



# ROKANOL IT - SERIES

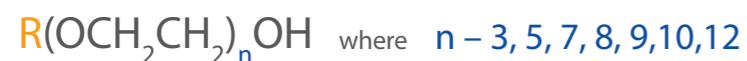
Ethoxylated fatty alcohols  
Non-ionic surfactant series



# ROKANOL IT-SERIES

## Chemical description

Rokanol IT Series are non-ionic surfactants of the polyethoxylated fatty alcohol type. The line of Rokanols IT is based on fully branched, synthetic isotridecyl alcohol. Owing to the appropriate method of conducting the reaction with ethylene oxide, it is possible to obtain a range of products with various ethoxylation degrees. The chemical structure of the Rokanol IT Series is represented by the following formula:



R – alkyl radical, with an average carbon chain length of 13

## Application

Nonionic surfactants - Rokanol IT Series are very useful in many different applications. They are especially suitable for:

- INDUSTRIAL AND INSTITUTIONAL CLEANING
- METAL WORKING
- TEXTILE INDUSTRY
- AGROCHEMICALS
- COSMETIC AND DETERGENTS
- OTHERS



## Basic physical and chemical properties

Depending on the ethoxylation degree, the appearance of the Rokanol IT Series ranges from clear or turbid liquids to pastes. Basic information concerning their physical and chemical properties is summarised in a Table 1. General characteristic.

PRODUCT NAME	AVERAGE MOLECULAR WEIGHT [g/mol]	APPEARANCE <sup>1)</sup>	COLOR <sup>2)</sup>	SOLUTION pH <sup>3)</sup>	CLOUD POINT <sup>4)</sup> [°C]	APPROX. SOLIDIFICATION POINT [°C]	APPROX. DENSITY <sup>5)</sup> [g/cm <sup>3</sup> ]	WATER CONTENT <sup>6)</sup> [%]	SURFACE TENSION <sup>7)</sup> [mN/m]	HLB <sup>8)</sup>
ROKANOL IT3	330	Clear/slightly turbid liquid	max. 100 (40°C) <sup>a</sup>	5.0-7.0 <sup>a</sup>	48-51 D	-20	0.93 <sup>a</sup>	max. 1	28	8.0
ROKANOL IT5	420	Clear/turbid liquid	max. 100 (40°C) <sup>a</sup>	5.0-7.0 <sup>b</sup>	60-62 E	-5	0.96 <sup>a</sup>	max. 0.5	29	10.5
ROKANOL IT6	460	Clear liquid <sup>a</sup>	max. 100 (50°C) <sup>a</sup>	5.0-7.0 <sup>b</sup>	67-72 D	-3	0.97 <sup>a</sup>	max. 0.5	28	11.4
ROKANOL IT7	510	Clear/slightly turbid liquid	max. 100 (50°C) <sup>a</sup>	5.0-7.0 <sup>b</sup>	65-70 E	2	0.97 <sup>a</sup>	max. 1	29	12.1
ROKANOL IT7W	510	Liquid	max. 50 <sup>a</sup>	5.0-7.0 <sup>b</sup>	65-70 E	<-18	0.99 <sup>a</sup>	9-11	27	12.1
ROKANOL IT8	550	Turbid liquid/paste	max. 50 (40°C) <sup>a</sup>	5.0-7.0 <sup>b</sup>	76-78 D	8	1.00	max. 0.5	28	12.8
ROKANOL IT9	600	Oily liquid/paste	max. 70 (50°C) <sup>a</sup>	5.0-7.0 <sup>b</sup>	56-60 A	10	1.01 <sup>a</sup>	max. 1	29	13.3
ROKANOL IT9W	600	Liquid	max. 70 <sup>a</sup>	5.0-7.0 <sup>b</sup>	58-62 A	-10	1.01 <sup>a</sup>	8-11	28	13.3
ROKANOL IT10	640	Turbid liquid/paste	max. 100 (40°C) <sup>a</sup>	5.0-7.0 <sup>b</sup>	74-77 A	18	1.02 <sup>b</sup>	max. 0.5	29	13.8
ROKANOL IT12	730	Turbid liquid/paste	max. 1.5 (40°C) <sup>b</sup>	5.0-7.0 <sup>b</sup>	79-85 A	10	1.02 <sup>a</sup>	max. 0.5	31	14.5

<sup>1)</sup> Appearance: <sup>a</sup> at 50°C

<sup>2)</sup> Color:  
<sup>a</sup> Hazen units  
<sup>b</sup> Gardner units

<sup>3)</sup> pH:  
<sup>a</sup> pH of a 2% solution, the potentiometric method according to PN-89/C-04963  
<sup>b</sup> pH of a 1% solution according to PN-EN 1262:2004, solution B, at 20°C

<sup>4)</sup> Cloud point according to PN-EN 1890:2000  
 Method A – aqueous solution  
 Method B – 50 g/l NaCl solution

Method C – 100 g/l NaCl solution  
 Method D – 45 g butyldiglycol/water solution  
 Method E – 25 g butyldiglycol/water solution

<sup>5)</sup> Density measurements:  
<sup>a</sup> at 30°C; <sup>b</sup> at 25°C; <sup>c</sup> at 50°C

<sup>6)</sup> Water content according to PN-ISO 760:2001, direct method, solvent – methanol

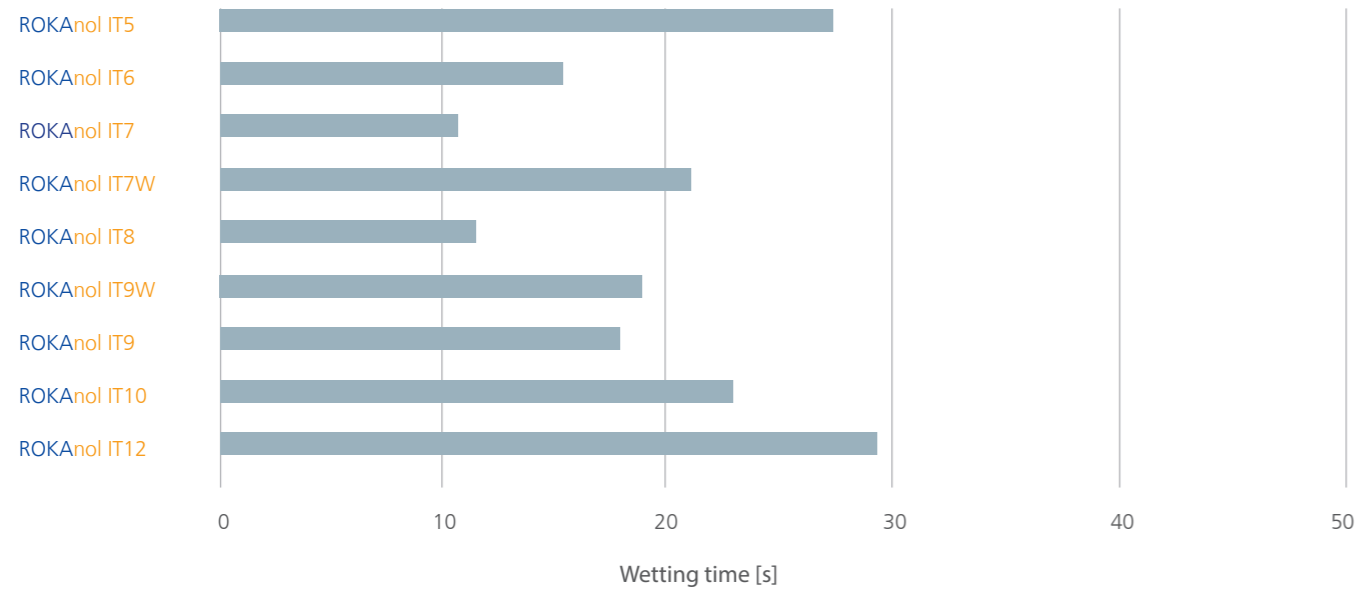
<sup>7)</sup> Surface tension according to PN-EN 14370:2004, determined using Wilhelmy plate method at a temperature of 25°C and concentration of 0.1%

<sup>8)</sup> HLB determined using calculation method

## Wetting capability

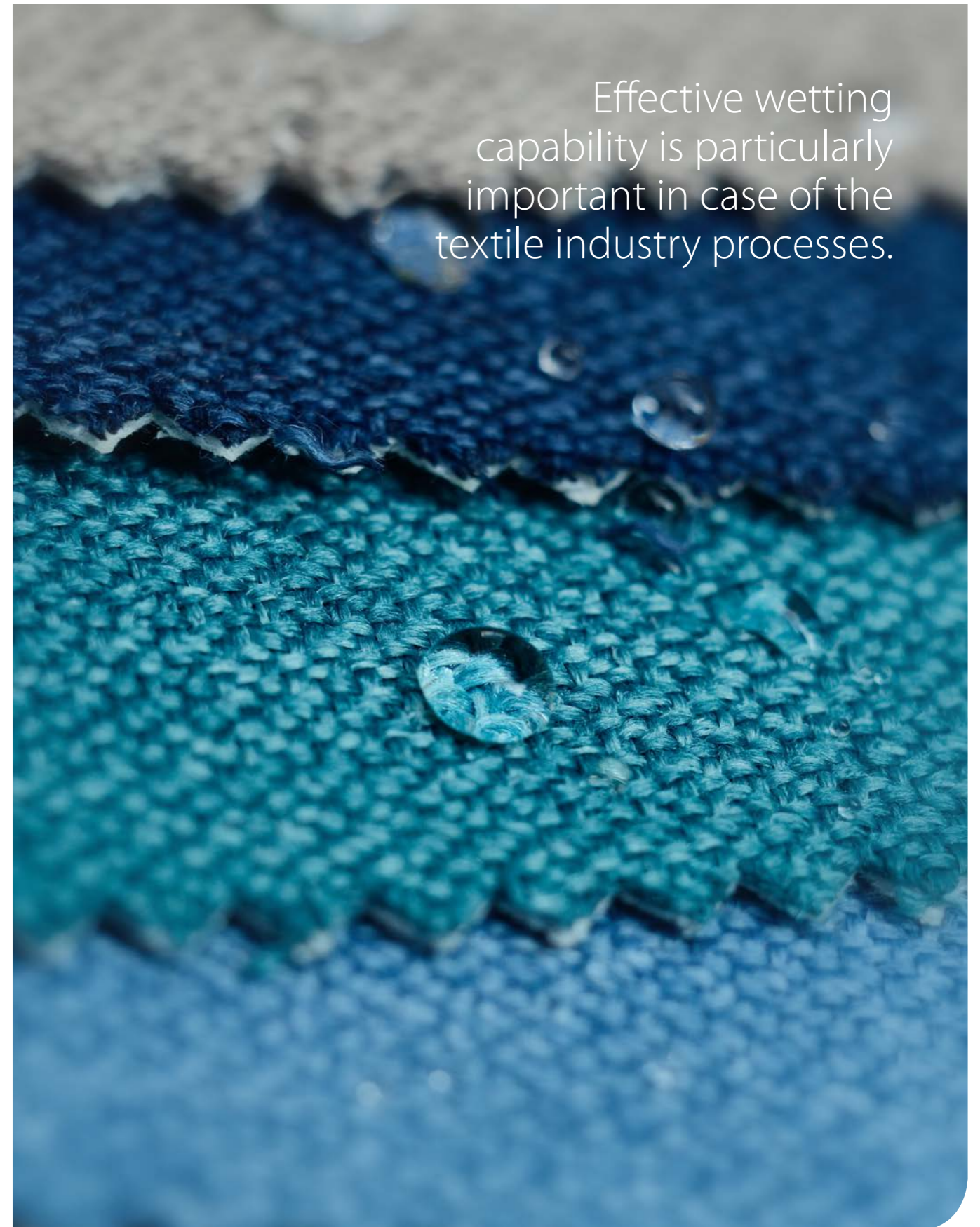
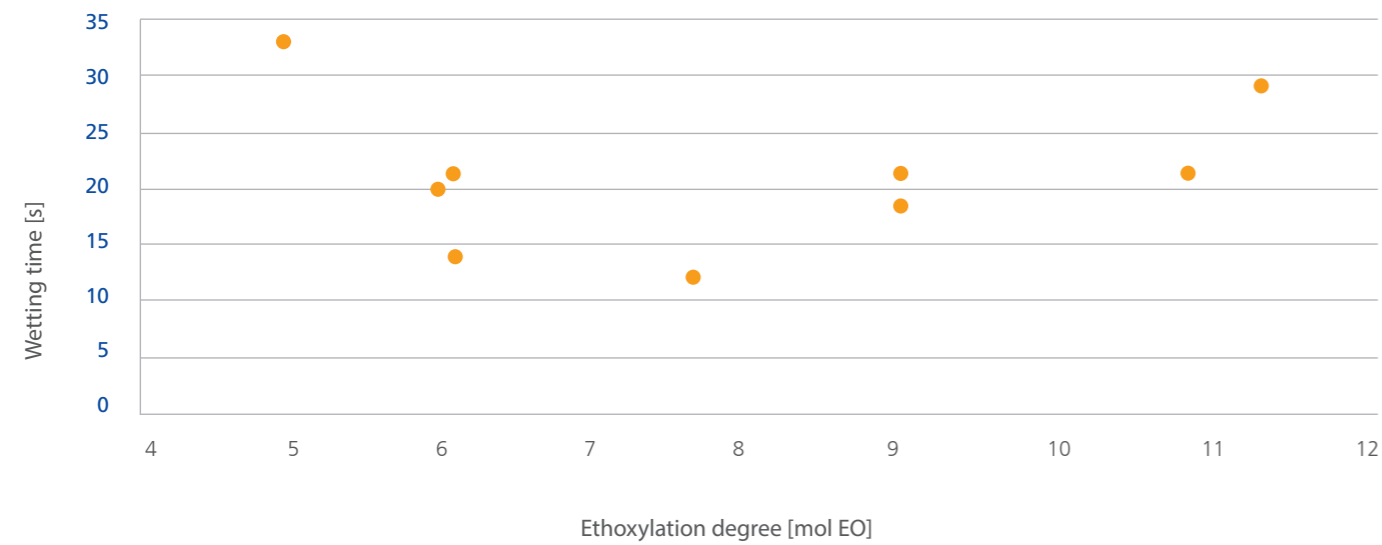
In a large number of applications the capability of effective wetting is desired property of surfactants. The wetting capability of cotton fabric was determined according to **EN 1772:2001** method. Wetting time (time in seconds necessary for wetting the textile material) was measured in Rokanols solutions with a concentration of 1.0 g/l in distilled water at a temperature of 20°C.

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



The best wetting properties were observed in products with the average ethoxylation degree in the range between 6 and 9. The dependence of the wetting capability against the function of the ethoxylation degree is presented in the following chart.

The dependence of wetting capability against the function of the ethoxylation degree



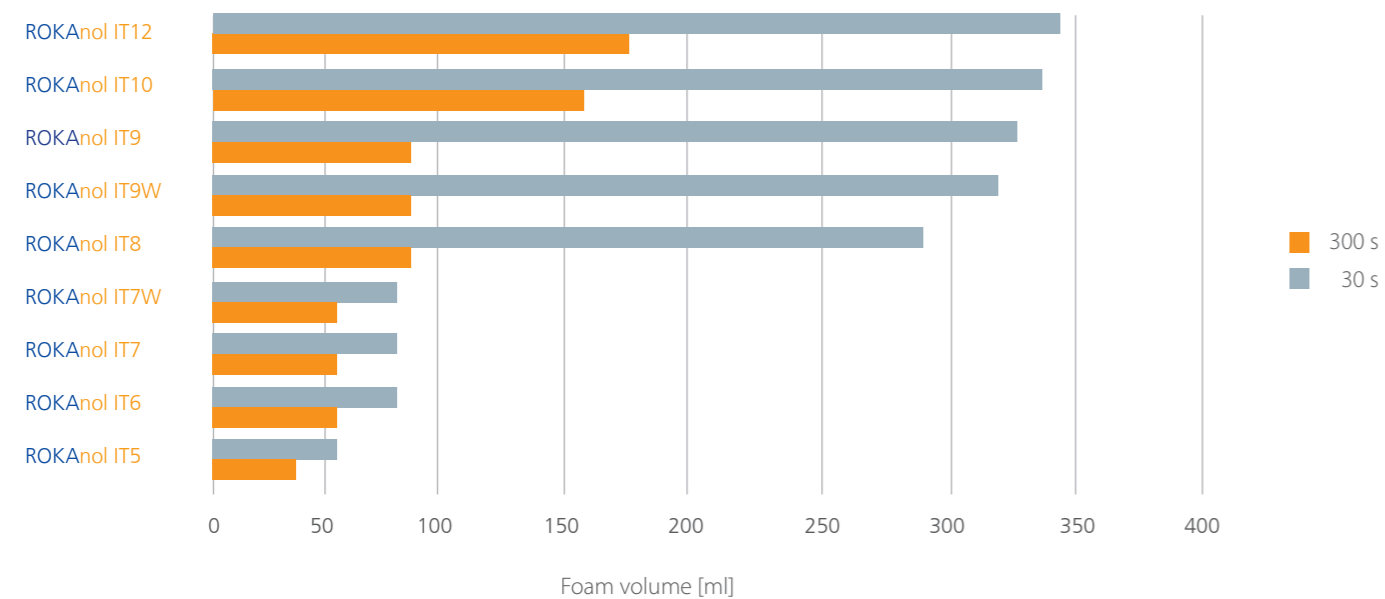
Effective wetting capability is particularly important in case of the textile industry processes.

## Foaming capability

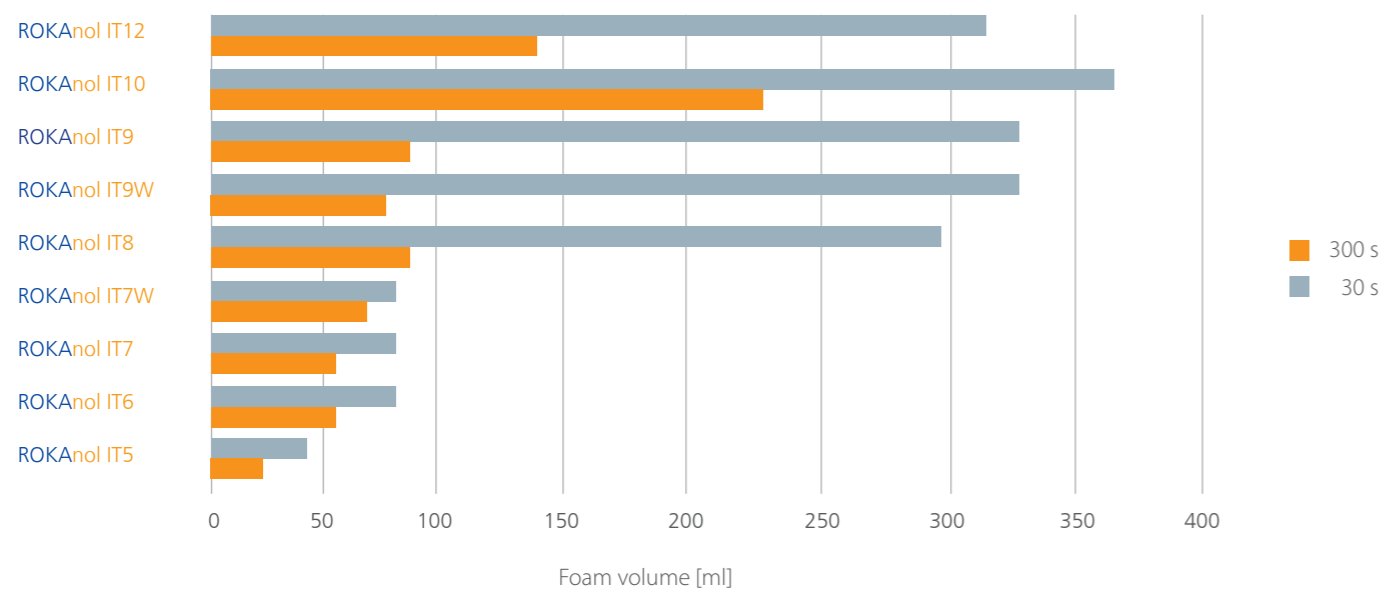
Determination of the foaming capability was performed according to PN-ISO 696:1994 (the modified Ross-Miles method) for the Rokanol IT Series solutions with a concentration of 1.0 g/l in deionised water at a temperature of 25°C.

The Rokanol IT Series display lower foaming capability in comparison to anionic surfactants for which the average foam volume obtained after 5 minutes is approximately 430 ml (alkylethersulfates). The foaming properties change with increasing product ethoxylation degree.

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



Concentration of 1.0 g/l; hard water with calcium hardness of 3 Ca<sup>2+</sup> mmol/l (17 °d); temperature 25°C



## Alkali and acid resistance

Determination of capability to form stable solutions in the acid and alkaline environment was performed according to **PN-EN 14712:2005** at a temperature of 20°C. Stability in the alkaline environment is defined as the maximum concentration of sodium hydroxide (with minimum purity of 98%) in g/l in a stable surfactant solution with a concentration of 1% (as active substance).

Stability in the acid environment is defined as the maximum concentration of sulphuric acid (with purity in the range between 95 and 98%) in ml/l in a stable surfactant solution with a concentration of 1% (as active substance).

The potential of Rokanols to form stable solutions in the acid and alkaline environment concentration of 1% (as an active substance); demineralized water; temperature 20°C

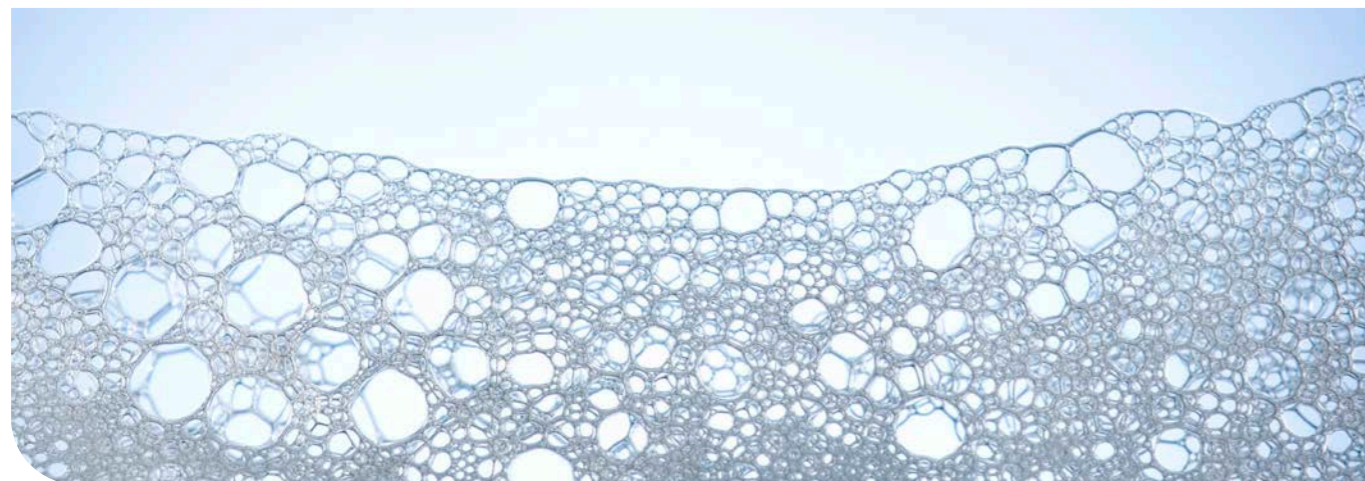
PRODUCT NAME	NaOH CONC.							
	10 g/l	20 g/l	30 g/l	40 g/l	50 g/l	60 g/l	70 g/l	
ROKANol IT3	o							
ROKANol IT5	o							
ROKANol IT6	o							
ROKANol IT7	o							
ROKANol IT7W	o	o	o	o	o	o	o	o
ROKANol IT8	o	o	o	o	o	o	o	o
ROKANol IT9	o	o	o	o	o	o	o	o
ROKANol IT9W	o	o	o	o	o	o	o	o
ROKANol IT10	o	o	o	o	o	o	o	o
ROKANol IT12	o	o	o	o	o	o	o	o

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

The potential of Rokanols to form stabile solutions in the acid and alkaline environment concentration of 1% (as an active substance); demineralized water; temperature 20°C

PRODUCT NAME	H <sub>2</sub> SO <sub>4</sub> CONC.					
	1 ml/l	5 ml/l	20 ml/l	40 ml/l	140 ml/l	225 ml/l
ROKANol IT3	o	o	o	o	o	o
ROKANol IT5	•	•	•	•	•	•
ROKANol IT6	•	•	•	•	•	•
ROKANol IT7	•	•	•	•	•	•
ROKANol IT7W	•	•	•	•	•	•
ROKANol IT8	•	•	•	•	•	•
ROKANol IT9	•	•	•	•	•	•
ROKANol IT9W	•	•	•	•	•	•
ROKANol IT10	•	•	•	•	•	•
ROKANol IT12	•	•	•	•	•	•

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



## PCC EXOL SA

### Sustainable technologies for new generations



PCC Exol SA is a combination of the latest technology with experience in production and distribution of surfactants.

PCC Exol SA is a combination of the latest technology with experience in production and distribution of surfactants. The company has its headquarters in Brzeg Dolny, Poland, where the manufacturing units of anionic, nonionic and amphoteric surfactants are located. Flexibility of production enables us to offer a wide range of surfactants adjusted to the current customer needs. As one of the leading chemical products manufacturers, we continue to undertake investment activities based on the principle of sustainable development.

Our products have numerous industrial applications. Our surfactants are used as raw materials for various markets including:

household chemicals, textile, agrochemicals, metalworking, oilfield industries, construction industry, paints & coatings, pulp and paper, and many others. Over the years, PCC Exol SA has developed core expertise 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 close customer relationships and by maximizing the synergy of customers' application experience combined with our knowledge of chemistry, 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 and being friendly to people and environment. Our operations are conducted in full compliance with legal and other requirements, including environmental requirements. The design, production and sale of large volumes of specialist, often unique, chemical products for further processing requires the coordinated cooperation of many services at the Company's disposal.

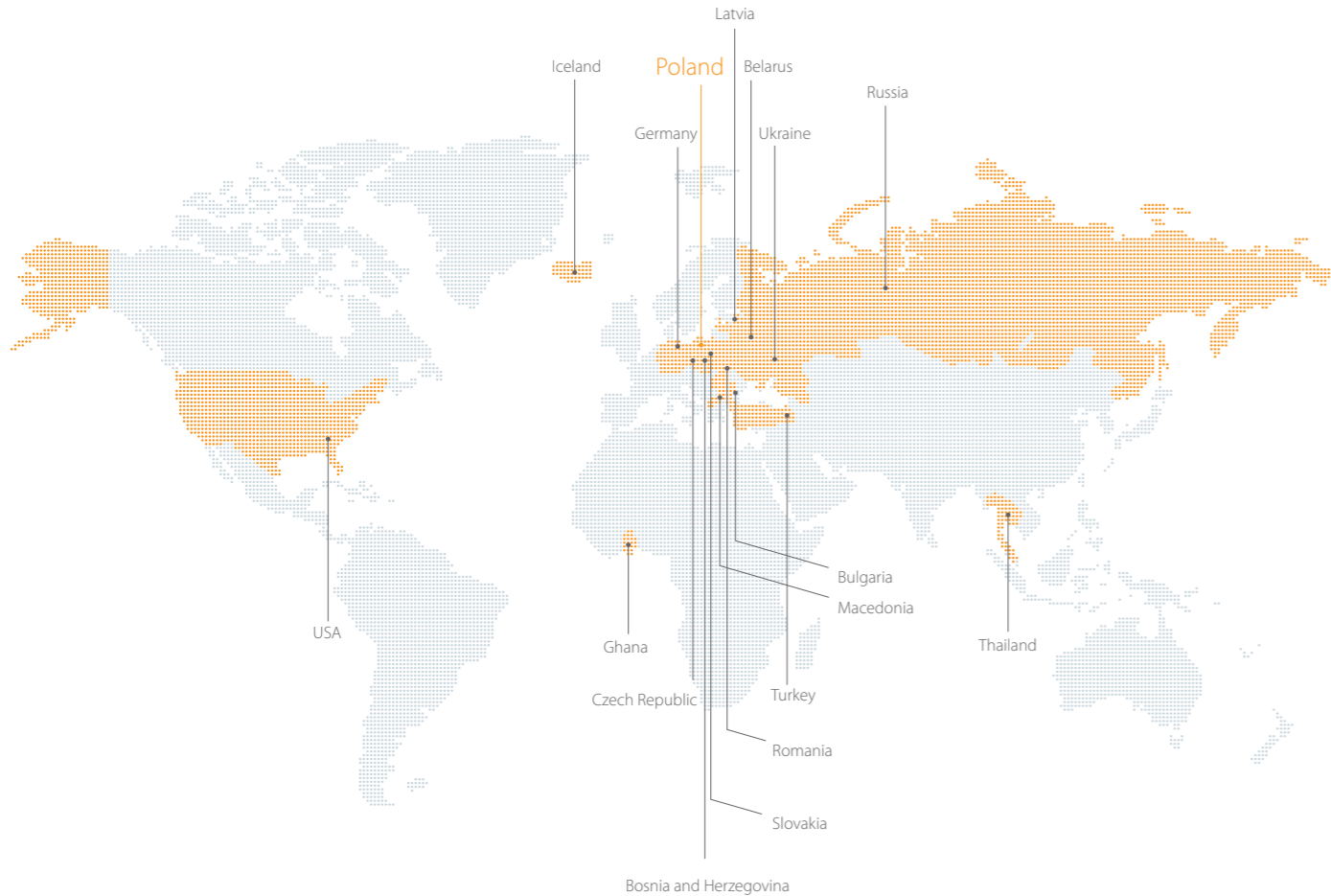
A certified quality management system and environmental management system has proven to be very useful. Those two integrated systems help our employees to be

aware of their roles in reaching quality and environmental goals.

Our specialists know that in the end, by carrying out their tasks in accordance with procedures applicable to their positions and other internal regulations, we provide our clients with exactly what they expect from us, acting within conditions of reasonable and legal usage with regard to the environment. Our strategic investor is the German company PCC SE, which operates internationally as three divisions: Chemical, Energy and Logistics.



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**PCC Exol SA**  
Sienkiewicza St. 4  
56-120 Brzeg Dolny  
Poland

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