

ROKAnol NL Series

Ethoxylated C9-C11 alcohols
Non-ionic surfactant series

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Local. Global. Integrated.

Operating in 18 countries, in 41 different locations, PCC Group currently employs more than 3 100 people.



About Us

PCC Exol SA is a major player in the European surfactants market. In the eastern and central-eastern part of the continent, it is the undisputed leader in its industry. Most of the production facilities and the company's headquarters are located in Brzeg Dolny, Poland. Here we develop, test and manufacture a wide range of anionic, non-ionic and amphoteric surfactants and speciality industrial formulations.

New products are continuously added to the portfolio in response to market trends and individual customer requirements. The surfactants produced at the plants have a very wide range of industrial applications. They are used as wetting agents, emulsifiers, auxiliaries in paper, metallurgy and many other industries, as well as in

household chemicals, personal care products and textiles.

Sustainable development is an important element of PCC EXOL's business approach. The company develops its management practices and processes to address environmental, social and ethical challenges. The scope of these activities is determined by the company's strategic priorities, operational capabilities and available, verifiable supporting documentation. Among other areas, PCC EXOL undertakes initiatives aimed at supporting the circular economy, improving energy and resource efficiency, enhancing safety performance, and promoting sustainability-related practices within selected elements of its value chain through cooperation with suppliers and customers.

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Polyols 	Chlorine 	Phosphorus 	Surfactants 	Alkylphenols 
• Polyether polyols • Polyester polyols • Prepolymers • Polyurethane Systems	• Chlorine • MCAA • Other Chlorine Downstream Product	• Phosphorus derivatives • Naphthalene derivatives • Polycarboxyethers (PCE)	• Anionic surfactants • Cationic surfactants • Nonionic surfactants • Amphoteric surfactants (betaines) • Chemical formulation	• Nonylphenol • Dodecylphenol • Tristyrylphenol
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• Household & industrial Cleaners, Detergents and Personal Care Products	• Energy Production	• Intermodal transport • Road Haulage • Rail Transport	• Microsilica • Silicon Metal	• Portfolio Management • Project Development

ROKAnol NL Series

Chemical specificity

ROKAnol NL Series are high active non-ionic surfactants. They are ethylene oxide adducts to C9-C11 alcohols. The numerical part

of the product name indicates the overall degree of ethoxylation. ROKAnol NL Series can be presented by the following structure:



where $n = 8 - 10$

$n' = 3, 5, 6, 8, 9$

Applications

ROKAnol NL Series are especially effective in the cleaning process. They are consumed as cleaning agents in the I&I industry, but also cope well as a components of laundry detergents or hard

surface cleaners. In addition, they have many other applications, such as in the textile industry or the paint and coatings industry.

Industrial and
institutional
cleaning



Laundry
detergents



Hard surface
cleaners



Textile
industry



Paints and
coatings



Others



Basic physical and chemical properties

ROKAnol	NL3	NL5	NL6W	NL6W/95	NL6	NL8W	NL8	NL9
Appearance at 20-25°C	Liquid	Liquid with a tendency to separation in time	Liquid	Liquid	Liquid with a tendency to separation in time	Liquid	Liquid with a tendency to separation in time	Liquid
Molecular weight [g/mol]	295	380	430	430	430	510	510	560
Hazen colour	Max. 50 (40°C)	Max. 70 (40°C)	Max. 70 (40°C)	Max. 70 (30°C)	Max. 70 (40°C)	Max. 70 (40°C)	Max. 70 (40°C)	Max.100 (40°C)
Hydroxyl number [mg KOH/g]	185-193	144	130	130	130	106	106	98-102
Cloud point [°C]								
Method A 1% in water solution	-	33 - 39	50 – 57	50 – 57	50 – 57	78 - 85	78 – 85	85
Method B 1% solution in 5% NaCl solution	-	25	39	39	39	63	64	69
Method C 1% solution in 10% NaCl solution	-	18	30	28	30	53	53	58
Method D 10% solution in 25% BDG solution	57	72	76	77	76	83	83	83
Method E 16.7% solution in 25% BDG solution	48	68	73	73	73	82	81	82
Approx. Solidification point [°C]	-12	-2	<-20	-5	+ 5	0	+ 15	+ 15
Water content [% , by weight]	max. 0.2	max. 0.5	8.0 – 12.0	max. 6.0	max. 0.5	8.0 - 12.0	max. 0.5	max. 0.5
pH in deionized water, at 20°C	5.5 – 7.5	4.6 – 7.4	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0
Density at 25°C [g/cm ³]	0.95	0.97	1.00	0.99	0.99	1.03	1.03	1.01
Viscosity at 20°C [cP]	Approx. 30	Approx. 40	Approx. 70	Approx. 70	Approx. 50	Approx. 90	Approx. 70	Approx. 130
Average degree of ethoxylation [mol EO]	3	5	6	6	6	8	8	9
Surface tension of 0.1% solution at 25°C [mN/m]	26	26	29	29	28	29	32	31

Additional information

Solubility

The solubility of ROKAnol NL Series depends on the degree of ethoxylation. The higher degree of ethoxylation, the better solubility in both water and acetone. Solubility in water and other solvents has been shown in the table below:

Solubility – at 25°C, 10% Solutions

Product name	Demineralized water	Methanol	Acetone
ROKAnol NL3	○	●	○
ROKAnol NL5	●	●	○
ROKAnol NL6W	●	●	●
ROKAnol NL6W/95	●	●	●
ROKAnol NL6	●	●	○
ROKAnol NL8W	●	●	●
ROKAnol NL8	●	●	○
ROKAnol NL9	●	●	●

○ macroscopic phase separation ● homogeneous, cloudy solution ● clear, homogeneous solution ● homogeneous, opalescent solution



Wetting capability

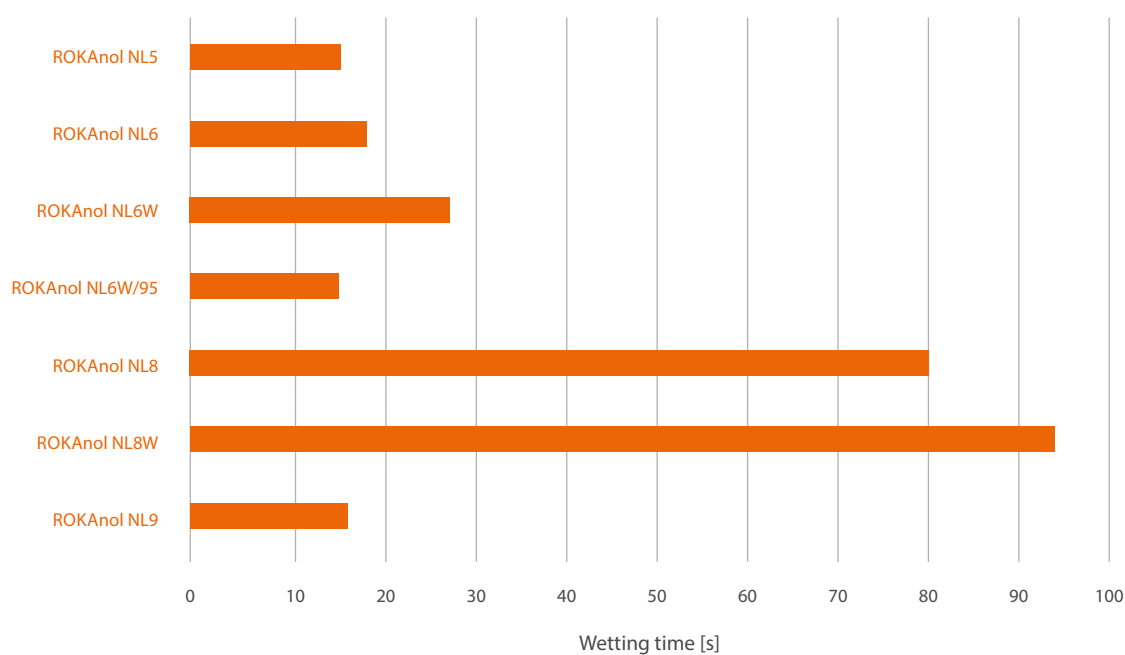
Surfactants reduce the surface tension of liquids in which they are dissolved. Thanks to them, any liquid (usually water) has greater wetting capability, which increases its ability to get as

close as possible to the solid. This is very important for many surfactant applications, especially in cleaning processes.

The capability of wetting cotton fabric was determined in accordance to **PN-EN 1772:2001** Standard.



Concentration of 1.0 g/l; demineralized water; temperature 20°C



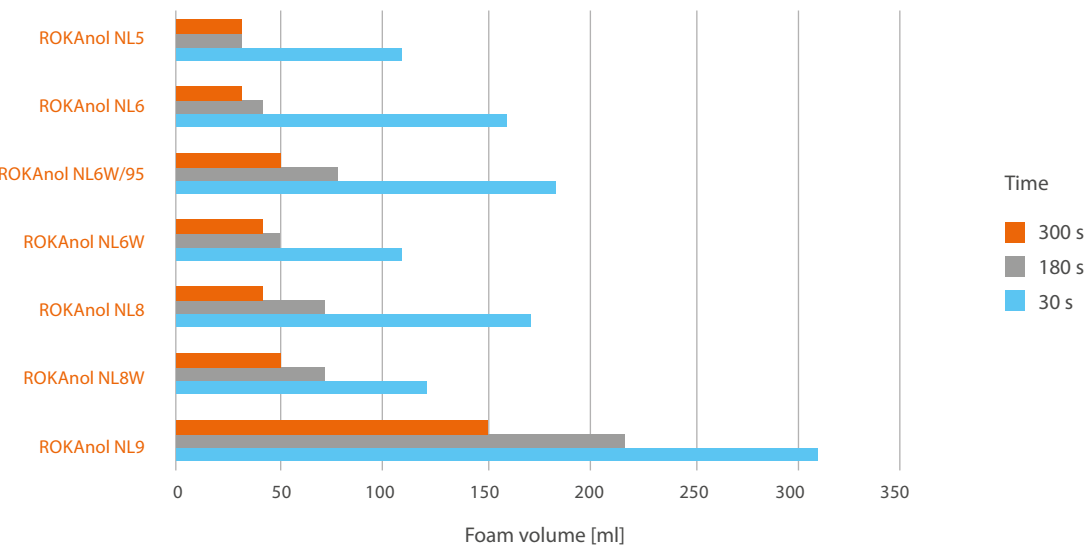
* The data presented in the charts were developed on the basis of tests carried out at PCC EXOL SA

Foaming capability

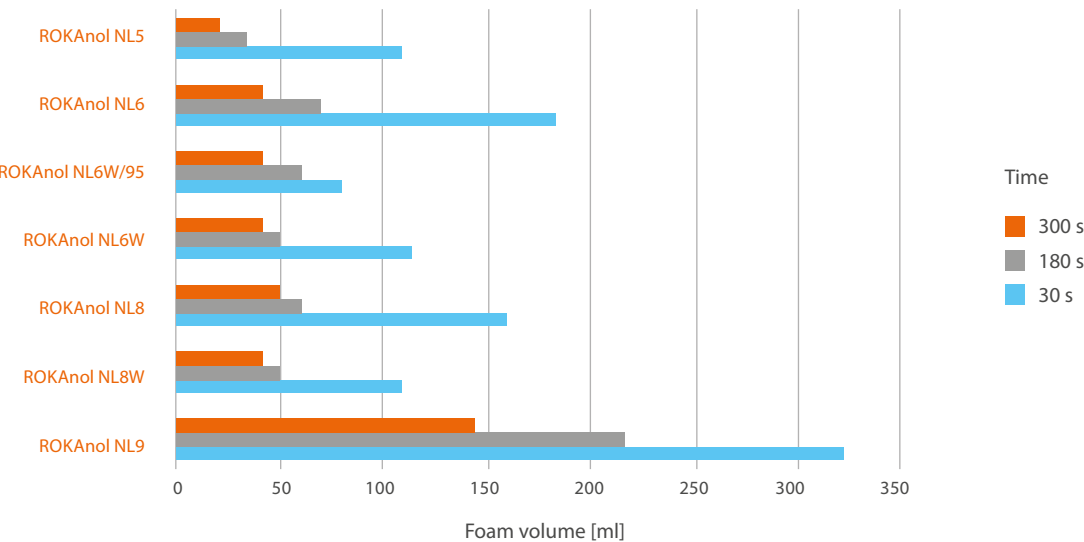
Foam is a heterogeneous system in which the liquid is the continuous phase and the dispersed phase is a gas. Foams, as well as emulsions, are thermodynamically unstable systems, so surfactant molecules on the interface are required to stabilize them. The ability to foam a substance is important in many industrial applications

including the detergents, where it prevents re-dirt in the washing or cleaning processes. The determination of the foaming capability was performed according to **PN-ISO 696: 1994** Standard (the modified Ross-Miles method) at a temperature of 25°C, for a surfactant concentration of 1 g/l, in both hard (17°d) and demineralized water.

Concentration of 1.0 g/l; demineralized water; temperature 25°C



Concentration of 1.0 g/l; hard water; temperature 25°C



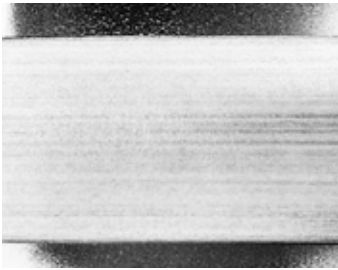
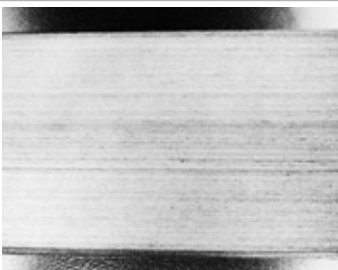
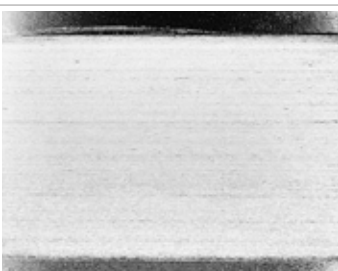
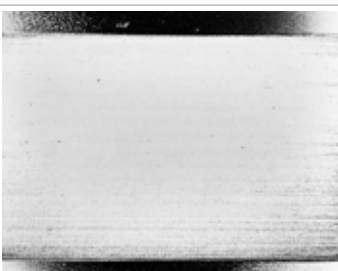
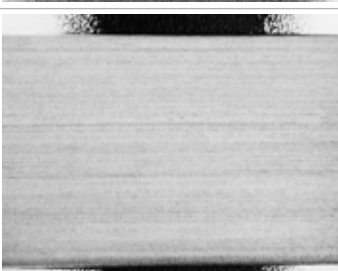
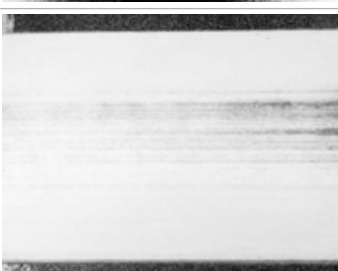
* The data presented in the charts were developed on the basis of tests carried out at PCC EXOL SA

Detergency on hard surfaces

Detergency is the ability of the surfactant to remove greasy soil from the surface of the masonite tile in the cleaning process. Non-polar structural fragments of surfactants form a micelle which interact with a particle of dirt.

Subsequently, an emulsion is formed, that can be removed mechanically with a sponge. The cleaning process was carried out on a BYK Gardner scrub abrasion tester according to our own method.

Comparison of masonite tiles, before and after the detergency tests

Product name \ Concentration [g/l]	0	2	5
ROKAnol NL5			
ROKAnol NL6			
ROKAnol NL8			
ROKAnol NL9			

* The pictures present the results of tests carried out at PCC EXOL SA

Detergency on hard surface results in dL units

Product name	Demi water		ROKAnol NL9		ROKAnol NL8		ROKAnol NL6		ROKAnol NL5	
Concentration	-	2 g/L	5 g/L	2 g/L	5 g/L	2 g/L	5 g/L	2 g/L	5 g/L	
The arithmetic average of all measurements [dL units]	41	35	31	33	32	33	32	31	31	

The cleaning process is described by the dL parameter according to the CIE LAB method. This parameter determines the change in the brightness (luminescence) between the tested sample and the standard which is a white plate. Detergency tests on hard surfaces were carried out in 3 replicates for each concentration of each product. The dL parameter is described by the following formula:

$dL = LT - LS$, where: T – tested sample (plate after cleaning process)
S – standard to which the tested sample is compared (white plate)

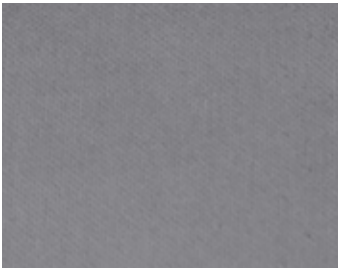
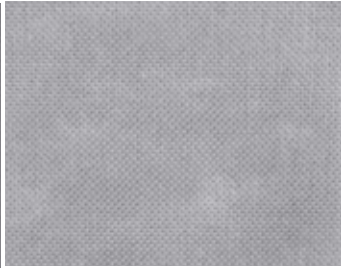
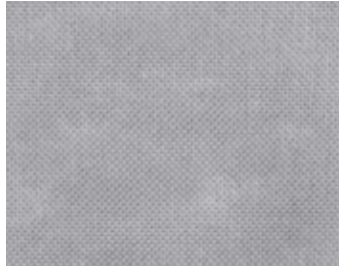
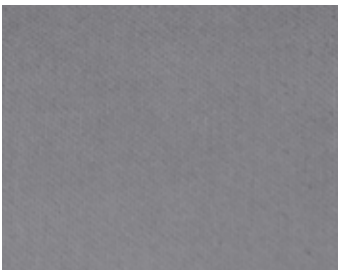
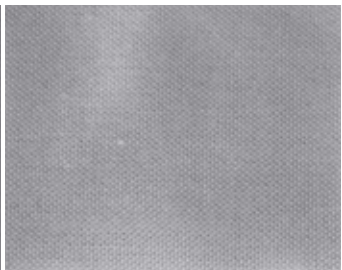
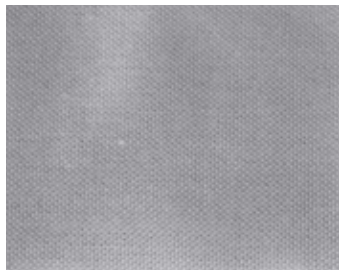
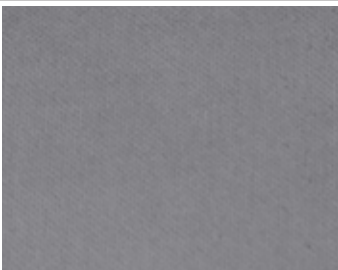
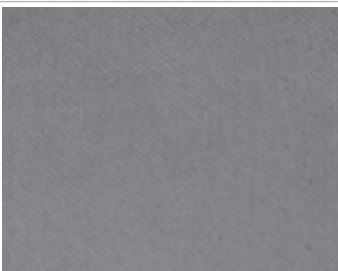


Detergency on a cotton fabric

Determination of detergency on a cotton fabric is tantamount to assessing the effectiveness of washing with the use of surfactants. Detergency tests were performed according to PCC EXOL SA

own method, using EMPA 125 fabric (cotton), soiled with a mixture of oils and pigments that were washed in ROKAnol NL Series solutions.

Comparison of the EMPA 125 fabric, before and after the detergency tests

Concentration [g/l]	0	2	5
Product name			
ROKAnol NL9			
ROKAnol NL8			
ROKAnol NL6			
ROKAnol NL5			

* The pictures present the results of tests carried out at PCC EXOL SA

Cotton fabric detergency results in dL units

Product name	ROKAnol NL9		ROKAnol NL8		ROKAnol NL6		ROKAnol NL5	
Concentration	2 g/L	5 g/L	2 g/L	5 g/L	2 g/L	5 g/L	2 g/L	5 g/L
The arithmetic average of all measurements [dL units]	13	13	12	12	21	21	18	21

As with the detergency on hard surface method, the cleaning process is described by the dL parameter in accordance with the CIE LAB method. The difference is that the standard in this case is the soiled fabric, so the higher the value of the dL parameter, the better the tested fabric is cleaned.



Alkali and acid resistance

Surfactants used in industrial cleaning have to be resistant to strong acids or alkalis. Acidic cleaning agents are mainly used to remove

mineral deposits from acid-resistant surfaces, while alkaline agents are known primarily for their remarkable degreasing ability.

The analysis of this stability for ROKAnol NL Series has been performed in accordance with the **PN-EN 14712:2005** Standard.

Alkali resistance (Sodium Hydroxide); concentration of 1%; temperature 20°C

NaOH conc. [g/l]	10	20	30	40	50	60	70	80	90	100
Product name										
ROKAnol NL3	○									
ROKAnol NL5	●	●	○							
ROKAnol NL6	●	●	●	●	○					
ROKAnol NL6W/95	●	●	●	●	●	○				
ROKAnol NL6W	●	●	●	●	●	○				
ROKAnol NL8	●	●	●	●	●	●	●	○		
ROKAnol NL8W	●	●	●	●	●	●	●	○		
ROKAnol NL9	●	●	●	●	●	●	●	●	●	○

○ macroscopic phase separation ● homogeneous, cloudy solution ● clear, homogeneous solution ● homogeneous, opalescent solution

Acid resistance (Sulphuric Acid); concentration of 1%; temperature 20°C

H₂SO₄ conc. [g/l] Product name	1	10	40	60	120	140	225
ROKAnol NL3	○	○	○	○	○	○	●
ROKAnol NL5	●	●	●	●	●	●	●
ROKAnol NL6	●	●	●	●	●	●	●
ROKAnol NL6W/95	●	●	●	●	●	●	●
ROKAnol NL6W	●	●	●	●	●	●	●
ROKAnol NL8	●	●	●	●	●	●	●
ROKAnol NL8W	●	●	●	●	●	●	●
ROKAnol NL9	●	●	●	●	●	●	●

○ macroscopic phase separation ● homogeneous, cloudy solution ● clear, homogeneous solution ● homogeneous, opalescent solution







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The information in the catalogue is believed to be accurate and compiled to the best of our knowledge; however, it should be considered as introductory only. Detailed information about our products is available in TDS and MSDS.

The suggestions for product applications are based on our best knowledge.

The responsibility for the use of products in conformity or otherwise with the suggested application, and for determining product suitability for the user's own purposes rests with the user.

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