•	•							
ROKAmina K30	Cocamidopropyl Betaine	•	•		•	•	•	•	•			•	•		•
ROKAmina K30B	Coco 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	•	•	•	•	•	•	•	•	•	•	•	•	•	•
EXOcare TE20 flakes	Cetearyl alcohol/Ceteareth-20			•						•	•		•		

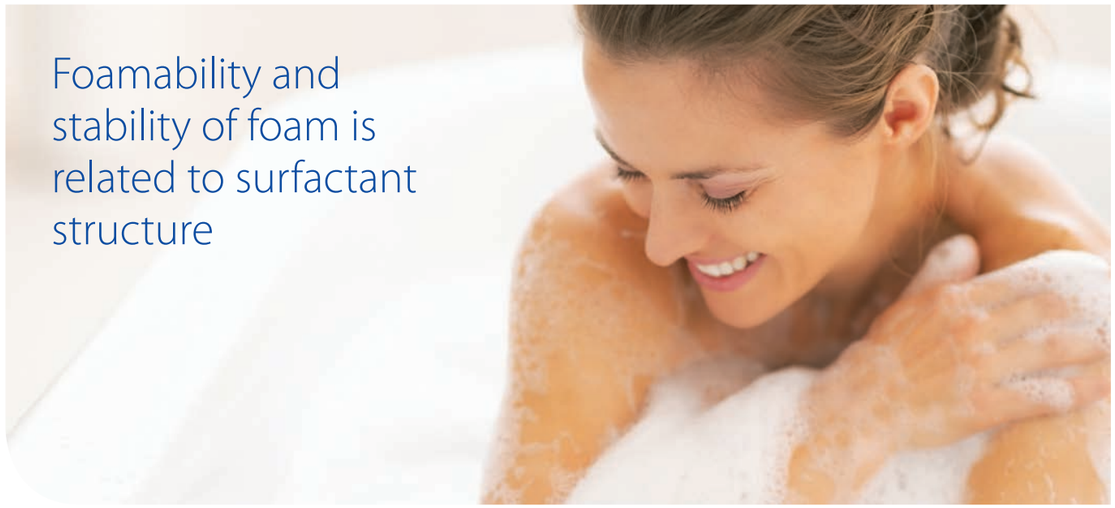
The specific function of the surfactant in the formulation stems from its chemical structure.

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 SA portfolio into funcion it plays in the end product.

Additives for everyday products

PRODUCT NAME	FUNCTION IN FORMULATION											
	PRIMARY SURFACTANT	CO-SURFACTANTS	EMULSIFIER	DISPERSANT	EMOLLIENT	HUMECTANT	HYDROTROP	SOLUBILIZER	WETTING AGENT	FOAMING AGENT	FOAM BOOSTER	VISCOSITY MODIFIER
Sulfated Fatty Alcohols	•		•								•	•
Sulfated Ethoxylated Fatty Alcohols	•		•								•	•
Sulfosuccinates	•	•	•				•				•	
Alkanolamides / Ethoxylated alkanolamides		•	•								•	•
Ethoxylated Fatty Alcohols		•	•	•	•			•	•	•	•	•
Ethoxylated Fatty Acids / Ethoxylated Oils		•	•	•	•			•			•	•
Sorbitan Esters / Ethoxylated Sorbitan Esters			•		•			•	•		•	•
Betaines		•	•							•	•	•
Polyoxyethylene Glycols (PEGs)			•	•	•	•		•			•	
Fatty Alcohols			•		•						•	•





Primary surfactants and foaming agents

Primary surfactants and foaming agents

PRODUCT NAME	CAS NUMBER	IONIC CHARAC-TER	PHYSICAL FORM	HLB	DESCRIPTION	ACTIVE CON-TENT (%)	CLOUD POINT [°C], CLOUD POINT TANAKA [°C][1]; SAPONIFICA-TION VALUE[2] [MGKOH/G]; AMINE VALUE[3] [MGKOH/G]; HYDROXYL VAL-UE[4] [MGKOH/G]	ALKYLSULPHATES	ALKYLETHERSULPHATES	SULPHOSUCCINATES	BETAINES	FATTY ALCOHOLS	ALKOXYLATED FATTY ALCOHOLS	POLYETHYLENE GLYCOLS	ETHOXYLATED FATTY ACIDS/OILS	FATTY ACID AMIDE	SORBITAN ESTERS / ETHOXYLATED
PRODUCT CHARACTERISTIC								PRODUCT GROUP									
SULFOROKAnol L170/1	68891-38-3	A	liquid paste	-	Sodium Laureth Sulfate + 1 EO	68.0-72.0	-		•								
SULFOROKAnol L225/1	68891-38-3	A	viscous liquid	-	Sodium Laureth Sulfate + 2 EO	25.0-27.0	-		•								
SULFOROKAnol L227/1	68891-38-3	A	viscous liquid	-	Sodium Laureth Sulfate + 2 EO	25-27	-		•								
SULFOROKAnol L270/1	68891-38-3	A	liquid paste	-	Sodium Laureth Sulfate + 2 EO	68-72	-		•								
SULFOROKAnol L270/1A	68891-38-3	A	liquid paste	-	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	27.0-29.0	-		•								

Production of reach and long lasting foam accompanies all hygiene activities and is perceived as a sign of cleansing 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.

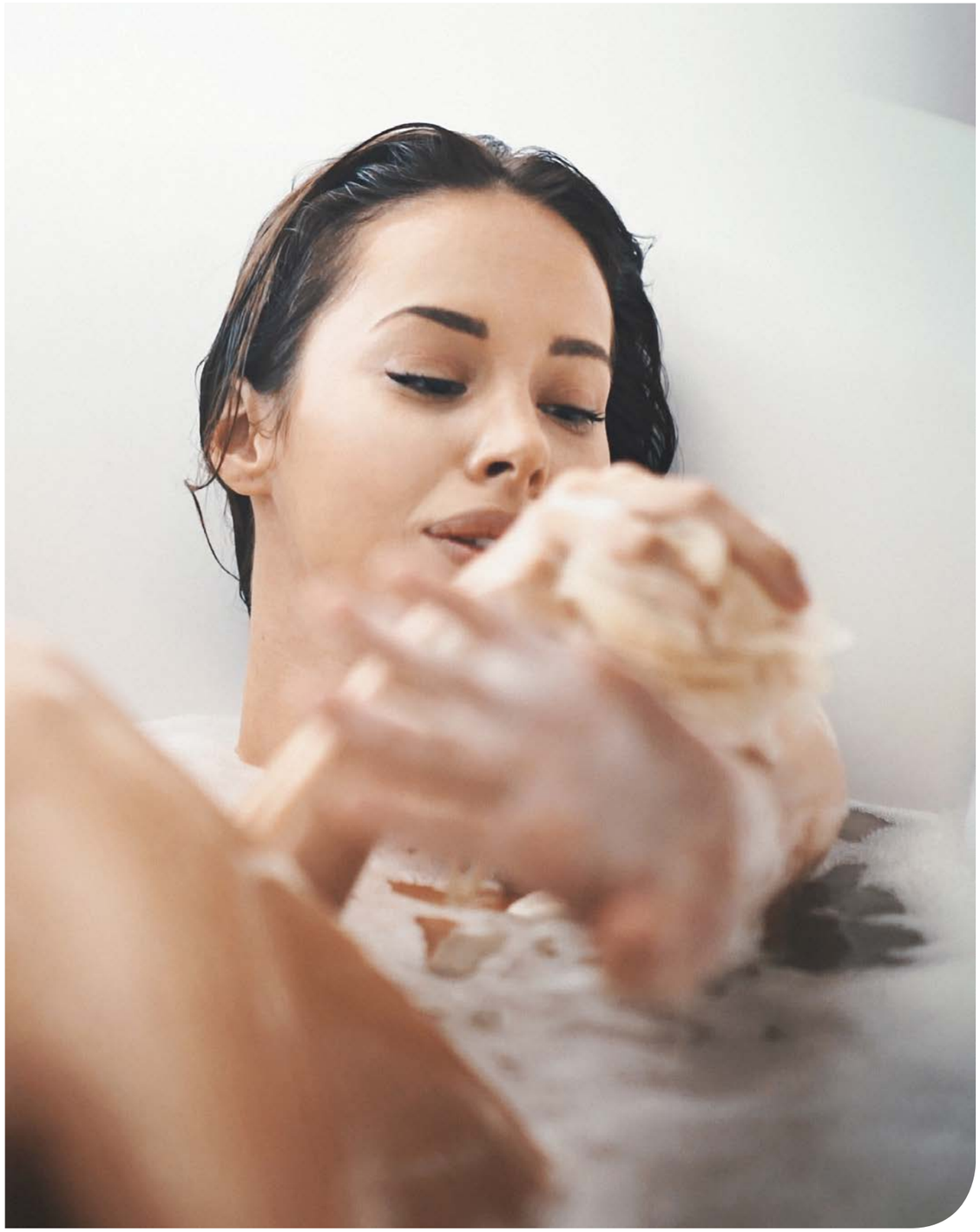
Primary surfactants and foaming agents

PRODUCT NAME	CAS NUMBER	IONIC CHARAC-TER	PHYSICAL FORM	HLB	DESCRIPTION	ACTIVE CONTENT (%)	CLOUD POINT [°C], CLOUD POINT TANAKA [°C][1]; SAPONIFICA-TION VALUE[2] [MGKOH/G]; AMINE VALUE[3] [MGKOH/G]; HYDROXYL VAL-UE[4] [MGKOH/G]	ALKYLSULPHATES	ALKYLETHERSULPHATES	SULPHOSUCCINATES	BETAINES	FATTY ALCOHOLS	ALKOXYLATED FATTY ALCOHOLS	POLYETHYLENE GLYCOLS	ETHOXYLATED FATTY ACIDS/OILS	FATTY ACID AMIDE	SORBITAN ESTERS / ETHOXYLATED
PRODUCT CHARACTERISTIC								PRODUCT GROUP									
SULFOROKAnol L370	125301-92-0	A	liquid paste	-	Sodium Pareth Sulfate + 3 EO	68.0-72.0	-		•								
SULFOROKAnol L370/1	13150-00-0	A	liquid paste	-	Sodium Laureth Sulfate + 3 EO	68.0-72.0	-		•								
ROSULfan A	90583-11-2	A	clear viscous liquid	-	Ammonium Lauryl Sulfate	26.0-28.0	-	•									
ROSULfan L	85586-07-8	A	clear liquid	-	Sodium Lauryl Sulfate	27.5 – 30.0	-	•									
ROSULFAN L/PH	85586-07-8	A	liquid	-	Sodium Lauryl Sulfate	29-31	-	•									
SULFOSUCCINATE L3/40	68815-56-5	A	liquid	-	Disodium Laureth Sulfos-uccinate	min. 38 (as dry matter)	-			•							
ROKAmid KAD	-	N	liquid	-	Cocamide DEA	min. 80.0	-									•	

Secondary surfactants and emulsifiers

Secondary surfactants and emulsifiers

PRODUCT NAME	CAS NUMBER	IONIC CHARAC-TER	PHYSICAL FORM	HLB	DESCRIPTION	ACTIVE CONTENT (%)	CLOUD POINT [°C], CLOUD POINT TANAKA [°C][1]; SAPONIFICA-TION VALUE[2] [MGKOH/G]; AMINE VALUE[3] [MGKOH/G]; HYDROXYL VAL-UE[4] [MGKOH/G]	ALKYLSULPHATES	ALKYLETHERSULPHATES	SULPHOSUCCINATES	BETAINES	FATTY ALCOHOLS	ALKOXYLATED FATTY ALCOHOLS	POLYETHYLENE GLYCOLS	ETHOXYLATED FATTY ACIDS/OILS	FATTY ACID AMIDE	SORBITAN ESTERS / ETHOXYLATED
PRODUCT CHARACTERISTIC								PRODUCT GROUP									
SULFOSUCCINATE L3/40	68815-56-5	A	Liquid	-	Disodium Laureth Sulfosuc-cinate	min. 38 (as dry matter)	-			•							
ROKAmina K30	-	Amph	Liquid	-	Cocamidopropyl Betaine	29-32	-				•						
ROKAmina K30B	-	Amph	Liquid	-	Coco Betaine	29-33	-				•						
ROKAmina K40	-	Amph	Liquid	-	Cocamidopropyl Betaine	min. 37.0	-				•						
ROKAmina K40HC	-	Amph	Liquid	-	Cocamidopropyl Betaine	37.0-42.0	-				•						
ROKAnol C7	68213-23-0	N	Liquid	11.9	Alcohols, C12-18 + 7 EO	min 99.7	106-112[4]						•				



Secondary surfactants and emulsifiers

PRODUCT NAME	CAS NUMBER	IONIC CHARAC-TER	PHYSICAL FORM	HLB	DESCRIPTION	ACTIVE CONTENT (%)	CLOUD POINT [°C], CLOUD POINT TANAKA [°C][1]; SAPONIFICA-TION VALUE[2] [MGKOH/G]; AMINE VALUE[3] [MGKOH/G]; HYDROXYL VAL-UE[4] [MGKOH/G]	ALKYLSULPHATES	ALKYLETHERSULPHATES	SULPHOSUCCINATES	BETAINES	FATTY ALCOHOLS	ALKOXYLATED FATTY ALCOHOLS	POLYETHYLENE GLYCOLS	ETHOXYLATED FATTY ACIDS/OILS	FATTY ACID AMIDE	SORBITAN ESTERS / ETHOXYLATED
PRODUCT CHARACTERISTIC								PRODUCT GROUP									
ROKAnol L4	68439-50-9	N	Liquid	10.0	Alcohols, C12-14 + 4 EO	min. 99.5	59-63 E						•				
ROKAnol L7W	68439-50-9	N	Liquid	12.9	Alcohols, C12-14 + 7 EO	89-92	30-40 C						•				
ROKAnol L10	68439-50-9	N	Paste	14.1	Alcohols, C12-14 + 10 EO	min. 99.5	59-63 C						•				
ROKAnol L10/80	68439-50-9	N	Liquid	14.1	Alcohols, C12-14 + 10 EO	min. 77.0	59-63 C						•				
ROKAnol L3A	68439-50-9	N	Liquid	7.8	Alcohols, C12-16 + 3 EO	min. 99.7	53-55 E						•				
ROKAnol L7A	68439-50-9	N	Liquid	12.9	Alcohols, C12-16 + 7 EO	min. 99.5	56-62 A						•				
ROKAnol LN75/50	61790-81-6	N	Viscous liquid	16	Lanolin + 75 EO	48-52	-						•				
ROKAnol LN75K	61790-81-6	N	Wax	16	Lanolin + 75 EO	min. 99	-						•				
ROKAnol O3	9004-98-2	N	Liquid	7.1	Alcohols, C16-18 unsaturated + 3 EO	min. 99	37-41 E						•				
ROKAnol O20	9004-98-2	N	Paste	15.3	Alcohols, C16-18 unsaturated + 22 EO	min. 99	71-76 C						•				
ROKAnol T10	68439-49-6	N	Wax	13	Alcohols, C16-18, + 10 EO	min. 99.5	85-95 [4]						•				
ROKAnol T20	68439-49-6	N	Wax	15.3	Alcohols, C16-18, + 20 EO	min. 99	88-94 B						•				
ROKAnol T20 Flakes	68439-49-6	N	Flakes	15.3	Alcohols, C16-18, + 20 EO	min. 99	88-94 B						•				
ROKAnol T25	68439-49-6	N	Wax	16	Alcohols, C16-18, + 25 EO	min. 99	36-45 [4]						•				
ROKAnol T25 Flakes	68439-49-6	N	Flakes	16	Alcohols, C16-18, + 25 EO	min. 99	36-45 [4]						•				
ROKAcet HR40	61788-85-0	N	Paste	-	Hydrogenated Castor Oil + 40 EO	min. 99	60-67 [2]						•				
ROKAcet HR40W	61788-85-0	N	Liquid	-	Hydrogenated Castor Oil + 40 EO	min. 99	60-67 [2]						•				
ROKAcet S7	9004-99-3	N	Paste	10.6	Stearic acid + 7 EO	min. 99	92-97 [2]							•			
ROKAcet S24	9004-99-3	N	Wax	15.8	Stearic acid + 24 EO	min. 99	40-45 [2]							•			
ROKAcet KO300G	68201-46-7	N	Liquid	-	Glycerides, coco mono- and di-, ethoxylated	min. 99	90-100 [2]							•			

Secondary surfactants and emulsifiers

PRODUCT NAME	CAS NUMBER	IONIC CHARAC-TER	PHYSICAL FORM	HLB	DESCRIPTION	ACTIVE CONTENT (%)	CLOUD POINT [°C], CLOUD POINT TANAKA [°C][1]; SAPONIFICA-TION VALUE[2] [MGKOH/G]; AMINE VALUE[3] [MGKOH/G]; HYDROXYL VAL-UE[4] [MGKOH/G]	ALKYLSULPHATES	ALKYLETHERSULPHATES	SULPHOSUCCINATES	BETAINES	FATTY ALCOHOLS	ALKOXYLATED FATTY ALCOHOLS	POLYETHYLENE GLYCOLS	ETHOXYLATED FATTY ACIDS	OILS OR FATTY ACIDS / OILS	FATTY ACID AMIDE	SORBITAN ESTERS / ETHOXYLATED
PRODUCT CHARACTERISTIC								PRODUCT GROUP										
ROKwin 60	1338-41-6	N	Wax	4.7	Sorbitan monostearate	min. 99.5	145-160 [2]											•
ROKwinol 60	9005-67-8	N	Liquid	14.9	PEG-20 sorbitan monostearate	min. 99.0	45-55 [2]											•
ROKwin 80	1338-43-8	N	Liquid	4.3	Sorbitan monooleate	min. 98.5	145-170 [2]											•
ROKwinol 80	9005-65-6	N	Liquid	15.0	PEG-20 sorbitan monooleate	min. 99.0	45-55 [2]											•
ROKwinol 20	9005-64-5	N	Liquid	16.7	Polysorbate 20	min. 97	40-50 [3]											•
ExoAlc 1618 pills	67762-27-0	N	Solid in pills form	-	Alcohols, C16- 18 (30/70)	min. 99.7	210-220 [4]					•						
ExoAlc 1698 pills	36653-82-4	N	Solid in pills form	-	Alcohol C16	min. 99.7	228-233 [4]					•						

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.

Delicate formulations like baby care products requirements of the formulation use of special thickeners is required.

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 example 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 pearlizers, capsule or shimmer suspensions and soap dispensers.

Thickeners and rheology modifiers – product list

PRODUCT NAME	CAS NUMBER	IONIC CHARAC-TER	PHYSICAL FORM	HLB	DESCRIPTION	ACTIVE CONTENT (%)	CLOUD POINT [°C], CLOUD POINT TANAKA [°C][1]; SAPONIFICA-TION VALUE[2] [MGKOH/G]; AMINE VALUE[3] [MGKOH/G]; HYDROXYL VALUE[4] [MGKOH/G]	ALKYLSULPHATES	ALKYLETHERSULPHATES	SULPHOSUCCINATES	BETAINES	FATTY ALCOHOLS	ALKOXYLATED FATTY ALCOHOLS	POLYETHYLENE GLYCOLS	ETHOXYLATED FATTY ACIDS/OILS	FATTY ACID AMIDE	SORBITAN ESTERS / ETHOXYLATED
PRODUCT CHARACTERISTIC								PRODUCT GROUP									
ROKAnol LK2	68439-50-9	N	Liquid	6.2	Alcohols, C12-14 + 2 EO	min. 99.9	192-204 [4]						•				
ROKAnol LK2A	68439-50-9	N	Liquid	6.2	Alcohols, C12-16 + 2 EO	min. 99.8	196-204 [4]						•				
ROKAnol LK3	68439-50-9	N	Liquid/Paste	7.8	Alcohols, C12-14 + 3 EO	min. 99.7	165-173 [4]						•				
ROKAcet K7	61791-29-5	N	Liquid	11.6	Cocoate + 7 EO	min. 99	104-112 [2]								•		
ROKAmid KAD	-	N	Liquid	-	Cocamide DEA	min. 80	-									•	
ROKAmid RAD	68603-38-3	N	Liquid	-	Oleamide DEA	min. 80	-									•	
ROKwin 60	1338-41-6	N	Wax	4.7	Sorbitan mono-stearate	min. 98.5	145-160 [2]										•
ROKwinol 60	9005-67-8	N	Liquid	14.9	PEG-20 sorbitan monostearate	min. 99.0	45-55 [2]										•
ROKwin 80	1338-43-8	N	Liquid	4.3	Sorbitan monooleate	min. 98.5	145-170 [2]										•
ROKwinol 80	9005-65-6	N	Liquid	15.0	PEG-20 sorbitan monooleate	min. 99.0	45-55 [2]										•
ROKwinol 20	9005-64-5	N	Liquid	16.7	Polysorbate 20	min. 97	40-50 [3]										•
ExoAlc 1618 pills	67762-27-0	N	Solid in pills form	-	Alcohols, C16-18 (30/70)	min. 99.7	210-220 [4]					•					
ExoAlc 1698 pills	36653-82-4	N	Solid in pills form	-	Alcohol C16	min. 99.7	228-233 [4]					•					

Wetting agents and other additives

Wetting agents and other additives – product list

PRODUCT NAME	CAS NUMBER	IONIC CHARAC-TER	PHYSICAL FORM	HLB	DESCRIPTION	ACTIVE CONTENT (%)	CLOUD POINT [°C], CLOUD POINT TANAKA [°C][1]; SAPONIFICA-TION VALUE[2] [MGKOH/G]; AMINE VALUE[3] [MGKOH/G]; HYDROXYL VAL-UE[4] [MGKOH/G]	ALKYLSULPHATES	ALKYLETHERSULPHATES	SULPHOSUCCINATES	BETAINES	FATTY ALCOHOLS	ALKOXYLATED FATTY ALCOHOLS	POLYETHYLENE GLYCOLS	ETHOXYLATED FATTY ACIDS/OILS	FATTY ACID AMIDE	SORBITAN ESTERS / ETHOXYLATED
PRODUCT CHARACTERISTIC								PRODUCT GROUP									
EXOpearl	-	-	Paste	-	Sodium Laureth Sulfate, Cocamide DEA, Glycol Distearate	min. 40 % (dry matter)	-	•								•	
ROKAnol L4P5	68439-51-0	N	Liquid	5.3	Alcohols, C12-14 + EO/PO	min. 99.5	98-108[4]						•				
ROKAnol L5P5	68439-51-0	N	Liquid	6.0	Alcohols, C12-14 + EO/PO	min. 99.5	27-31 A						•				

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 NAME	CAS NUMBER	IONIC CHARAC-TER	PHYSICAL FORM	HLB	DESCRIPTION	ACTIVE CONTENT (%)	CLOUD POINT [°C], CLOUD POINT TANAKA [°C][1]; SAPONIFICA-TION VALUE[2] [MGKOH/G]; AMINE VALUE[3] [MGKOH/G]; HYDROXYL VALUE[4] [MGKOH/G]	ALKYLSULPHATES	ALKYLETHERSULPHATES	SULPHOSUCCINATES	BETAINES	FATTY ALCOHOLS	ALKOXYLATED FATTY ALCOHOLS	POLYETHYLENE GLYCOLS	ETHOXYLATED FATTY ACIDS/OILS	FATTY ACID AMIDE	SORBITAN ESTERS / ETHOXYLATED
PRODUCT CHARACTERISTIC								PRODUCT GROUP									
POLIkol 200	25322-68-3	N	Liquid	-	Polyoxyethylene glycol	min. 99.5	530-590 [4]							•			
POLIkol 300	25322-68-3	N	Liquid	-	Polyoxyethylene glycol	min. 99.5	360-390 [4]							•			
POLIkol 400	25322-68-3	N	Liquid	-	Polyoxyethylene glycol	min. 99.5	270-300 [4]							•			
POLIkol 600	25322-68-3	N	Liquid/paste	-	Polyoxyethylene glycol	min. 99.5	170-200 [4]							•			
POLIkol 800	25322-68-3	N	Paste/solid	-	Polyoxyethylene glycol	min. 99.5	132-148 [4]							•			

A cutting edge technology applied by PCC EXOL SA in the production process allows achieving unparalleled quality parameters that meet the highest standards of customer safety.

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 SA 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

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

Application

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

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

Betaines

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 K30B	Coco Betaine	29.0-33.0	Liquid	6.0-8.0	30	Free	100%	Supreme Quality
ROKAmina K40HC	Cocamidopropyl Betaine	37.0-42.0	Liquid	4.5-5.5	25	Free	76.3%	Supreme Quality
ROKAmina K40	Cocamidopropyl Betaine	min. 37	Liquid	4.5-5.5	28	Free	76.3%	Market Benchmark

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

PCC EXOL SA has developed two classes of betaines surfactants: Cocamidopropyl Betaines and Coco-Betaine whose parameters are summarized in the table.
Rokamina K30, 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, 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.

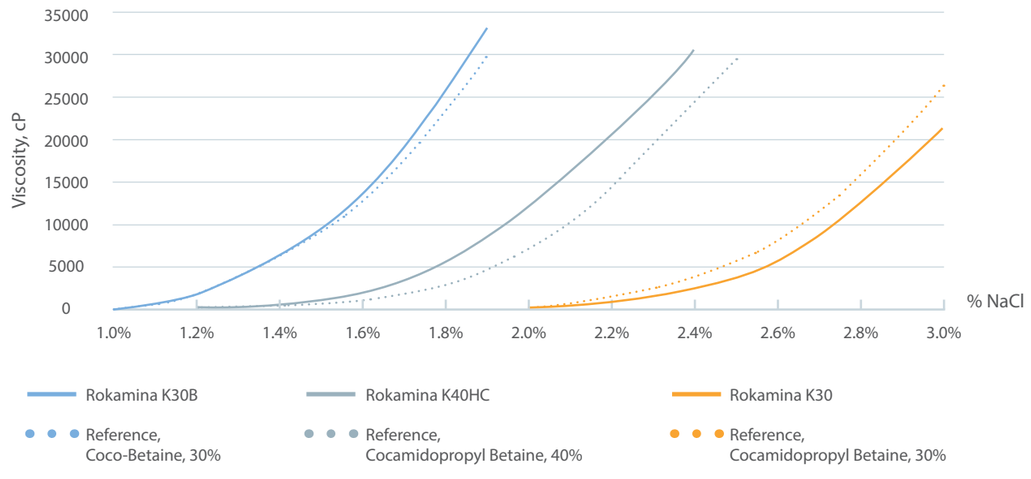
Thickening property

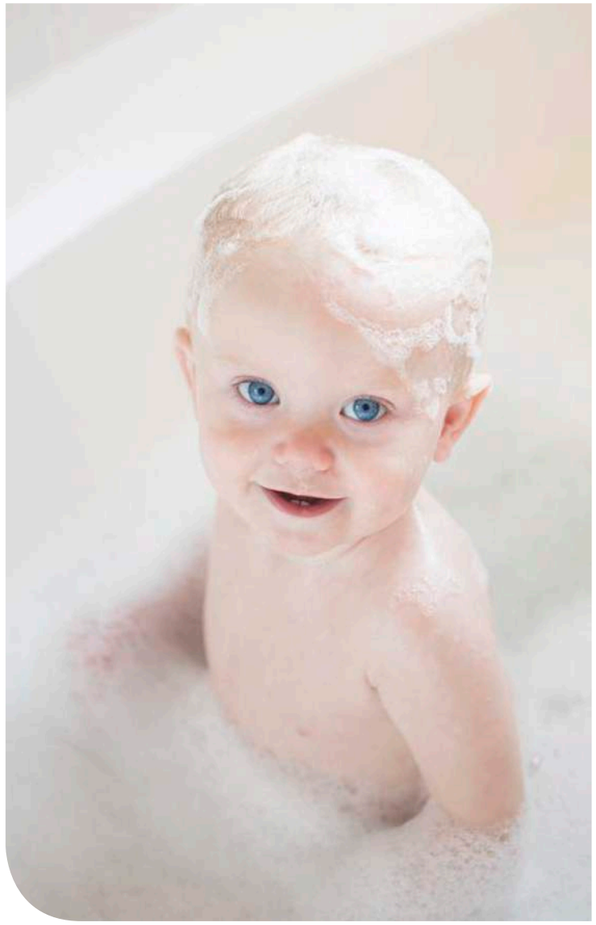
Addition of betaines to a standard anionic surfactant system not only optimizes a viscosity profile and a response to salt but also improves cleansing power and mildness of the final formulation. A synergistic effect of an anionic surfactant-betaines system gives a formulator a powerful tool in creating 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, K40HC) (Coco-Betaine, Cocamidopropyl Betaine)	8%
NaCl	1-3%
Water	up to 100%

Thickening ability





Foaming capability

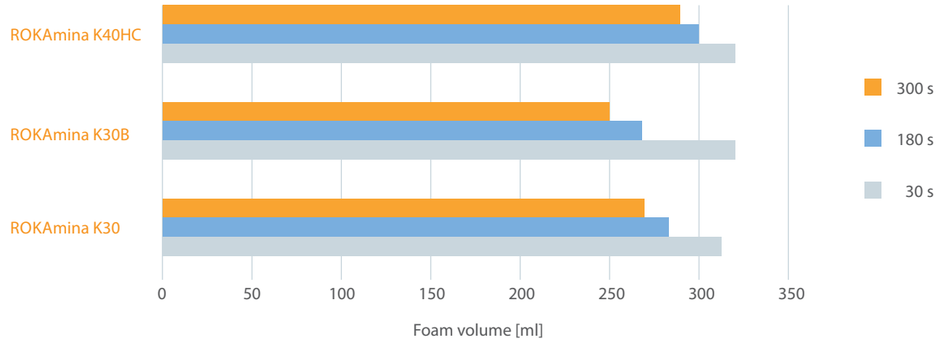
There is a wide possibility to formulate products that are characterized by outstanding foam using blends of anionic and amphoteric surfactants. It also implies that the surfactant system has different foam properties than the anionic alone. This explains why betaines are so commonly used in personal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

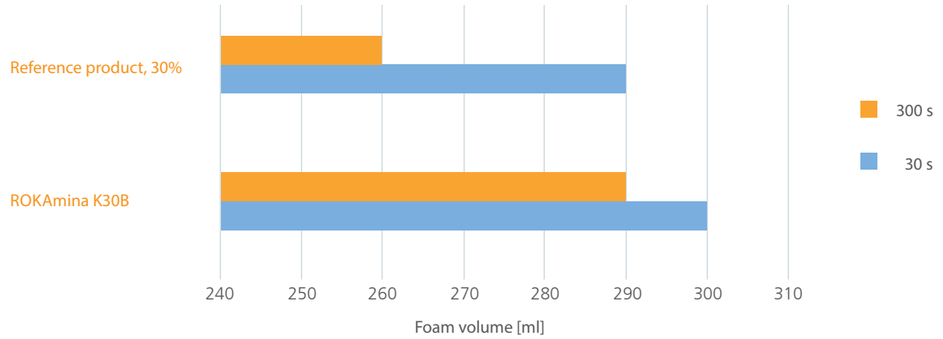
Basic Formulation

Sulforokanol L270/1 (Sodium Laureth Sulfate, 70%)	13%
Rokamina (K30B, K30, K40HC) (Coco-Betaine, Cocamidopropyl Betaine)	8%
NaCl	1.4-2.6%
Water	up to 100%

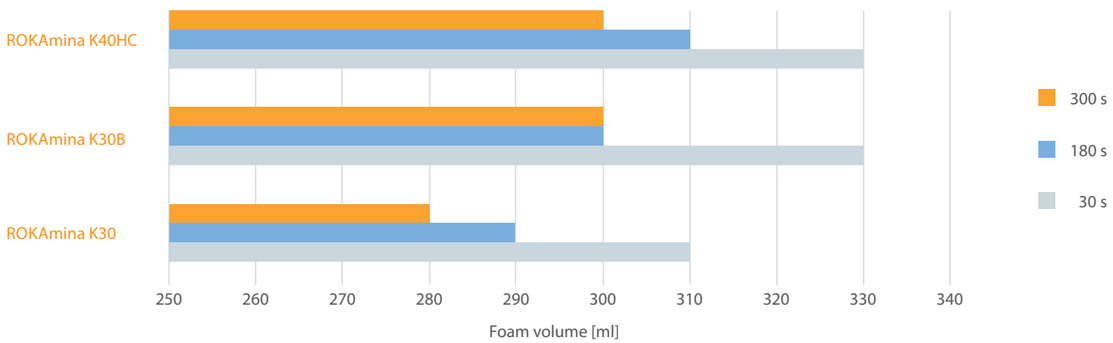
Foaming capability in hard water for betaines



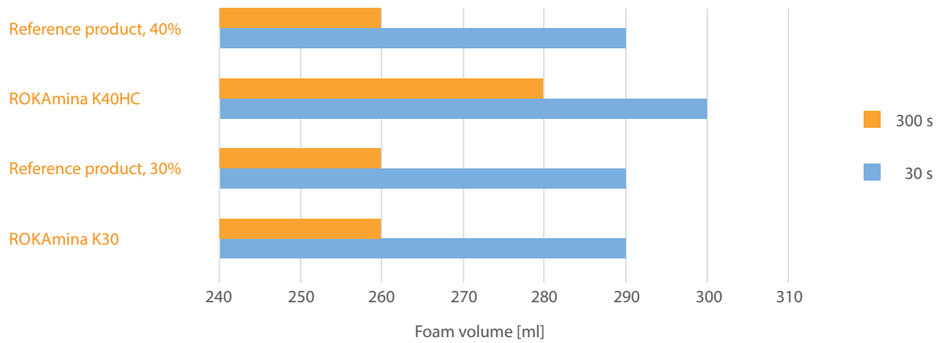
Foaming capability for basic formulation with Coco-Betaine



Foaming capability in distilled water for betaines



Foaming capability for basic formulation with Cocamidopropyl Betaine



Surface tension

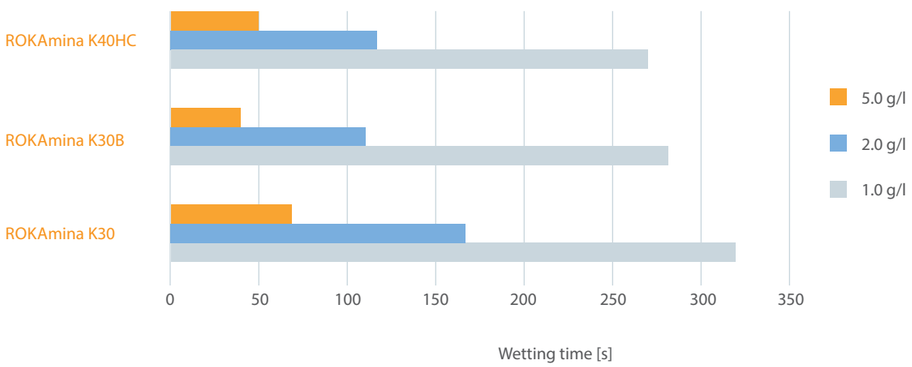
Surface tension according to PN-EN 14370:2004, determined with a use of the Wilhelmy plate method, at a temperature of 25°C, concentration of 0.1%.
Pure water has a relatively high surface tension at room temperature (~72.4 mN/m) and hence cleans poorly. In the cleaning process, surface tension must 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.

PRODUCT NAME	SURFACE TENSION [MN/M]	
	DEMINERALIZED WATER	HARD WATER (17°D)
ROKAmina K30	28	28
ROKAmina K30B	30	30
ROKAmina K40HC	25	25

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.



Example formulations

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

Favorable dermatological properties, excellent foaming and thickening properties make EXOcare PC60 surfactant of choice where mildness and outstanding performance in final formulation is required.

Product

Laureth-2 Sulfate
Cocamidopropyl Betaine
Alkyl Glucoside

Product Specifications:

Active Substance, (m/m)	60-63%
Anionic Substance, (m/m)	42-45%
Specific Gravity	0.9-1.19 g/ml at 20°C
$pH_{(a)}$	10.0-11.5

(a) 10% Aqueous Solution

Apperance (20-25°C)	Paste
Color	Colorless to Light Yellow
Water Solubility	Completely Soluble
Viscosity, cP	3000 – 8000 Brookfield

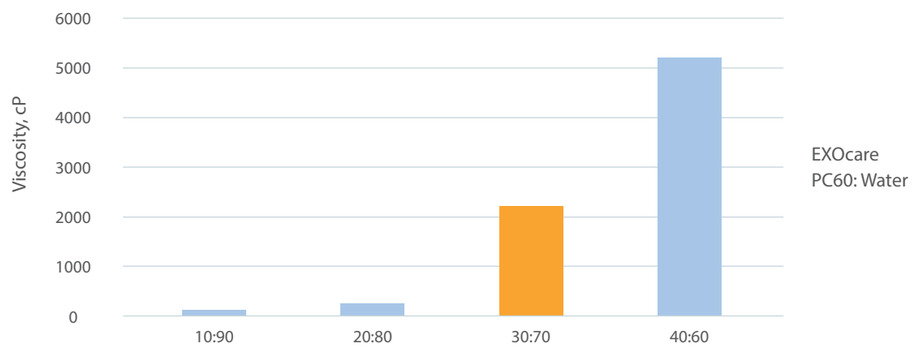
EXOcare PC60

Multifunctional surfactants blend for Cosmetic cleansing formulation

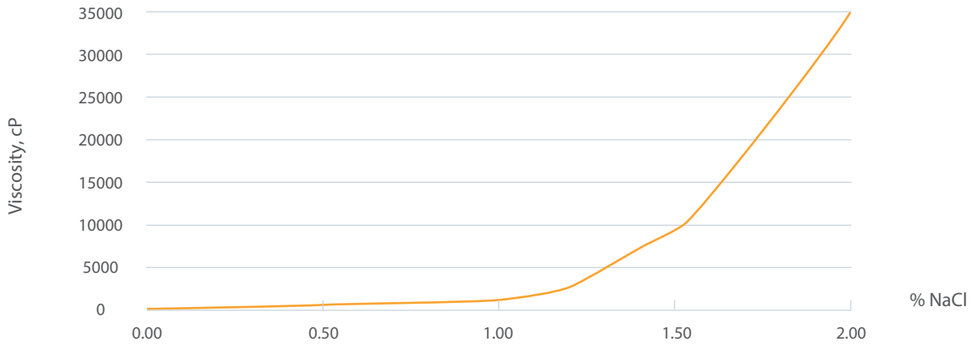
EXOcare PC60 was developed to meet expectations of our customers for universal and cost effective product in the area of personal care applications.
Carefully selected and formulated blend of Alkyl Glucoside, Cocamidopropyl Betaine and Laureth Sulfate gave a unique product suitable as a primary surfactant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

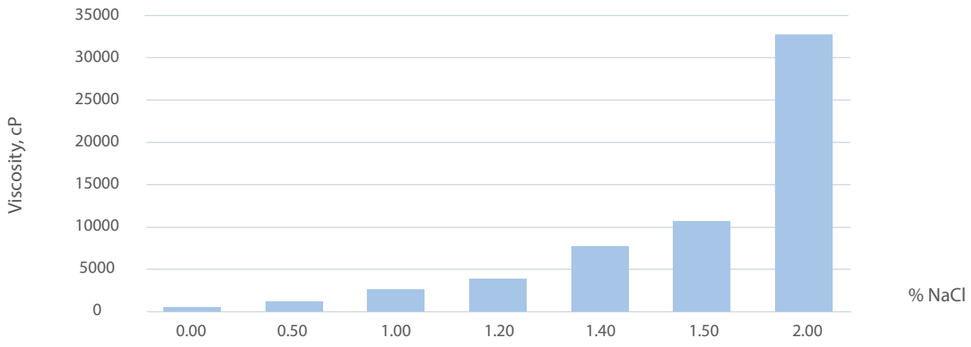
Viscosity Profile EXOcare PC60: Water



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



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



Example Formulation: Liquid Shampoo:

PCC 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.

Part A

Demineralized Water	60%
Citric Acid	0.05%
DiSodium EDTA	0.1%

Part B

Demineralized Water	11%
Rokacet KO300G	0.6%
ExoAlc 1698	1.1%

Part C

EXOcare PC60	25%

Part D

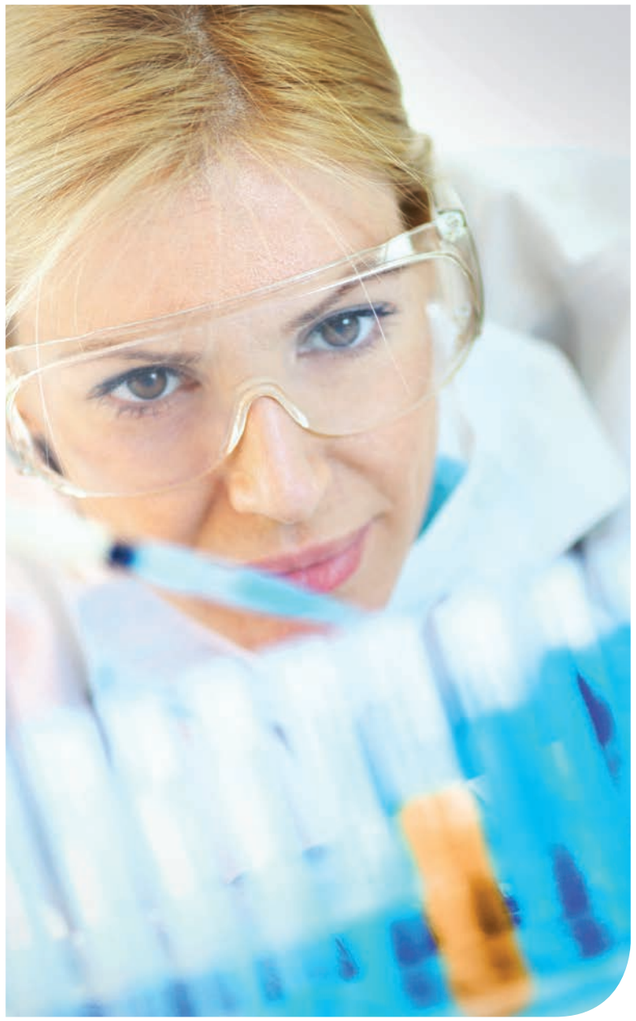
Natural Extracts	0,35%
Colors	0.09%

Part E

Sodium Chloride	1.55%

Procedure:

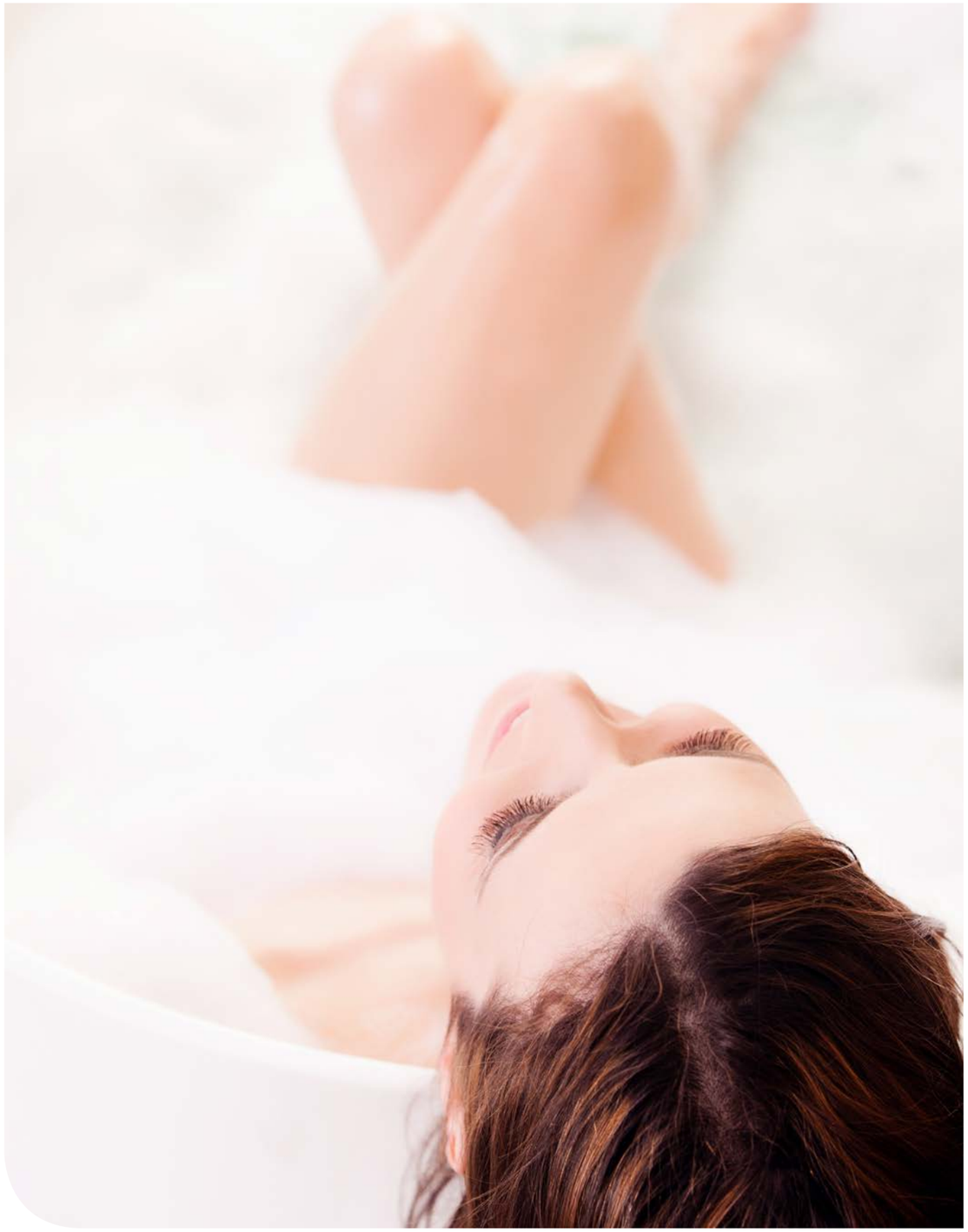
Add demineralized water to the mixing kettle. Begin mixing. Add remaining part A. Heat the mixing kettle contents to 77-79°C. Add part B Ingredients to the mixing kettle. Reduce mixer speed, Mix until uniform. Maintain temperature at 77-79°C. Once the batch is uniform, turn off to heat. Cool the batch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



Product parameters

pH	6
Viscosity (Brookfield s34, 4 rpm)	7500 cP

The given data are suggestions without any guarantee aimed to support customers' development. PCC 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.



Chlor-alkali business

PCC Group is also a manufacturer and supplier of basic chemical raw materials used in many industries. Caustic soda liquid and solid form and hydrochloric acid are the main products used in the cosmetics industry. Installation of membrane electrolysis, in which caustic soda is produced, is one of the youngest and most modern in Europe. Synthesis installation of hydrochloric acid produces the unique on the European scale concentrations and exceptional purity.

High quality and chemical purity of PCC Group products guarantees stability and repeatability of the production processes of our customers.

PRODUCT NAME	CAUSTIC SODA	CAUSTIC SODA	HYDROCHLORIC ACID PURE	HYDROCHLORIC ACID FOOD GRADE	SYNTHETIC HYDROCHLORIC ACID
PRODUCT CHARACTERISTIC					
Chemical formula	NaOH	NaOH	HCl	HCl	HCl
Other comercial names	Sodium hydroxide, soda	Sodium hydroxide, soda, sodium alkali, lye	Hydrogen chloride water solution	Hydrogen chloride water solution	Hydrogen chloride water solution
Form	solid, flakes	liquid	liquid	liquid	liquid
Concentration	98%	~50% water solution	>=37% water solution	>=33% water solution	>=33% water solution
Quality	High	High	Supreme, lab. quality	Very high	High
Charakteristic	Product of membrane electrolysis	Product of membrane electrolysis	Product of inorganic synthesis	Product of inorganic synthesis, approved to use in food industry installation and production processes	Product of inorganic synthesis
Packing	Plastic bags 25 kg	IBC 1000L or road/rail tank cars	IBC 1000L	IBC 1000L or road/rail tank cars	IBC 1000L or road/rail tank cars
Main applications	Soap production. Used for the manufacture of other cosmetic materials, eg. sodium salt.		Used in trace amounts to adjust the pH of cosmetics. Used for the manufacture of other cosmetic raw materials.		

Good manufacturing practices

Why do we use Good Manufacturing Practices at our company?

One of the key priorities of PCC EXOL SA is focusing on the customers' needs. Meeting their needs in the area of product variety, quality and safety is a major determinant of the use of Best Practices in the production of surfactants supplied to our customers in the cosmetics industry.

The most important reason why we have implemented Good Manufacturing Practices (GMPs) in our company is to ensure the safety of users using cosmetics containing surfactants manufactured at our production plants. The use of GMP standards gives consumers greater peace of mind and assurance as to the quality and safety of the final product.

Good Manufacturing Practices at our plants are used to:

- ensure repeatability and homogenity of subsequent product batches
- eliminate any situations that could potentially contaminate the product with foreign physical and chemical substances and bodies, and harmful microflora
- prevent any accidental actions in the production processes and ensure that these processes are carried out in accordance with strict requirements in the form of instructions and procedures

GMP EFfCI Certificate Number: PL17/0626

GMP EFfCI Certificate Number: PL17/0627

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.

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 O/W
10-15	50-75	Detergent
10-18	50-90	Solubilizer

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)

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 development 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 3300 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	Divisions	Segments	Business units
Chemicals	Polyols	• Polyols • Polyurethane Systems	Energy	Energy	• Renewable Energies • Conventional Energies
	Surfactants	• Anionic Surfactants • Non-ionic Surfactants • Amphoteric Surfactants (Betaines)	Logistics	Logistics	• Intermodal Transport • Road Haulage • Rail Transport
	Chlorine	• Chlorine • MCAA • Other Chlorine Downstream Products	Holding	Holding	• Portfolio Management • Projects • Services
	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			

PCC Group - Industrial Park in Brzeg Dolny, Poland

PCC Rokita SA

PCC Rokita Capital Group, 22 companies, including:
PCC Rokita SA
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.

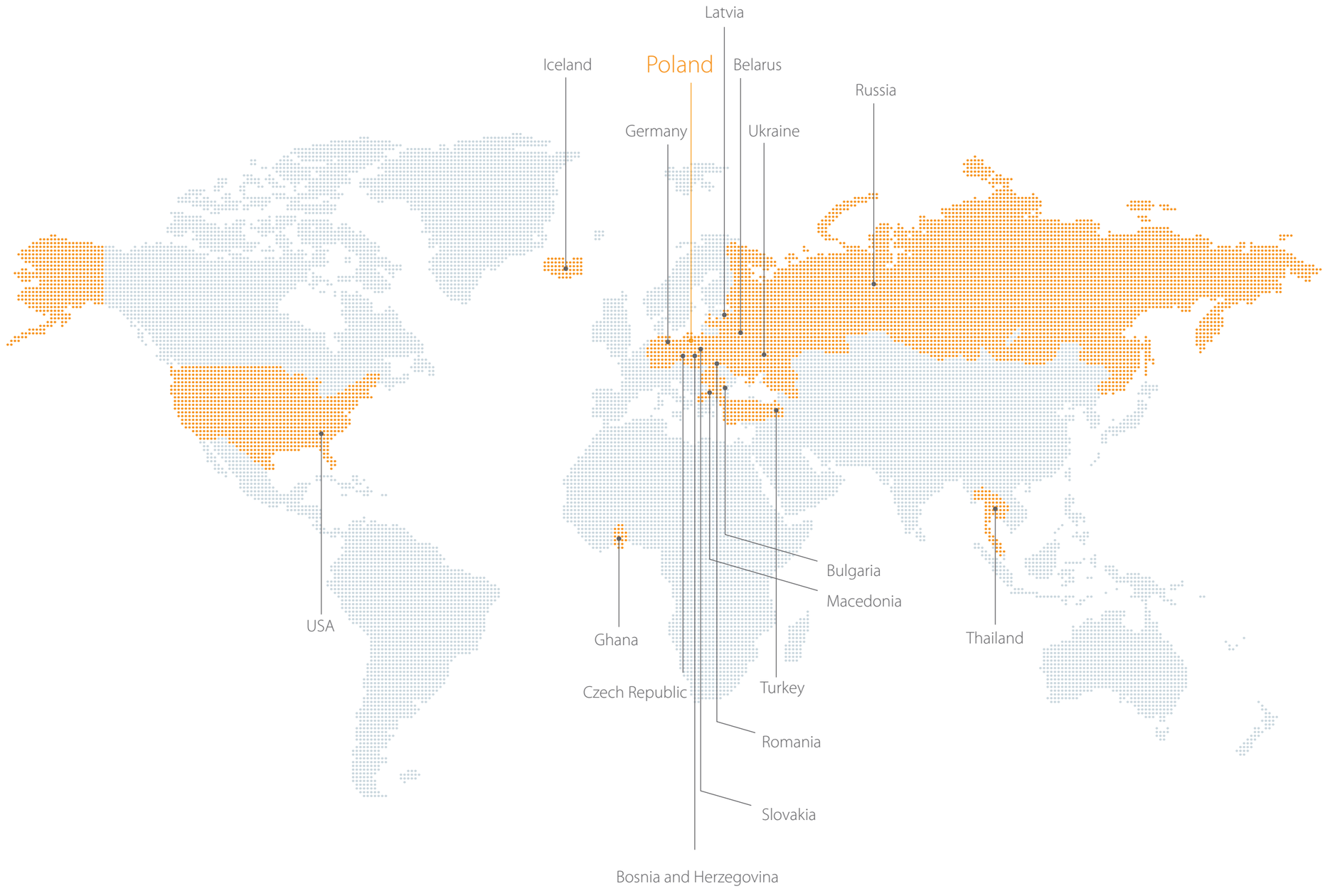
Capital Group PCC CP Kosmet, 3 companies, including:
PCC CP Kosmet Sp. z o.o.
OOO PCC Consumer Products Navigator (Belarus)
OOO PCC Consumer Products (Russia)

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	
Brand	Cocoon Silk
Grammage	135
Number of pages	40

COVER PAGES	
Brand	Cocoon Silk
Grammage	250
Number of pages	4

PUBLICATION	
Size (cm)	21 x 29.7
Quantity	400

By using Cocoon Silk rather than non-recycled paper, the environmental impact was reduced by:

73	kg of landfill
9	kg CO_2 and greenhouse gases
98	km travel in the average European car
2 874	litres of water
168	kWh of energy
119	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.

PCC Group
Sienkiewicza 4
56-120 Brzeg Dolny, Poland
products@pcc.eu

Please visit our capital group business platform:
www.products.pcc.eu

PCC
More than Chemistry