ROKAnol GT Series

Ethoxylated Fatty Alcohols
Non-ionic surfactant Series

pcc Exol

ROKAnol GT Series

Chemical description

ROKAnol GT Series are non-ionic, branched surfactants based on C_9 – C_{16} Alcohol. Due to the specific structure these products exhibits superior performance and can be used in variety of applications where they can be used instead of C_{13} Alcohols Ethoxylates. The numeric portion of the product name indicates the general degree of ethoxylation.

Application

ROKAnol GT Series can successfully become ingredients of household and professional cleaning agents, detergents, textile auxiliaries, agrochemicals as well as an emulsifier in industrial applications:

- Industrial and institutional cleaning
- Metalworking
- Household detergents
- Textile industry
- Agrochemicals
- Others

Basic physical and chemical properties

PRODUCT PARAMETER	ROKANOL GT3	ROKANOL GT5	ROKANOL GT6	ROKANOL GT6R	ROKANOL GT7	ROKANOL GT8	ROKANOL GT9	ROKANOL GT10
Appearance at 20-25°C	liquid	liquid	liquid	liquid	liquid	liquid	liquid	turbid liquid/ paste
Molecular weight [g/mol]	310	410	440	460	480	530	560	600
Hazen colour at 40°C	Max. 100	Max. 100	Max. 100	Max. 100	Max. 100	Max. 50	Max. 50	Max. 50
Hydroxyl value in 5% NaCl solution	170	140	120	120	120	110	110	100
pH of 1% solution in deionized water at 20°C	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0b	5.0 – 7.0
Cloud point, method A [°C]	-	-	-	-	-	55	54-56	64-66
Cloud point, method B [°C]	-	-	-	-	-	40	42	50
Cloud point, method C [°C]	-	-	-	-	-	20	30	39
Cloud point, method D [°C]	48-51	65	67-72	71-73	71	76-78	77	80
Cloud point, method E [°C]	41	60-62	68	68	65-70	74	75	78
Solidification point [°C]	-10	4	3	4	10	9	14	19
Water content [%]	Max. 1	Max. 0.5	Max. 0.5	Max. 0.5	Max. 0.5	Max. 0.5	Max. 0.5	Max. 0.5
Density at 30°C [g/cm^3]	0.94	0.95a	0.98	0.98	0.97a	0.99	0.98a	0.99a
Viscosity at 50°C [cP]	Max. 50	Max. 50	Max. 50	Max. 50	Max. 50	Max. 50	Max. 50	Max. 50
Surface tension of 0.1% [mN/m]	27	27	27	27	27	27	27	27
HLB	8.5	10.7	12.0	12.4	12.8	13.3	13.7	14.0

a- density measurements at 50°C, b-pH of 5% solution

Additional information

Solubility

The solubility of ROKAnol GT Series depends on the degree of ethoxylation. The higher the degree of ethoxylation of the product, the better it dissolves in water.

Solubility – at 25°C, 10% solutions

PRODUCT NAME	DEMINERALIZED WATER	METHANOL	ACETONE
ROKAnol GT3	o	●	●
ROKAnol GT5	o	●	●
ROKAnol GT6	o	●	●
ROKAnol GT6R	o	●	●
ROKAnol GT7	o	●	●
ROKAnol GT8	●	●	●
ROKAnol GT9	●	●	●
ROKAnol GT10	●	●	●

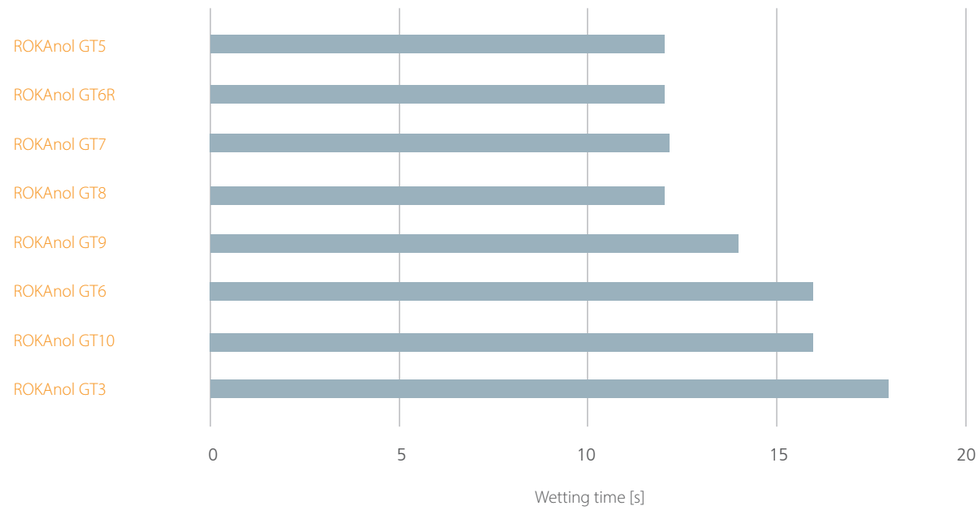
o macroscopic phase separation
● homogeneous, cloudy solution
● clear, homogeneous solution
● homogeneous, opalescent solution

Wetting capability

For many applications, such as hard surface cleaning or textile processing, i.e. in all processes where one phase (air, oil or soil), should be replaced by a liquid phase (aqueous or organic), one of the most important parameters is capability of effective wetting.

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

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

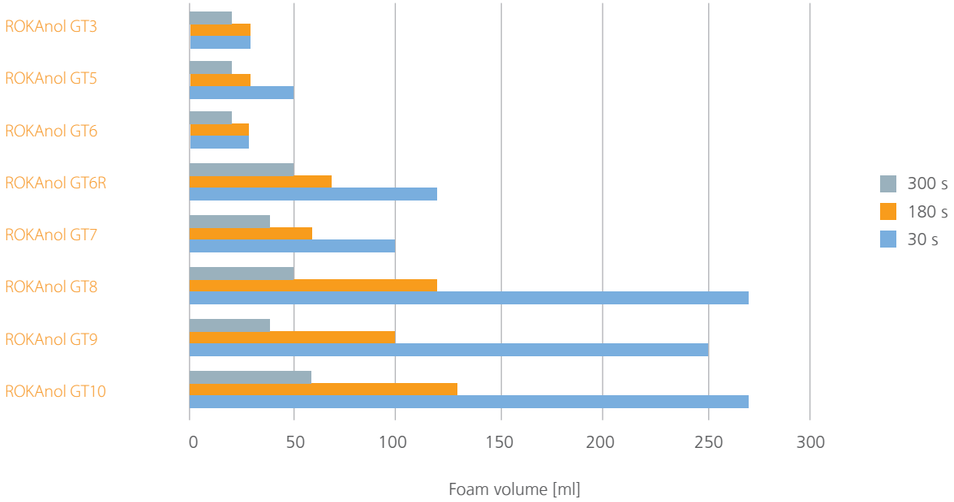


Foaming capability

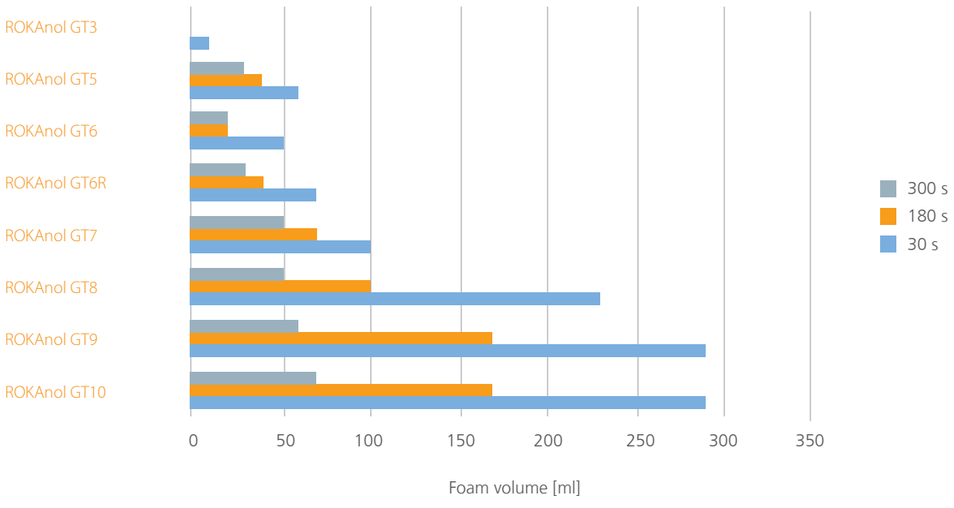
The foaming capability is one of the fundamental properties of surfactants, essential for assessing the possible directions of application and these agents. The foaming properties change with the increasing product ethoxylation degree.

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 2.0 g/l; demineralized water; temperature 25°C



Concentration of 2.0 g/l; hard water; temperature 25°C



Degreasing capability/dynamic method

The propeller stirrer was immersed in used oil for 5 minutes at 20°C and then placed in the beakers containing the 2 g/l solutions of Rokanol GT Series. Subsequently, the engine was set at 200 RPM and after 2 and 5 min the stirrer was taken out of the solution. The degree of soiling was assessed visually.

Demineralized water

Pic. 1A/1B Degreasing capability. Dynamic test, demineralized water, after 2 min and 5 min.

ROKAnol GT3

Pic. 2A/2B Degreasing capability. Dynamic test, ROKAnol GT3, after 2 min and 5 min.

ROKAnol GT5

Pic. 3A/3B Degreasing capability. Dynamic test, ROKAnol GT5, after 2 min and 5 min.

ROKAnol GT6

Pic. 4A/4B Degreasing capability. Dynamic test, ROKAnol GT6, after 2 min and 5 min.

ROKAnol GT7

Pic. 5A/5B Degreasing capability. Dynamic test, ROKAnol GT7, after 2 min and 5 min.

ROKAnol GT8

Pic. 6A/6B Degreasing capability. Dynamic test, ROKAnol GT8, after 2 min and 5 min.

ROKAnol GT9

Pic. 7A/7B Degreasing capability. Dynamic test, ROKAnol GT9, after 2 min and 5 min.

ROKAnol GT10

Pic. 8A/8B Degreasing capability. Dynamic test, ROKAnol GT10, after 2 min and 5 min.

Detergency

Detergency - the ability of the surfactant to remove soils from the fabric surface during the laundering process. Detergency tests were performed using to own method, with an EMPA 125 fabric: soiled with a mixture of oils and carbon black. Cotton was washed at a temperature 40°C in Rokanol GT series solutions.
After drying the fabrics and pressing them, the total color difference of the fabric before and after washing, was measured. ROKAnol GA3 was excluded from the study, because it was retained partially on the water surface during the detergency test.

Table 3 Comparison of the EMPA 125 fabric, before and after the detergency tests

PRODUCT NAME \ CONCENTRATION [g/l]	0	2	5
ROKAnol GT10			
ROKAnol GT9			
ROKAnol GT8			
ROKAnol GT7			
ROKAnol GT6			

Table 4 Detergency results in dL units

PRODUCT NAME	ROKAnol GT10		ROKAnol GT9		ROKAnol GT8		ROKAnol GT7		ROKAnol GT6	
Concentration [g/L]	2	5 g	2	5	2	5	2	5	2	5
The aritmetic average of all measurements [dL units]	18	18	18	19	18	19	15	18	16	18

The dL parameter is described by perceptually uniform, trichromatic colour models: CIE LAB and CIE LCH. The following is an interpretation of this parameter:
L is defined as lightness (luminosity), while dL is determined by the equation:
dL = LT - LS,

where:
T – tested sample (fabric after the detergency test),
S – standard to which the tested sample is compared (fabric before the detergency test).

Alkali and acid resistance

The physical stability of surface active agents over a specified time, in acidic/alkaline environment, is the maximum concentration of acid/base (g/l), at which the surfactant can be dissolved in an acidic/alkaline solution with a concentration of 1% to form a stable solution. Stability is determined by evaluating the appearance of solutions.

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

- o macroscopic phase separation
- ● homogeneous, cloudy solution
- ● clear, homogeneous solution
- ● homogeneous, opalescent solution

Alkali resistance (Sodium Hyroxide); concentration of 1% active matter; temperature 20°C

PRODUCT NAME \ NaOH conc. [g/l]	10	20	30	40	50	60	70
ROKAnol GT3	o	o	o	o	o	o	o
ROKAnol GT5	●	●	●	●	●	o	o
ROKAnol GT6	●	●	●	o	o	o	o
ROKAnol GT6R	●	●	●	o	o	o	o
ROKAnol GT7	●	●	●	o	o	o	o
ROKAnol GT8	●	●	●	●	o	o	o
ROKAnol GT9	●	●	●	●	o	o	o
ROKAnol GT10	●	●	●	●	●	o	o

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

PRODUCT NAME \ H_2SO_4 conc. [g/l]	1	10	40	60	120	140	225
ROKAnol GT3	o	o	o	o	o	o	o
ROKAnol GT5	●	●	●	●	●	●	●
ROKAnol GT6	●	●	●	●	●	●	●
ROKAnol GT6R	●	●	●	●	●	●	●
ROKAnol GT7	●	●	●	●	●	●	●
ROKAnol GT8	●	●	●	●	●	●	●
ROKAnol GT9	●	●	●	●	●	●	●
ROKAnol GT10	●	●	●	●	●	●	●

PCC EXOL SA
Sustainable technologies for new generations

PCC EXOL SA combines innovative technologies with experience in designing, producing and selling surfactants and chemical formulations

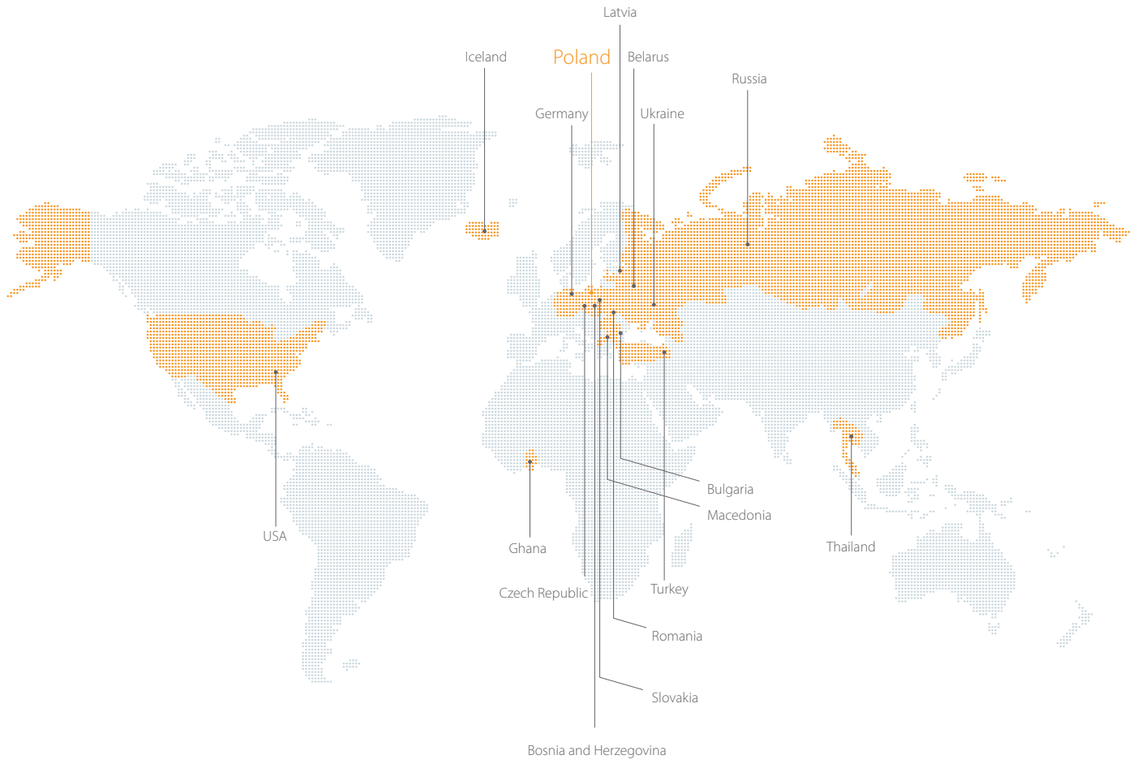
PCC EXOL SA is a company that combines cutting-edge technologies with rich experience in the production of surfactants (surface active agents). The company is seated in Brzeg Dolny (Poland), where s anionic, non-ionic and amphoteric surfactants production plants are located. With its flexible production processes, the company offers a wide spectrum of surfactants and industrial formulations, which are often suited to individual customers operating in various industry sectors. As one of leading surfactant manufacturers, PCC EXOL SA carries out new investment projects and implements innovative technologies based on global sustainability trends.

The offered surfactants have a very broad range of application. Aside from the mass production for personal care products industry, cosmetics and detergents, the substances produced by PCC EXOL SA also include specialised products used in various industries, such as textiles, agrochemicals, metal machining, oil drilling, building & construction, paints & coatings, paper industry, extraction & drilling, and many others.

Their comprehensive portfolio is continuously extended by new, innovative products, so the company can meet even the strictest market requirements and adapt to individual needs of customers. This is possible due to the dynamic development of the research facilities, flexible production as well as the knowledge and experienced personnel. PCC EXOL SA have the key competence necessary for a worldwide production of surfactants. The ongoing projects will soon bring new opportunities for the company further development and expansion into new markets. The company offers not only a wide portfolio and professional servicing but most of all flexible production and comprehensive system solutions that suit individual customer demands.

The strategic investor in PCC EXOL SA is PCC SE, operating on international markets of chemical raw materials, transport, energy, coal, coke, petrol, plastics and metallurgy. PCC SE includes 82 companies operating in 41 different locations in 18 countries.

PCC Group in the world



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