



ROKAnol DB Series

Ethoxylated C12-C15 alcohols
Non-ionic surfactant series

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
PCC CONSUMER PRODUCTS SA	PCC ROKITA SA	PCC INTERMODAL SA	PCC BAKKISILICON HF.	PCC SE
Consumer Products 	Energy 	Logistics 	Silicon 	Holding & Projects 
• Household & industrial Cleaners, Detergents and Personal Care Products	• Energy Production	• Intermodal transport • Road Haulage • Rail Transport	• Microsilica • Silicon Metal	• Portfolio Management • Project Development

ROKAnol DB Series

Chemical description

ROKAnol DB Series are nonionic surfactants of the ethoxylated fatty alcohols type. The product belongs to the ROKAnol DB Series, based on C12-C15 fatty alcohol. Its high surface activity allows it to

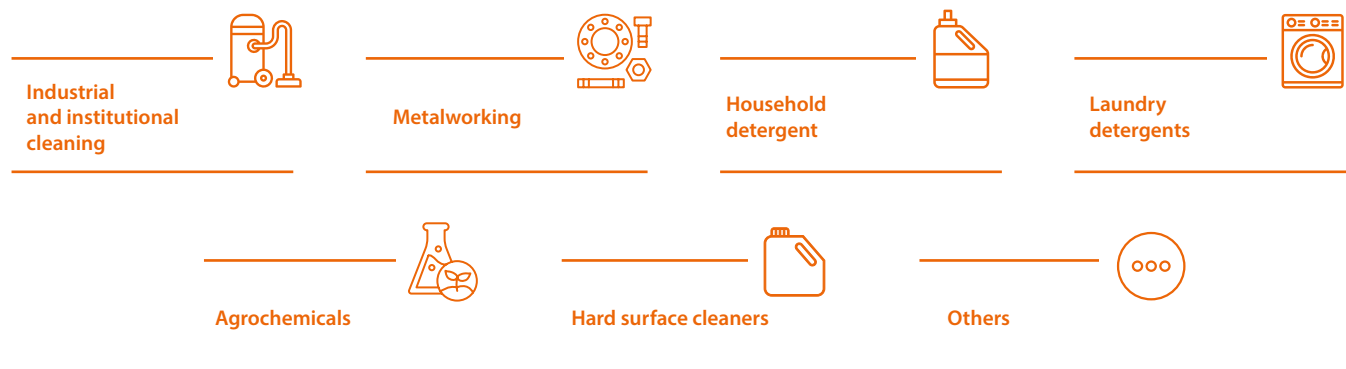
be used as an excellent detergent and a cleaning agent, and opens up the possibility of using it in other branches of industry.



Application

ROKAnol DB Series are especially effective in the cleaning process can successfully become ingredients of household and

professional cleaning agents, detergents as well as an emulsifier in industrial application.



Basic physical and chemical properties

Basic information concerning their physical and chemical properties is summarised in a Table 1.

General characteristic

Product name	ROKAnol DB3	ROKAnol DB5	ROKAnol DB6	ROKAnol DB7	ROKAnol DB7W	ROKAnol DB7R	ROKAnol DB9	ROKAnol DB11W
Appearance	Liquid or paste ^a	Clear or slightly turbid liquid ^a	Liquid ^c	Slightly turbid liquid or paste ^b	Oily liquid ^a	Liquid ^a	Paste ^a	Oily liquid or paste ^a
Average molecular weight [g/mol]	approx. 330	approx. 415	approx. 464	approx. 530	approx. 530	–	approx. 600	approx. 680
Color	max. 70 ^b	max. 50 ^b	max. 60 ^c	max. 70 ^b	max. 70 ^b	max. 70 ^b	max. 100 ^b	max. 50 ^c
Solution pH	4.6 ÷ 7.4 ^a	4.6 ÷ 7.4 ^a	5 ÷ 7 ^b	4.6 ÷ 7.4 ^a	4.6 ÷ 7.4 ^a	5.0 ÷ 7.0 ^a	5.0 ÷ 7.0 ^a	5.0 ÷ 7.0
Cloud point [°C]	–	65 ÷ 72 ^c	76 ÷ 82 ^d	–	48 ÷ 52 ^a	48 ÷ 52 ^a	61 ÷ 69 ^a	60 ÷ 64 ^b
Water content [%]	max. 0.3	max. 0.5	max. 0.5	max. 0.5	7 ÷ 10	max. 0.5	max. 0.5	8 ÷ 12
Solidification point [°C]	approx. 10	approx. 10	approx. 15	approx. 20	approx. 5	approx. 5	approx. 26	approx. 16
Density [g/mL]	approx. 0.93 ^a	approx. 0.957 ^a	approx. 0.96 ^b	approx. 0.97 ^a	approx. 0.099 ^b	approx. 0.97 ^c	approx. 0.98 ^d	approx. 1.02 ^b
Viscosity at 25°C [cP]	–	–	approx. 45	–	–	–	–	–
Hydroxyl number [mg KOH/g]	164 ÷ 172	130 ÷ 140	–	100 ÷ 114	–	–	–	–
HLB	7.8	10.5	11.4	12	12	12	13.2	13.6

Appearance:

a – at 20÷25°C
b – at 25÷30°C
c – at 50°C

Color:

a – Hazen units at 30°C
b – Hazen units at 40°C
c – Hazen units at 50°C

pH according to PN-EN 1262:2004 solution B at 20°C where:

a – pH of a 1% solution
b – pH of a 10% solution

Cloud point according to PN-EN 1890:2000:

a – aqueous solution
b – 100 g/l NaCl solution
c – 45 g butyldiglycol/water solution
d – 25 g butyldiglycol/water solution

Water content was measured according to PN-ISO 760:2001, direct method, solvent – methanol

Density measurements:

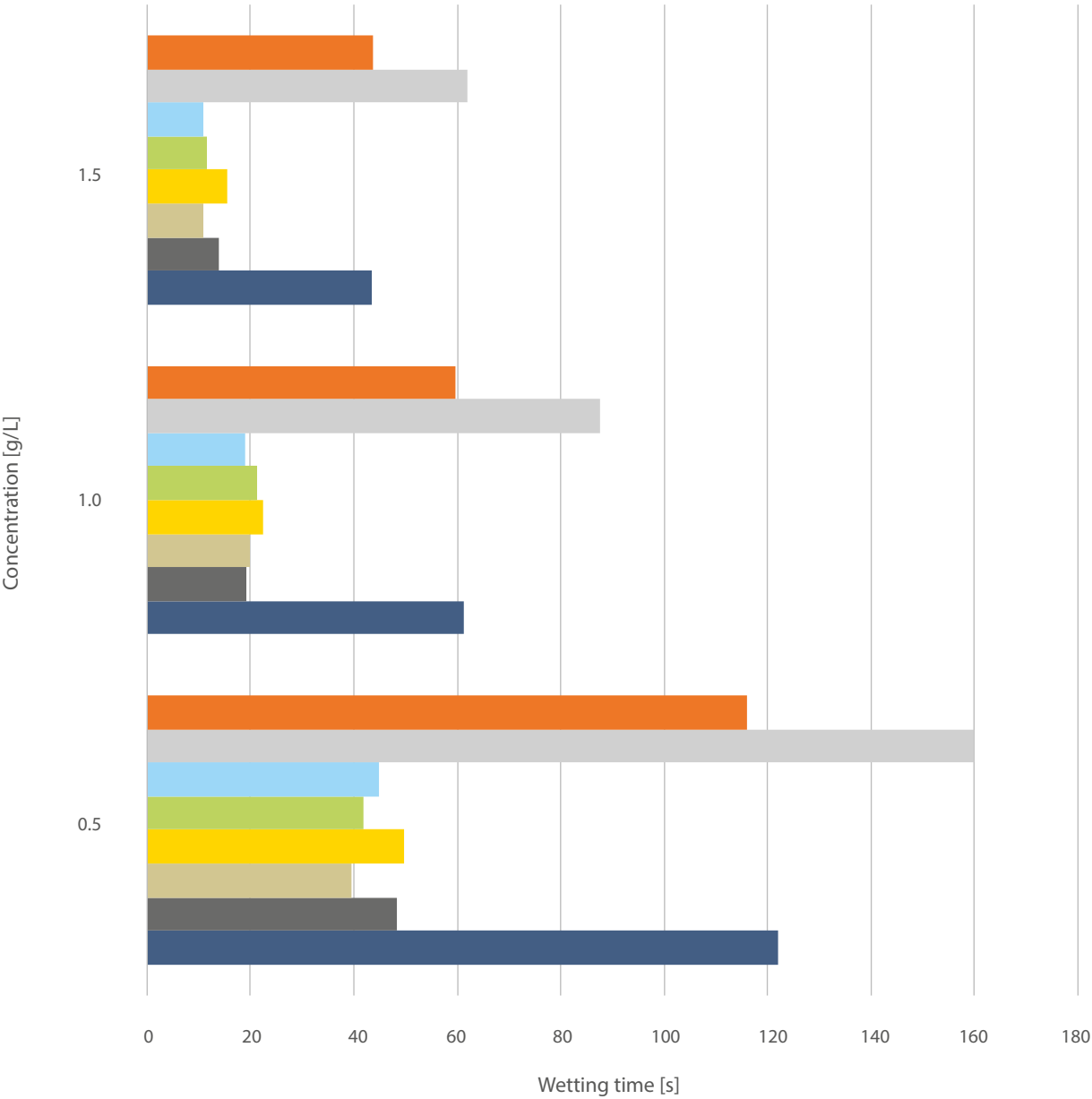
a – at 20°C
b – at 25°C
c – at 40°C
d – at 50°C

HLB was 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.



- ROKAnol DB3

ROKAnol DB5
- ROKAnol DB6

ROKAnol DB7
- ROKAnol DB7W

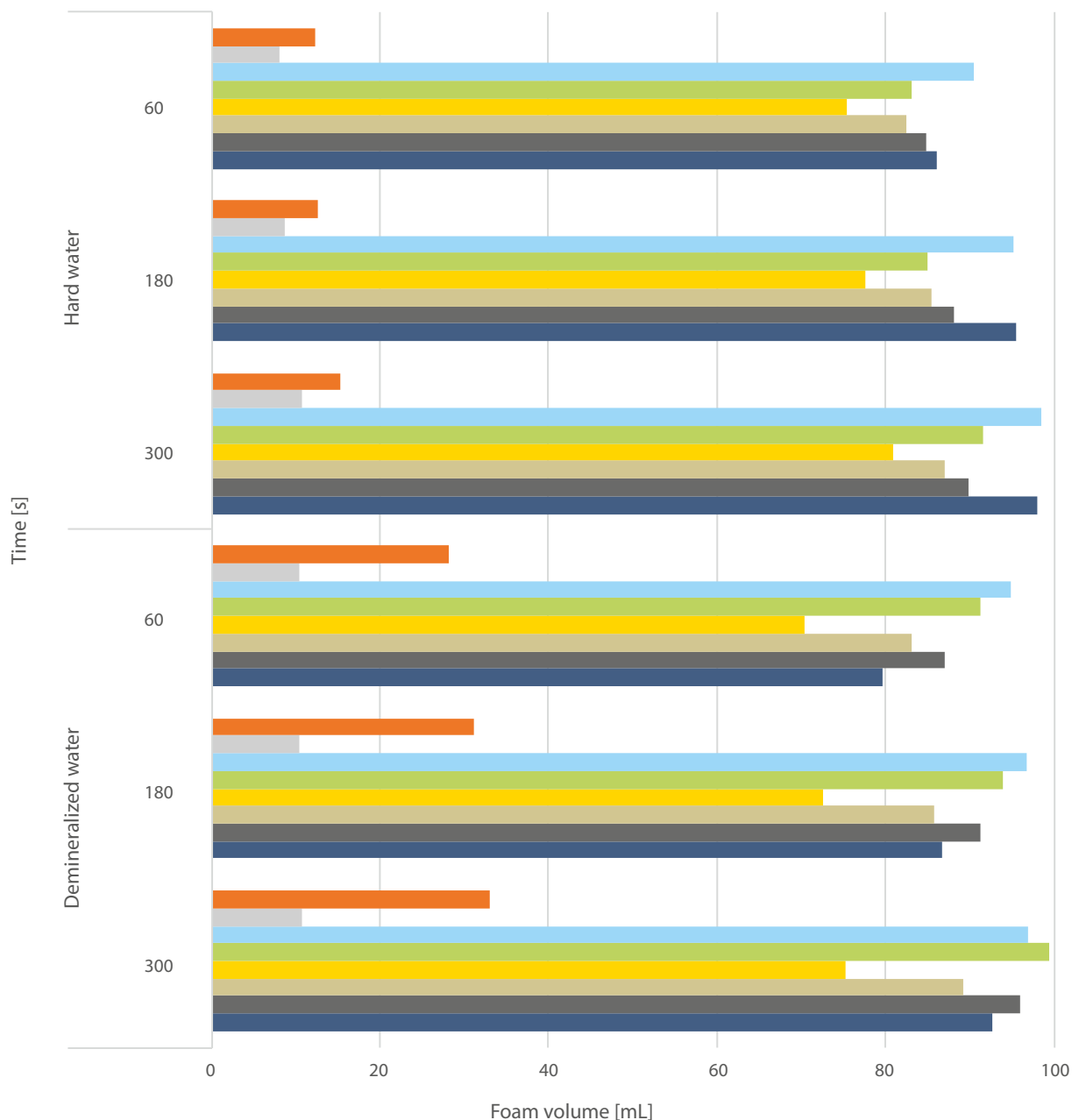
ROKAnol DB7R
- ROKAnol DB9

ROKAnol DB11W

Foaming capability

Determination of the foaming capability was performed on Ross Miles Foam Analyzer according to ASTM D1173 for the ROKAnol DB Series solutions with a concentration of 1.0 g/L in both hard

(17°dH – calcium hardness of 3 Ca²⁺ mmol/L) and demineralized water at a temperature of 25°C.



Stability

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%)

and hydrogen chloride (with purity in the range between 35 and 38%) in ml/L in a stable surfactant solution with a concentration of 1% (as active substance).

Stability in the peroxides environment was measured using hydrogen peroxide at a concentration of 30% in ml/L in a stable surfactant solution with a concentration of 1% (as active substance).

Alkali resistance (SODIUM HYDROXIDE); concentration of 1%; temperature 20°C

Product	NaOH conc. [g/L]											
	10	20	30	40	50	60	70	80	110	120	180	225
ROKAnol DB3	○	○	○	○	○	○	○	○	○	○	○	○
ROKAnol DB5	○	○	○	○	○	○	○	○	○	○	○	○
ROKAnol DB6	●	●	●	●	○	○	○	○	○	○	○	○
ROKAnol DB7	●	●	●	●	●	○	○	○	○	○	○	○
ROKAnol DB7W	●	●	●	●	●	○	○	○	○	○	○	○
ROKAnol DB7R	●	●	●	○	○	○	○	○	○	○	○	○
ROKAnol DB9	●	●	●	●	●	●	○	○	○	○	○	○
ROKAnol DB11W	●	●	●	●	●	●	●	○	○	○	○	○

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

**Acid resistance (SULPHURIC ACID, HYDROGEN CHLORIDE);
concentration of 1%; temperature 20°C**

Product	H ₂ SO ₄ conc. [g/L]											
	10	20	30	40	50	60	70	80	110	120	180	225
ROKAnol DB3	o	o	o	o	o	o	o	o	o	o	o	o
ROKAnol DB5	o	o	o	o	o	o	o	o	o	o	o	o
ROKAnol DB6	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB7	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB7W	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB7R	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB9	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB11W	•	•	•	•	•	•	•	•	•	•	•	•

• homogenous, clear solution • homogeneous, opalescent solution • homogeneous, cloudy solution o macroscopic phase separation



Peroxides resistance (HYDROGEN PEROXIDE); concentration of 1%; temperature 20°C

Product	H ₂ O ₂ conc. [g/L]											
	10	20	30	40	50	60	70	80	110	120	180	225
ROKAnol DB3	o	o	o	o	o	o	o	o	o	o	o	o
ROKAnol DB5	o	o	o	o	o	o	o	o	o	o	o	o
ROKAnol DB6	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB7	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB7W	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB7R	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB9	•	•	•	•	•	•	•	•	•	•	•	•
ROKAnol DB11W	•	•	•	•	•	•	•	•	•	•	•	•

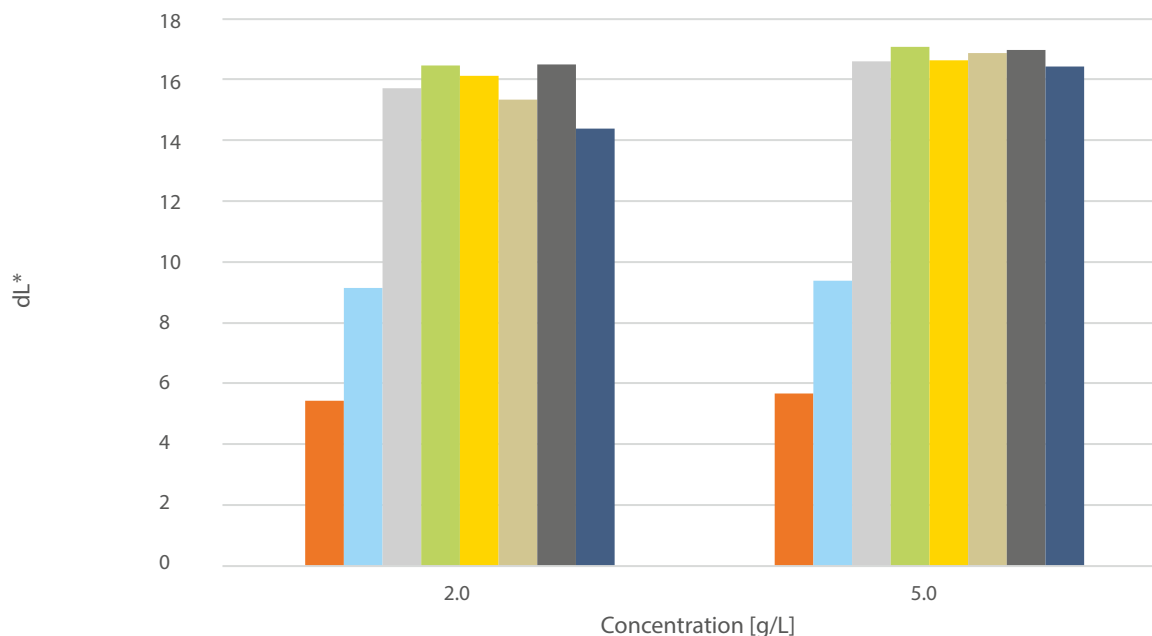
• homogenous, clear solution • homogeneous, opalescent solution • homogeneous, cloudy solution o macroscopic phase separation



Detergency

Detergency is 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 DB series solutions. After drying the fabrics and pressing them, the total color difference of the fabric before and after washing, was measured. The higher the difference is, the better detergency properties are for surfactant.



Solubility

Determination of the solubility of products is carried out by visual evaluation of 1%, 10% and 50% solutions of a given product in a

specified solvent, 24 hours after their preparation. Visually, the appearance of the sample is evaluated according to the following scale:

Result	1	2	3	4
Appearance of the test sample	Homogeneous clear	Homogeneous opalescent	Homogeneous cloudy	Macroscopic phase separation

The results of the samples (1%, 10% and 50%) are added up and on this basis the solubility of the product is determined. The following

table gives the solubility scales according to the sum of the appearance scale results:

Sum	3-6	7-9	10-12
Solubility	Soluble	Partially soluble	Insoluble

Product name	Demineralized water	Methanol	Ethyl ether	Acetone
ROKAnol DB3	•	•	•	•
ROKAnol DB5	•	•	•	•
ROKAnol DB6	•	•	•	•
ROKAnol DB7	•	•	•	•
ROKAnol DB7W	•	•	•	•
ROKAnol DB7R	•	•	•	•
ROKAnol DB9	•	•	•	•
ROKAnol DB11W	•	•	•	•

• Soluble • Partially soluble • Insoluble

Viscosity of stain removal formulation

Test was conducted on the effect of changing the concentration of ROKAnol in the formulation on the viscosity of the final product. Viscosity was tested using an IKA ROTAVISC lo-vi

Complete viscometer, spindle 6.7, temperature 20°C. The results are shown in the graph.

Liquid stain remover

Compound	Brand name	Concentration [%]	Function
C12-16 Laureth-7	ROKAnol L7A	9.0	Breaks down stains
Sodium Dodecylbenzenesulfonate	ABSNa 50	8.0	Removes stains / foaming agent
C12-15 Pareth-3 / C12-15 Pareth-5 / C12-15 Pareth-7	ROKAnol DB3 / ROKAnol DB5 / ROKAnol DB7	1.0 / 2.0 / 3.0	Removes stains / rheology modifier
Hydrogen Peroxide	–	30.0	Bleaching agent
Aqua	–	up to 100.0	Solvent

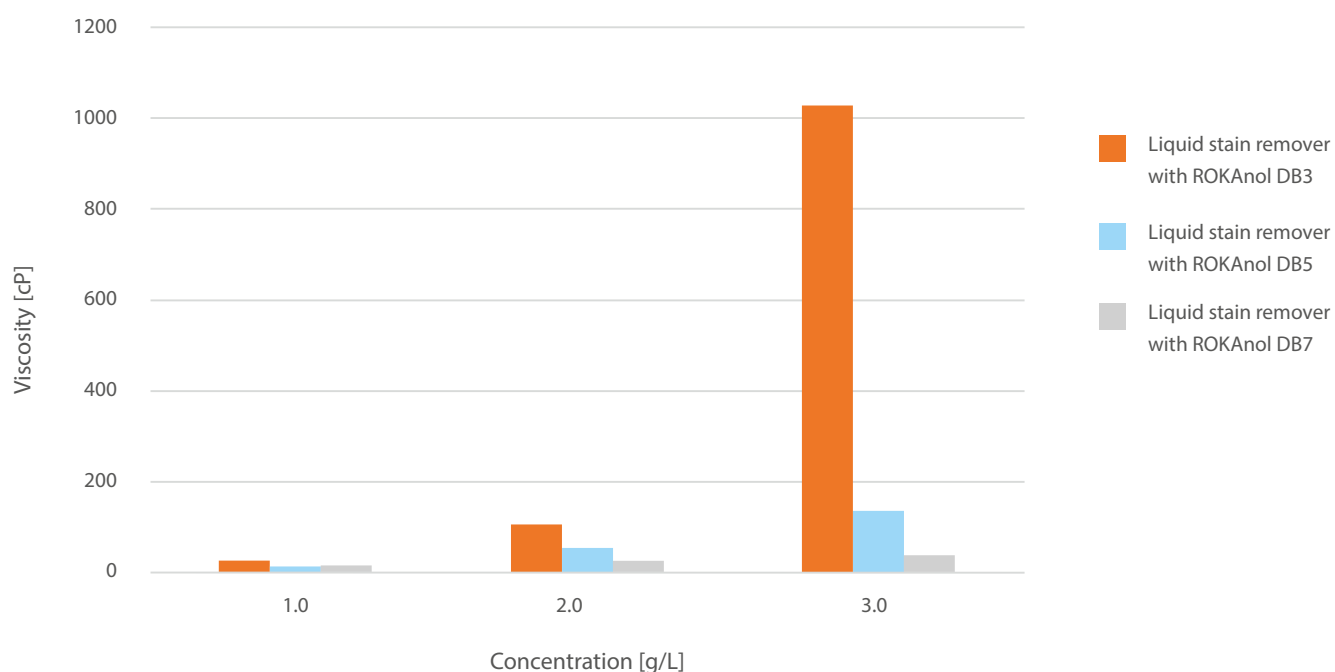
Appearance
pH

visual method

clear liquid
6

Procedure:

1. Mix ABSNa 50 with water.
2. Add ROKAnol L7A and mix until a homogeneous solution is obtained.
3. Add ROKAnol DB3/ ROKAnol DB5/ ROKAnol DB7 and mix.
4. Then add Hydrogen Peroxide and mix.



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