



# ROKAnol ID Series

Ethoxylated fatty alcohols  
Non-ionic surfactant series

Local. Global. Integrated.



Operating in 17 countries, in 39 different locations, PCC SE currently employs over 3 300 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.

PCC EXOL pays special attention to the issue of sustainable development, which is one of the key elements of the company's strategy. In order to strengthen its competitive position in the surfactants market, the company is committed to promoting responsible production and consumption throughout the value chain. The concept of sustainable development is therefore a key aspect of all the company's management and operational processes.

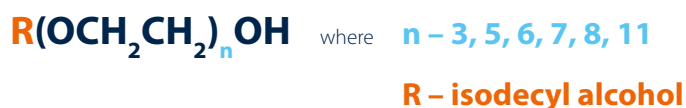
<b>PCC ROKITA SA</b> <b>PCC PCG</b> <b>OXYALKYLATES</b> <b>IRPC</b>	<b>PCC</b> <b>ROKITA SA</b>	<b>PCC</b> <b>ROKITA SA</b>	<b>PCC EXOL SA</b> <b>PCC CHEMAX INC</b> <b>PCC PCG OXYALKYLATES</b>	<b>PCC</b> <b>SYNTEZA</b>
<b>Polyols</b> 	<b>Chlorine</b> 	<b>Phosphorus</b> 	<b>Surfactants</b> 	<b>Alkylphenols</b> 
<ul style="list-style-type: none"> <li>• Polyether polyols</li> <li>• Polyester polyols</li> <li>• Prepolymers</li> <li>• Polyurethane Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Chlorine</li> <li>• MCAA</li> <li>• Other Chlorine Downstream Product</li> </ul>	<ul style="list-style-type: none"> <li>• Phosphorus derivatives</li> <li>• Naphthalene derivatives</li> <li>• Polycarboxyethers (PCE)</li> </ul>	<ul style="list-style-type: none"> <li>• Anionic surfactants</li> <li>• Cationic surfactants</li> <li>• Nonionic surfactants</li> <li>• Amphoteric surfactants (betaines)</li> <li>• Chemical formulation</li> </ul>	<ul style="list-style-type: none"> <li>• Nonylphenol</li> <li>• Dodecylphenol</li> <li>• Tristyrylphenol</li> </ul>
<b>PCC CONSUMER PRODUCTS SA</b>	<b>PCC</b> <b>ROKITA SA</b>	<b>PCC</b> <b>INTERMODAL SA</b>	<b>PCC</b> <b>BAKKISILICON HF.</b>	<b>PCC</b> <b>SE</b>
<b>Consumer Products</b> 	<b>Energy</b> 	<b>Logistics</b> 	<b>Silicon</b> 	<b>Holding &amp; Projects</b> 
<ul style="list-style-type: none"> <li>• Household &amp; industrial Cleaners, Detergents and Personal Care Products</li> </ul>	<ul style="list-style-type: none"> <li>• Renewable Energy</li> <li>• Conventional Energy</li> </ul>	<ul style="list-style-type: none"> <li>• Intermodal transport</li> <li>• Road Haulage</li> <li>• Rail Transport</li> </ul>	<ul style="list-style-type: none"> <li>• Microsilica</li> <li>• Silicon Metal</li> </ul>	<ul style="list-style-type: none"> <li>• Portfolio Management</li> <li>• Project Development</li> </ul>

## ROKAnol ID Series

### Chemical description

ROKAnol ID Series are non-ionic surfactants which belong to ethoxylate fatty alcohols. The line of ROKAnols ID based on isodecyl alcohol. The series' detergent and dispersing ability is so distinct that the products are successfully used as components of households

cleaning agents, as well as in industrial and institutional applications. The chemical structure of the Rokanol ID series is represented by the following formula:



### Application

Non-ionic surfactants - Rokanol ID Series are very useful in many different applications. They are especially suitable for:





## Basic physical and chemical properties

Depending on the ethoxylation degree, the appearance of the Rokanol ID 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.

ROKAnol	ID3	ID5	ID5W	ID6	ID6W	ID7	ID7W	ID8	ID11
Approx. molecular weight [g/mol]	290	375	375	410	410	465	465	510	640
Appearance at 20-25 °C	liquid with a tendency to separation in time	clear or slightly turbid liquid	colourless liquid	liquid	clear liquid	clear or turbid liquid	clear liquid	clear or turbid liquid	paste
Hazen colour at 40°C	max. 50	max. 50	max. 150 (at 25°C)	max. 50	max. 50	max. 50	max. 50	max. 50	max. 100
Cloud point [°C]									
Method A 1% in water solution	<10	28-32	31-35	<b>36-40</b>	<b>35-40</b>	<b>59-62</b>	<b>58-62</b>	<b>64-68</b>	89-93
Method B 1% solution in 5% NaCl solution	<10	17-21	31-35	22-26	24-28	43-47	43-47	47-51	72-76
Method C 1% solution in 10% NaCl solution	<10	12-16	15-19	15-19	15-19	33-37	32-36	36-40	<b>61-65</b>
Method D 10% solution in 25% BDG solution	58-62	69-73	71-75	70-74	73-77	76-80	77-81	78-82	84-88
Method E 16.7% solution in 25% BDG solution	<b>51-55</b>	<b>66-69</b>	67-71	66-70	68-72	70-74	69-73	73-77	83-87
Approx. solidification point [°C]	-16	3	-20	0	below -20	6	below -20	7	18
Water content [% by weight]	<b>max. 0.5</b>	<b>max. 0.5</b>	<b>9-11</b>	<b>max. 1</b>	<b>9-11</b>	<b>max. 0.5</b>	<b>14-16</b>	<b>max. 0.5</b>	<b>max. 0.2</b>
pH in 1% solution at 20°C	<b>5-8</b>	<b>5.0-7.0</b>	<b>4.5-7.5</b>	<b>5.0-7.0</b>	<b>5-7</b>	<b>5.0-7.0</b>	<b>5-7</b>	<b>5.0-7.0</b>	<b>5-7</b>
Approx. density at 25°C [g/cm <sup>3</sup> ]	0.95	0.98	0.99	0.98 (at 50°C)	1.00 (at 20°C)	1.01	1.01	1.02	1.01 (at 40°C)
Approx. viscosity at 20°C [cP]	30	50	65	50	65	60	65	70	42 (at 40°C)
Average degree of ethoxylation [mol EO]	3	5	5	6	6	7	7	8	11
Surface tension of 0.1% solution at 25°C [mN/m]	26	26	27	26	27	27	27	28	33

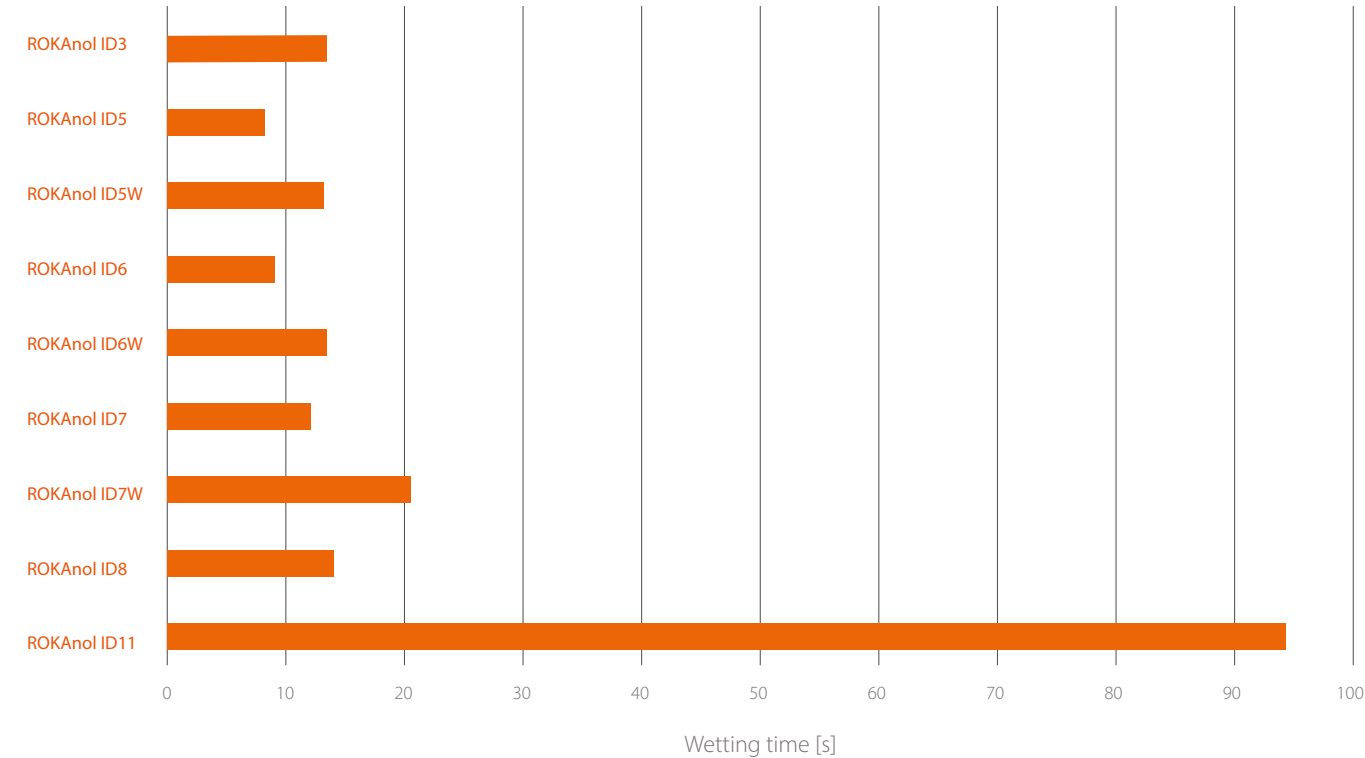
\*Bolted parameters are guaranteed technical requirements

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 ROKAnol ID series solutions with a concentration of 1.0 g/l in demineralised water at a temperature of 20°C.

Wetting capability, concentration of 1.0 g/l in demineralised water, temperature 20°C

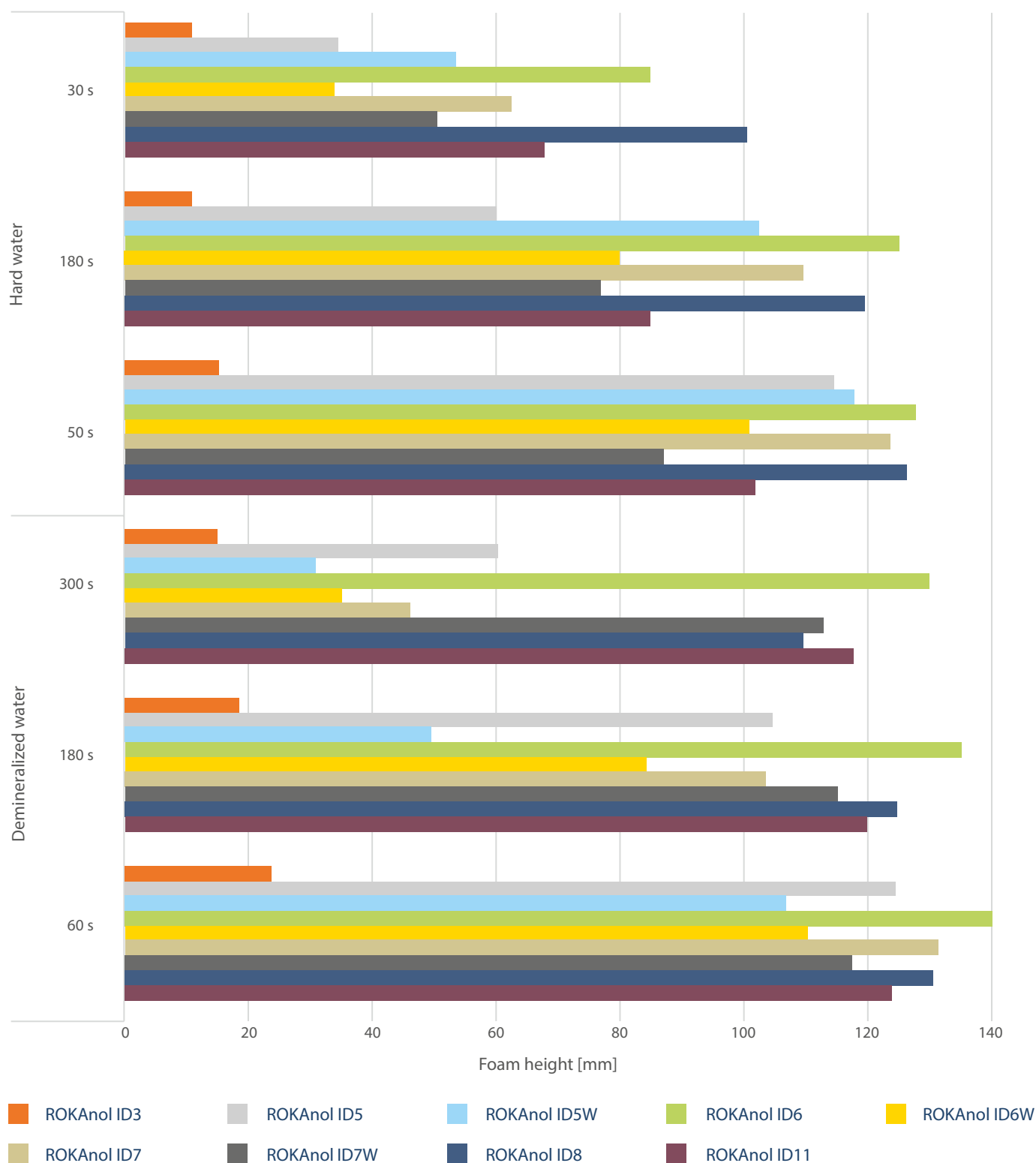


## Foaming capability

Determination of the foaming capability was performed on Ross Miles Foam Analyzer according to ASTM D1173 for the ROKAnol ID Series solutions with a concentration of 1.0 g/l in both hard (17°d -

calcium hardness of 3 Ca<sup>2+</sup> mmol/l) and demineralised water at a temperature of 25°C.

### Foaming capability, concentration of 1.0 g/l, 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 hydrochloric acid or 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).

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

Product	NaOH Concentration [g/L]													
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
ROKAnol ID3	o													
ROKAnol ID5	•	•	•	•	•	•	•	o						
ROKAnol ID5W	•	•	•	•	•	o								
ROKAnol ID6	•	•	•	o										
ROKAnol ID6W	•	•	•	•	•	•	o							
ROKAnol ID7	•	•	•	•	•	o								
ROKAnol ID7W	•	•	•	•	•	•	•	•	o					
ROKAnol ID8	•	•	•	•	•	•	o							
ROKAnol ID11	•	•	•	•	•	•	•	•	•	•	•	•	•	o

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





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

Product	H <sub>2</sub> SO <sub>4</sub> concentration [g/l]					
	1	5	20	40	140	225
ROKAnol ID3	●	●	●	●	●	●
ROKAnol ID5	●	●	●	●	●	●
ROKAnol ID5W	●	●	●	●	●	●
ROKAnol ID6	●	●	●	●	●	●
ROKAnol ID6W	●	●	●	●	●	●
ROKAnol ID7	●	●	●	●	●	●
ROKAnol ID7W	●	●	●	●	●	●
ROKAnol ID8	●	●	●	●	●	●
ROKAnol ID11	●	●	●	●	●	●

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

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

Product	HCl concentration [g/l]					
	1	5	20	40	140	225
ROKAnol ID3	○					
ROKAnol ID5	●	●	●	●	●	●
ROKAnol ID5W	●	●	●	●	●	●
ROKAnol ID6	●	●	●	●	●	●
ROKAnol ID6W	●	●	●	●	●	●
ROKAnol ID7	●	●	●	●	●	●
ROKAnol ID7W	●	●	●	●	●	●
ROKAnol ID8	●	●	●	●	●	●
ROKAnol ID11	●	●	●	●	●	●

● clear, homogenous solution   ● homogenous, opalescent solution   ● homogenous, cloudy solution   ○ 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 ID 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.

### Detergency on EMPA 125 fabric (cotton)



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:

$$dL^* = L^*T - L^*S$$

where:

T – tested sample (fabric after the detergency test),

S – standard to which the tested sample is compared (fabric before the detergency test).

The higher the  $dL^*$  value, the better the detergent effectiveness.

## 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	Appearance of the test sample
1	Homogeneous clear
2	Homogeneous opalescent
3	Homogeneous cloudy
4	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	Solubility
3 – 6	Soluble
7 – 9	Partially soluble
10 – 12	Insoluble

Product	Demineralized water	Methanol	Ethyl ether	Acetone
ROKAnol ID3	Insoluble	Soluble	Soluble	Soluble
ROKAnol ID5	Soluble	Soluble	Insoluble	Soluble
ROKAnol ID5W	Soluble	Soluble	Partially soluble	Soluble
ROKAnol ID6	Soluble	Soluble	Partially soluble	Soluble
ROKAnol ID6W	Soluble	Soluble	Insoluble	Soluble
ROKAnol ID7	Soluble	Soluble	Partially soluble	Soluble
ROKAnol ID7W	Soluble	Soluble	Soluble	Soluble
ROKAnol ID8	Soluble	Soluble	Partially soluble	Soluble
ROKAnol ID11	Soluble	Soluble	Insoluble	Soluble





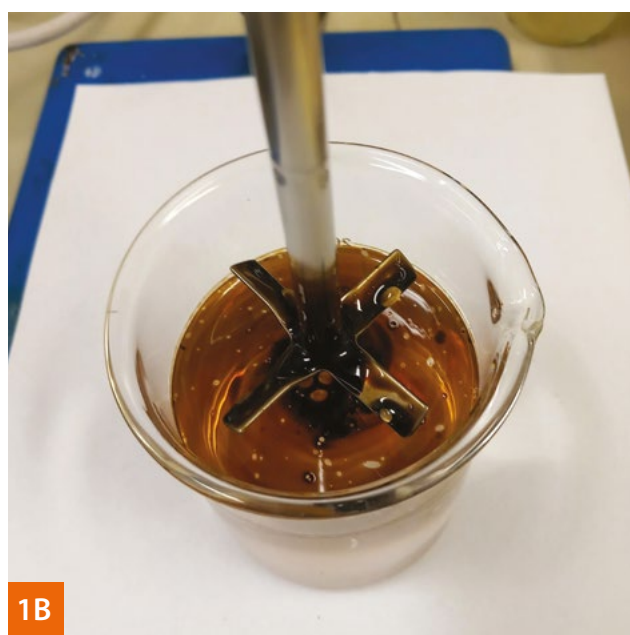
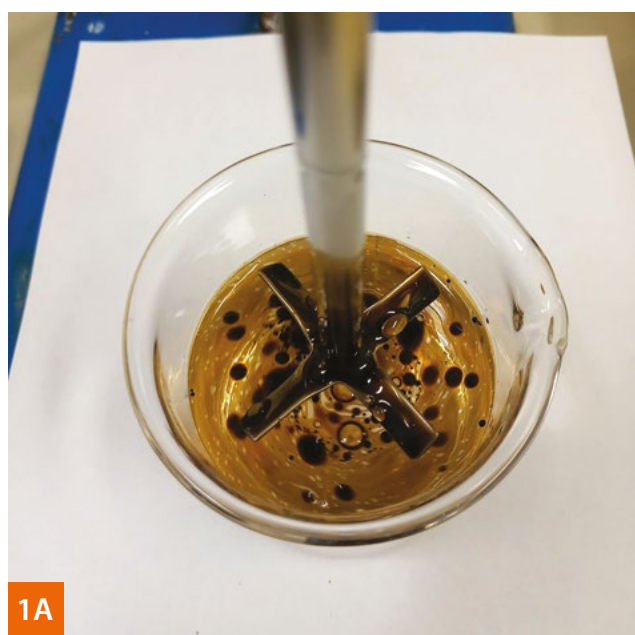


## Degreasing capability, dynamic method

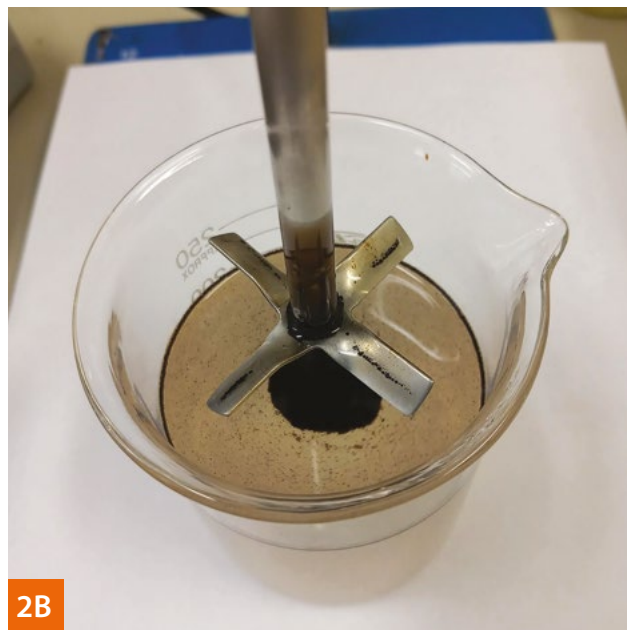
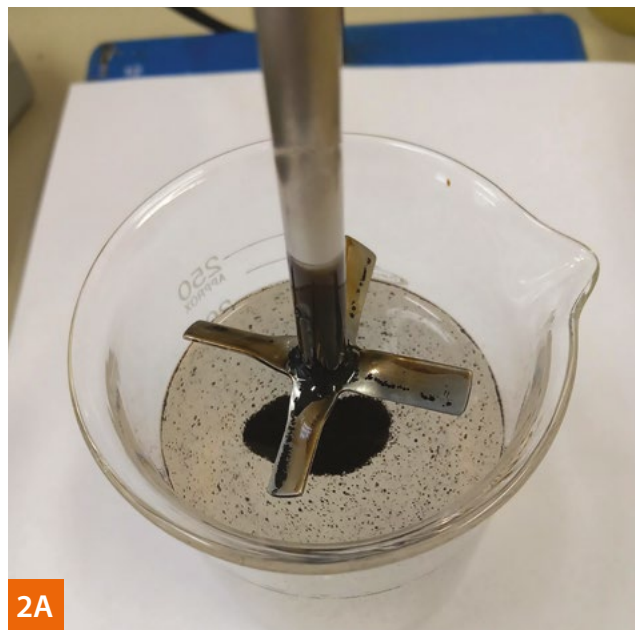
The propeller stirrer was immersed in used oil for 5 minutes at 20°C and then placed in the beakers containing the 2 g/l and 5 g/l solutions of ROKAnol ID series. Subsequently, the engine was set at

200 RPM and after 2 and 5 min the stirrer was taken out of the solution. The degree of soiling was assessed by visually. This test was available for all products ROKAnol ID series.

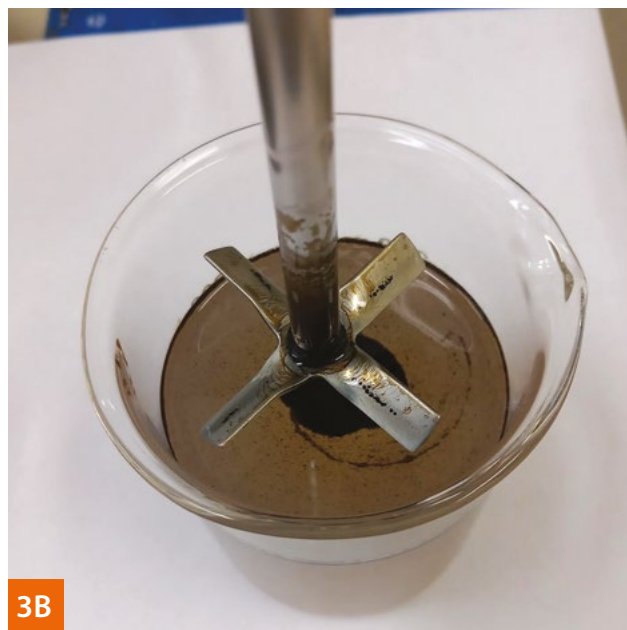
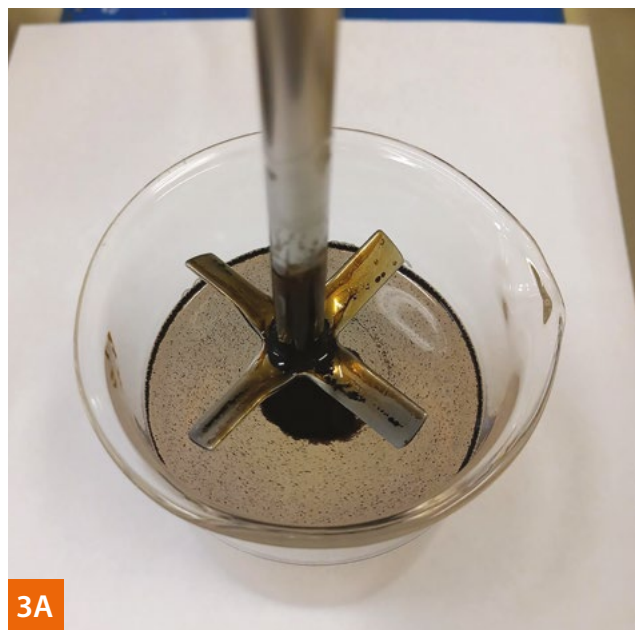
## Demineralized water



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

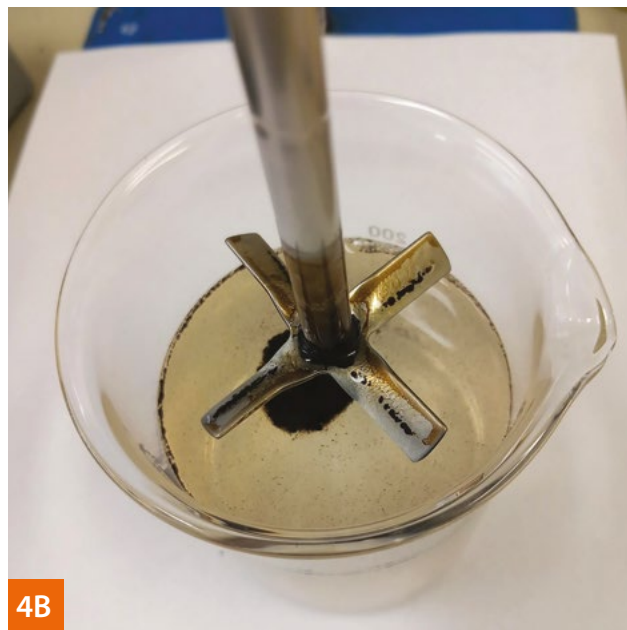
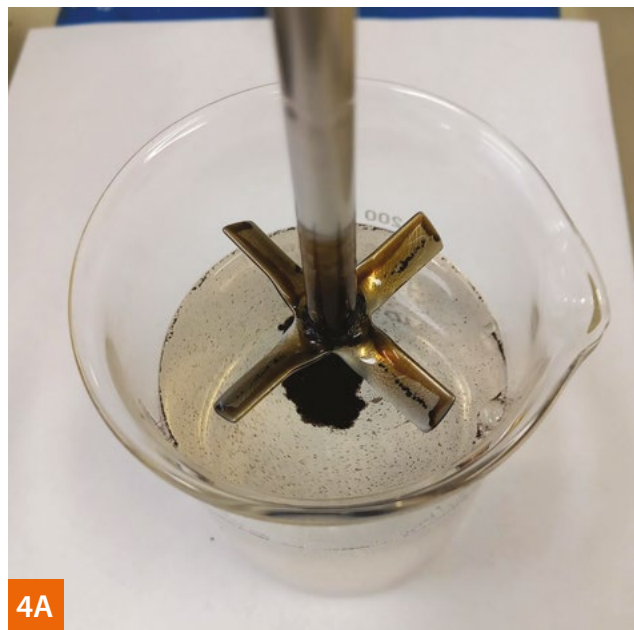
**ROKAnol ID3, concentration of 2.0 g/l**

Pic. 2A/2B Degreasing capability. Dynamic test, ROKAnol ID3 (concentration of 2.0 g/l) after 2 min and 5 min

**ROKAnol ID3, concentration of 5.0 g/l**

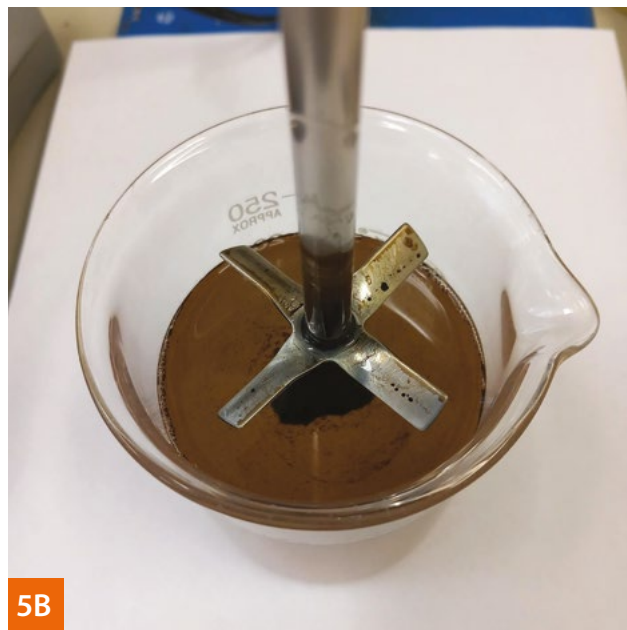
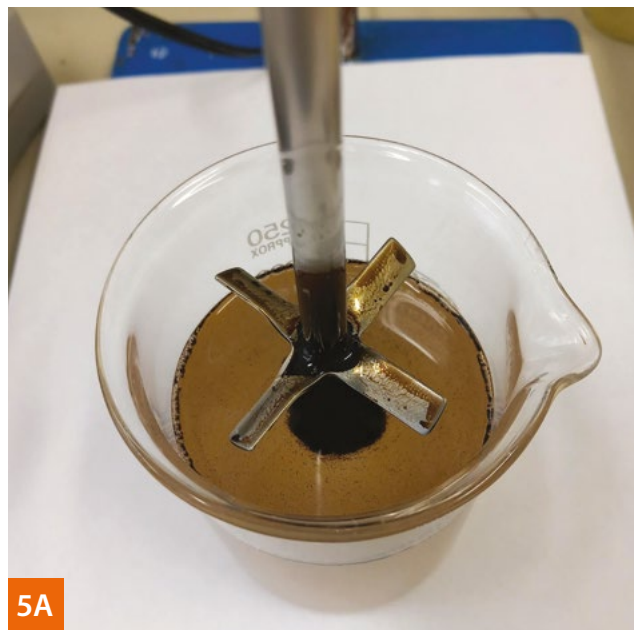
Pic. 3A/3B Degreasing capability. Dynamic test, ROKAnol ID3 (concentration of 5.0 g/l) after 2 min and 5 min

### ROKAnol ID5, concentration of 2.0 g/l



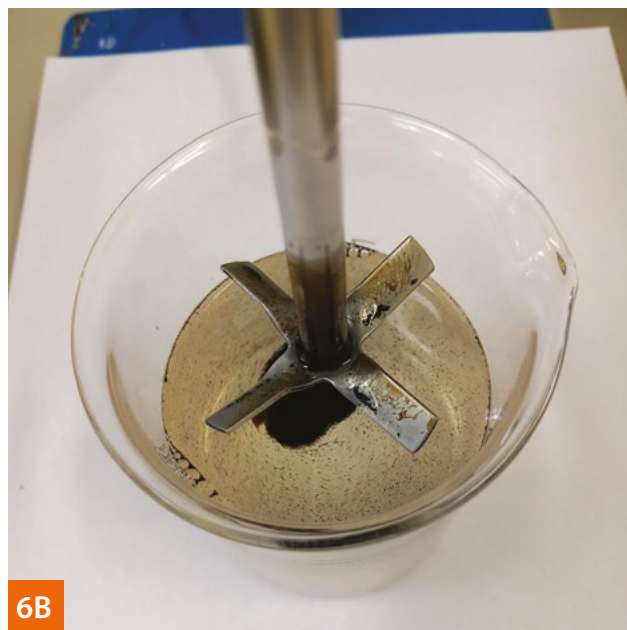
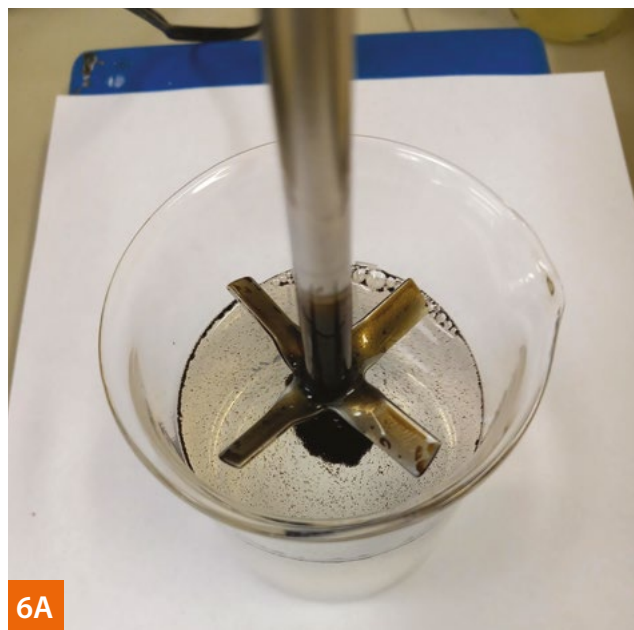
Pic. 4A/4B Degreasing capability. Dynamic test, ROKAnol ID5 (concentration of 2.0 g/l) after 2 min and 5 min

### ROKAnol ID5, concentration of 5.0 g/l

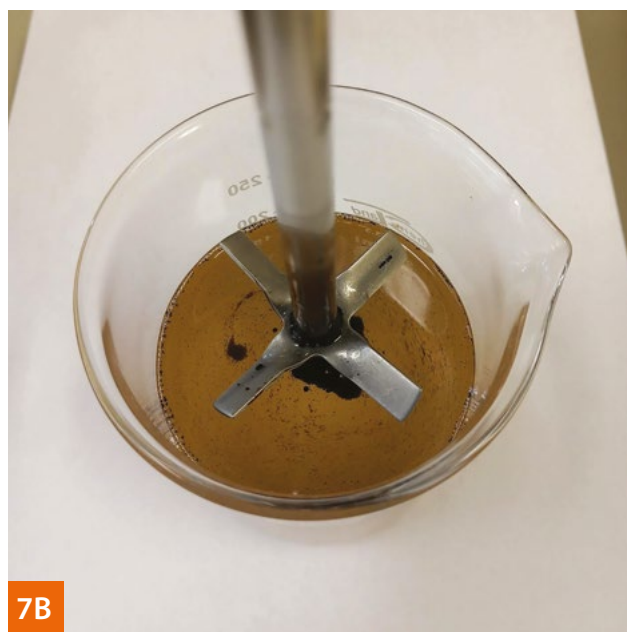


Pic. 5A/5B Degreasing capability. Dynamic test, ROKAnol ID5 (concentration of 5.0 g/l) after 2 min and 5 min



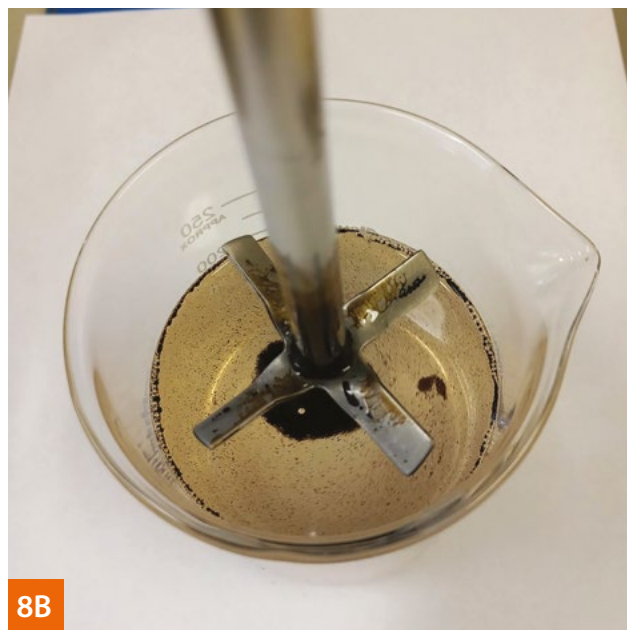
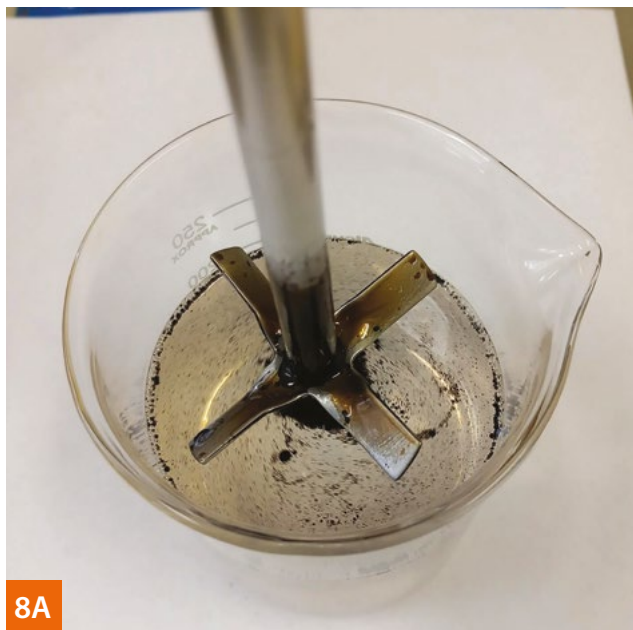
**ROKAnol ID5W, concentration of 2.0 g/l**

Pic. 6A/5B Degreasing capability. Dynamic test, ROKAnol ID5W (concentration of 2.0 g/l) after 2 min and 5 min

**ROKAnol ID5W, concentration of 5.0 g/l**

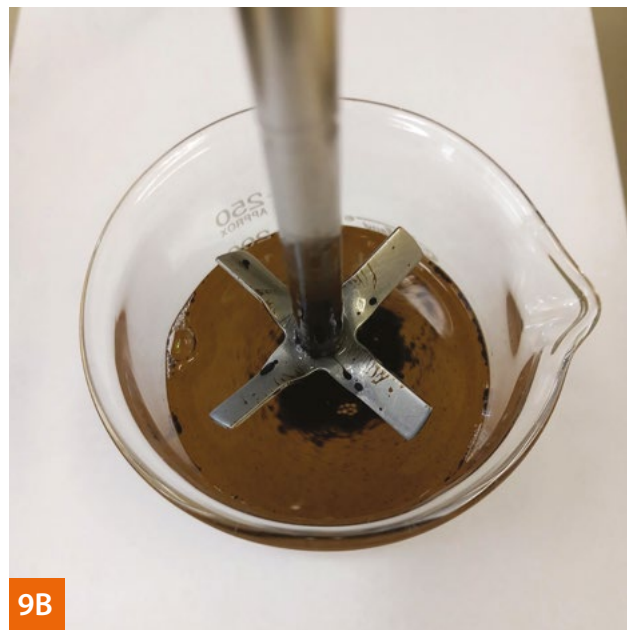
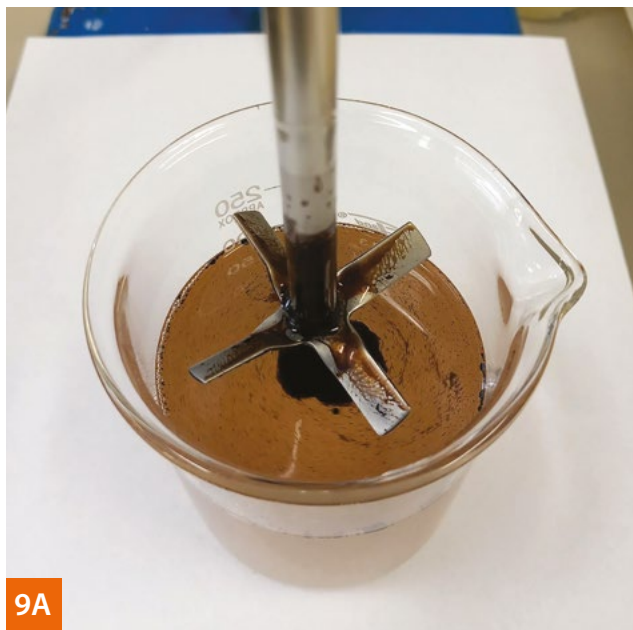
Pic. 7A/7B Degreasing capability. Dynamic test, ROKAnol ID5W (concentration of 5.0 g/l) after 2 min and 5 min

### ROKAnol ID6, concentration of 2.0 g/l

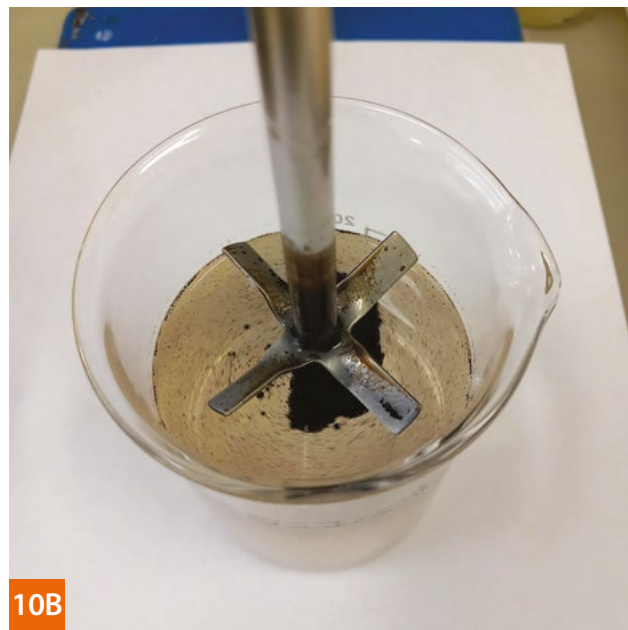
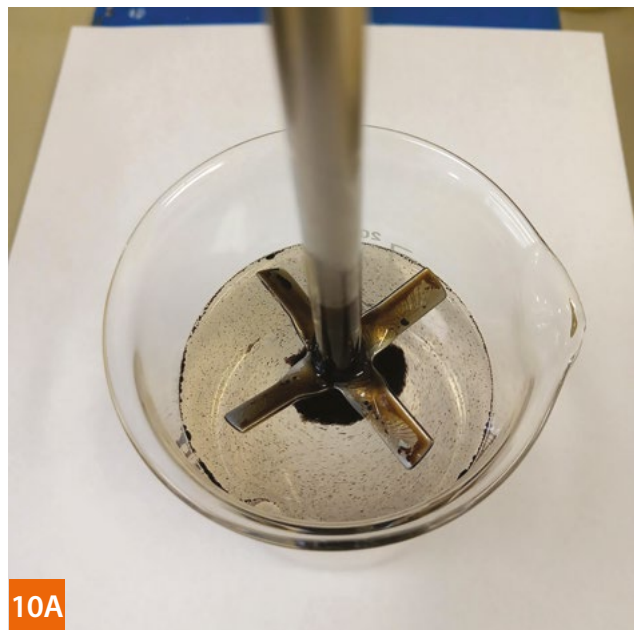


Pic. 8A/8B Degreasing capability. Dynamic test, ROKAnol ID6 (concentration of 2.0 g/l) after 2 min and 5 min

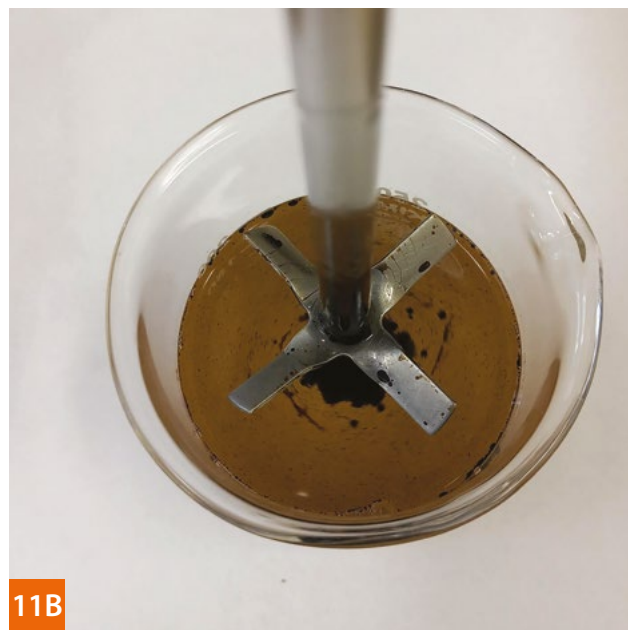
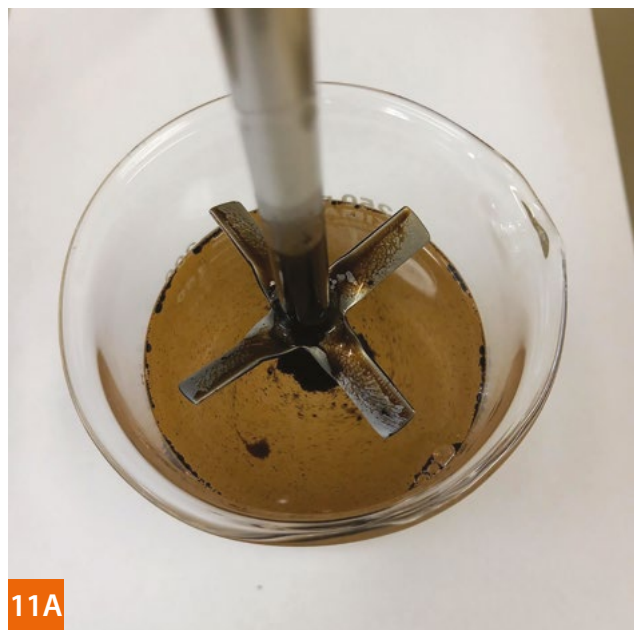
### ROKAnol ID6, concentration of 5.0 g/l



Pic. 9A/9B Degreasing capability. Dynamic test, ROKAnol ID6 (concentration of 5.0 g/l) after 2 min and 5 min

**ROKAnol ID6W, concentration of 2.0 g/l**

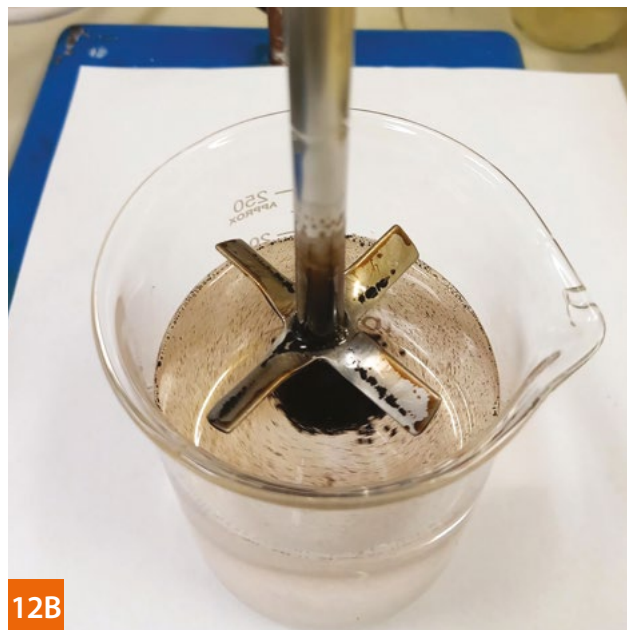
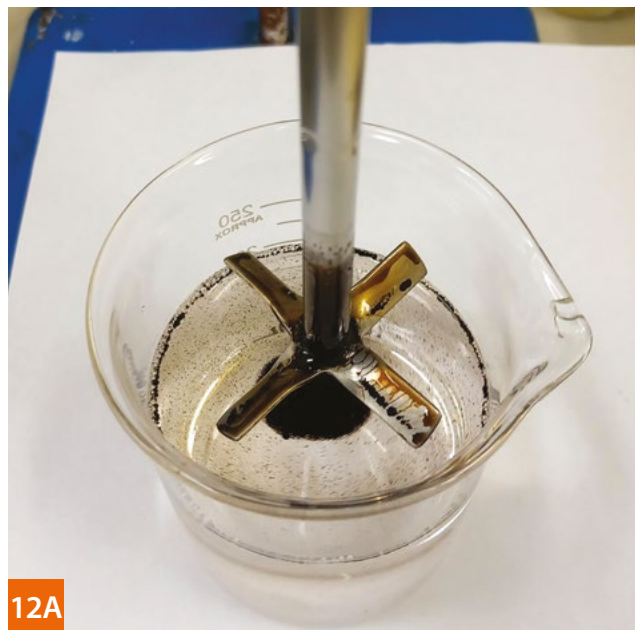
Pic. 10A/10B Degreasing capability. Dynamic test, ROKAnol ID6W (concentration of 2.0 g/l) after 2 min and 5 min

**ROKAnol ID6W, concentration of 5.0 g/l**

Pic. 11A/11B Degreasing capability. Dynamic test, ROKAnol ID6W (concentration of 5.0 g/l) after 2 min and 5 min

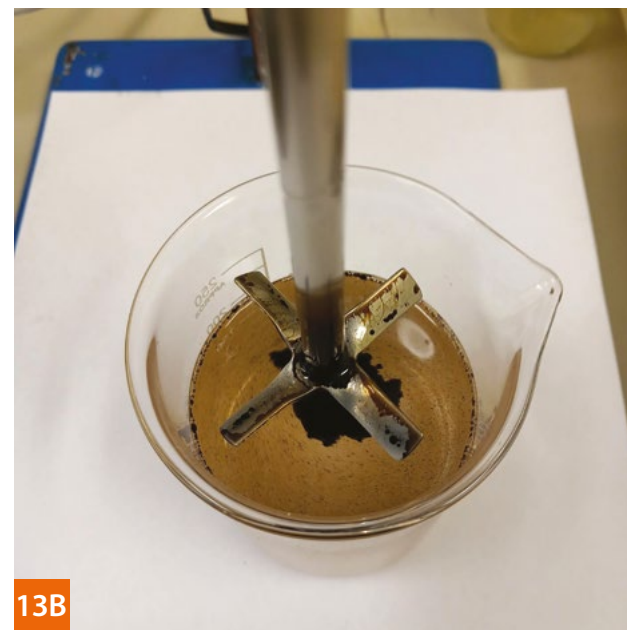
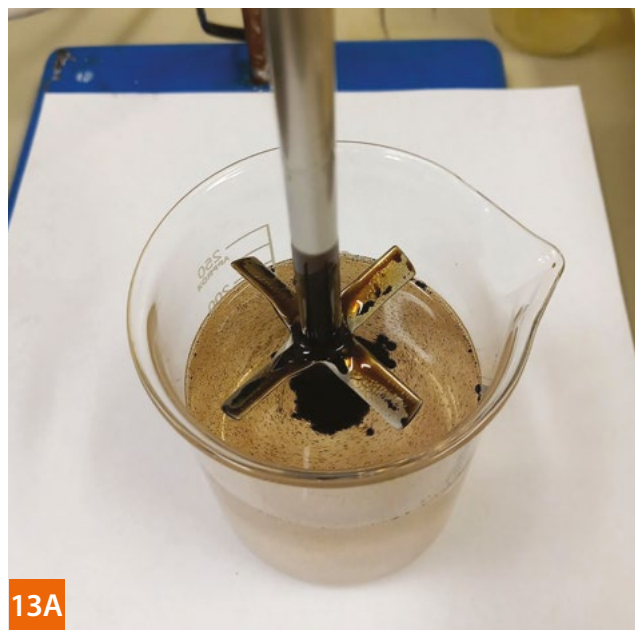


### ROKAnol ID7, concentration of 2.0 g/l

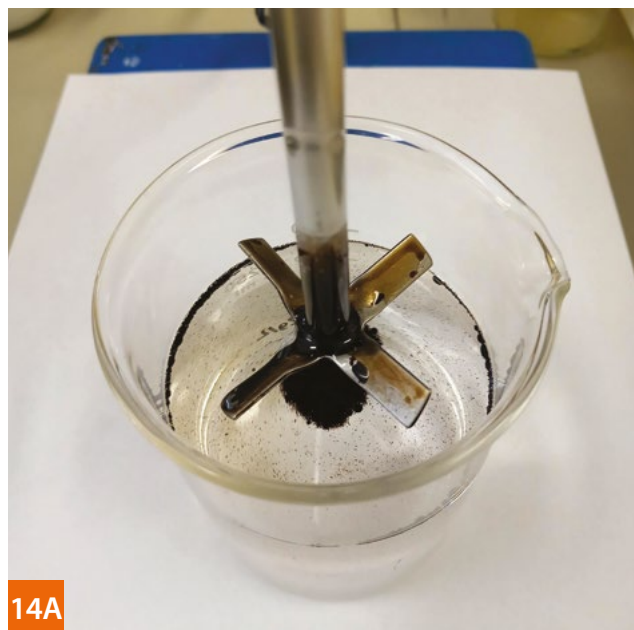


Pic. 12A/12B Degreasing capability. Dynamic test, ROKAnol ID7 (concentration of 2.0 g/l) after 2 min and 5 min

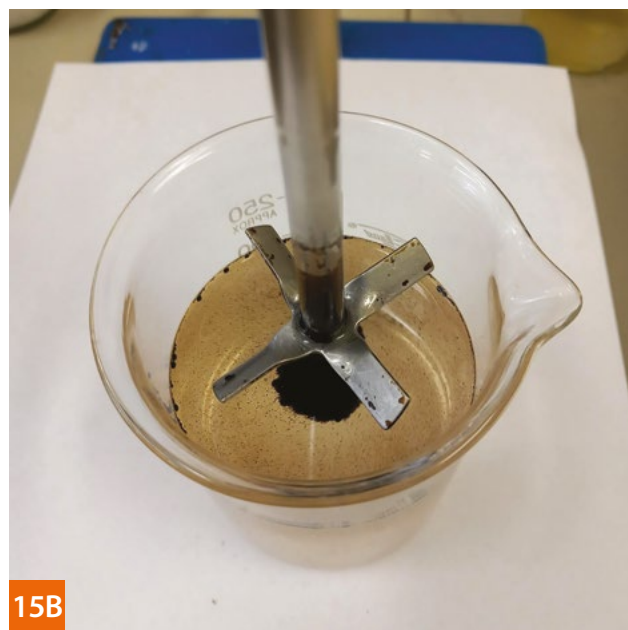
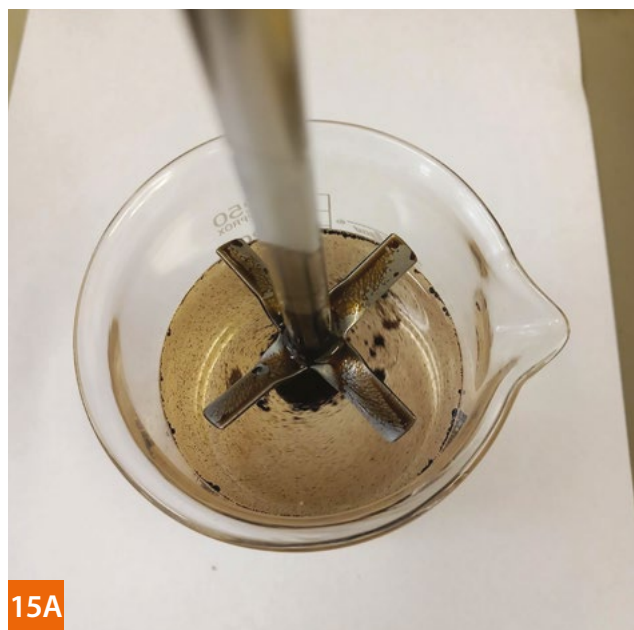
### ROKAnol ID7, concentration of 5.0 g/l



Pic. 13A/13B Degreasing capability. Dynamic test, ROKAnol ID7 (concentration of 5.0 g/l) after 2 min and 5 min

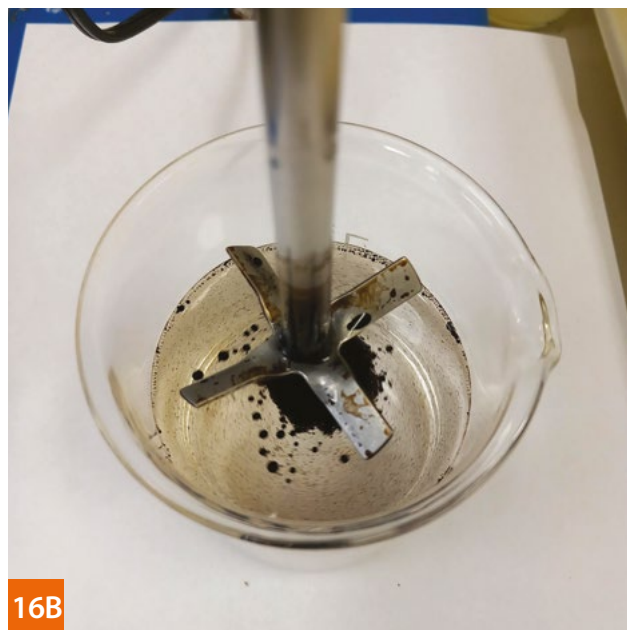
**ROKAnol ID7W, concentration of 2.0 g/l**

Pic. 14A/14B Degreasing capability. Dynamic test, ROKAnol ID7W (concentration of 2.0 g/l) after 2 min and 5 min

**ROKAnol ID7W, concentration of 5.0 g/l**

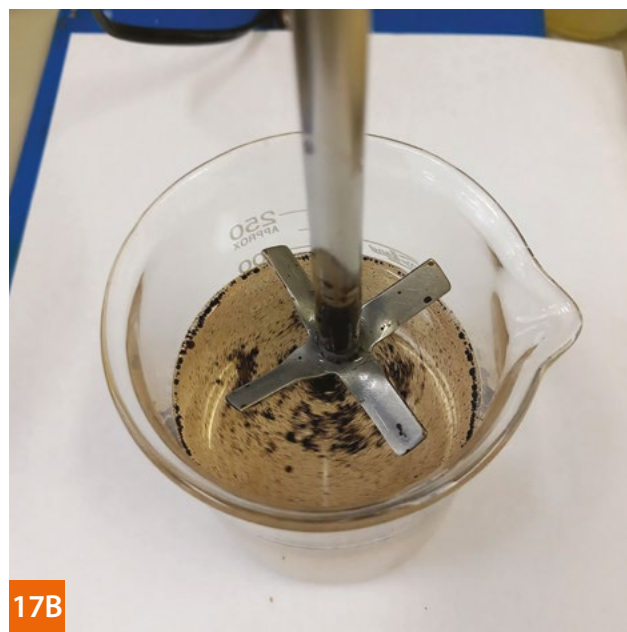
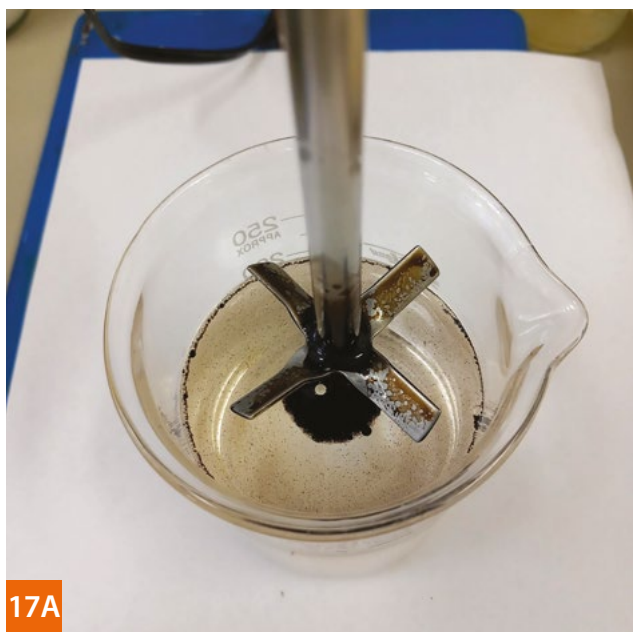
Pic. 15A/15B Degreasing capability. Dynamic test, ROKAnol ID7W (concentration of 5.0 g/l) after 2 min and 5 min

### ROKAnol ID8, concentration of 2.0 g/l



Pic. 16A/16B Degreasing capability. Dynamic test, ROKAnol ID8 (concentration of 2.0 g/l) after 2 min and 5 min

### ROKAnol ID8, concentration of 5.0 g/l



Pic. 17A/17B Degreasing capability. Dynamic test, ROKAnol ID8 (concentration of 5.0 g/l) after 2 min and 5 min



**ROKAnol ID11, concentration of 2.0 g/l**

Pic. 18A/18B Degreasing capability. Dynamic test, ROKAnol ID11 (concentration of 2.0 g/l) after 2 min and 5 min

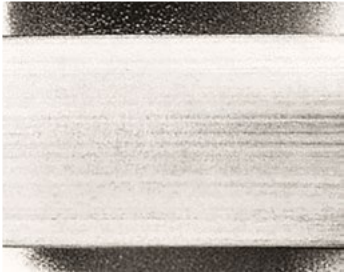

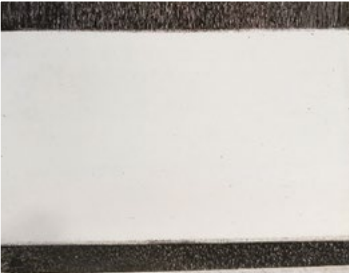
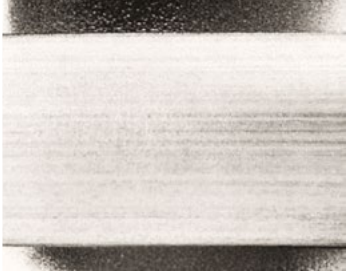





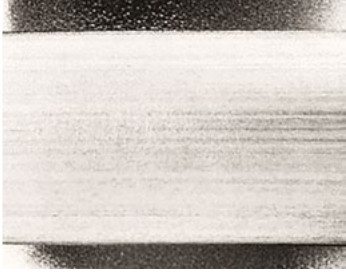


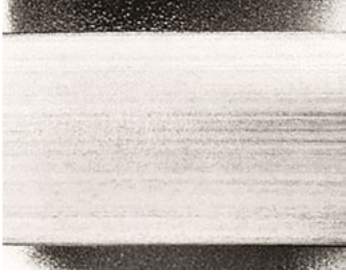


**ROKAnol ID11, concentration of 5.0 g/l**

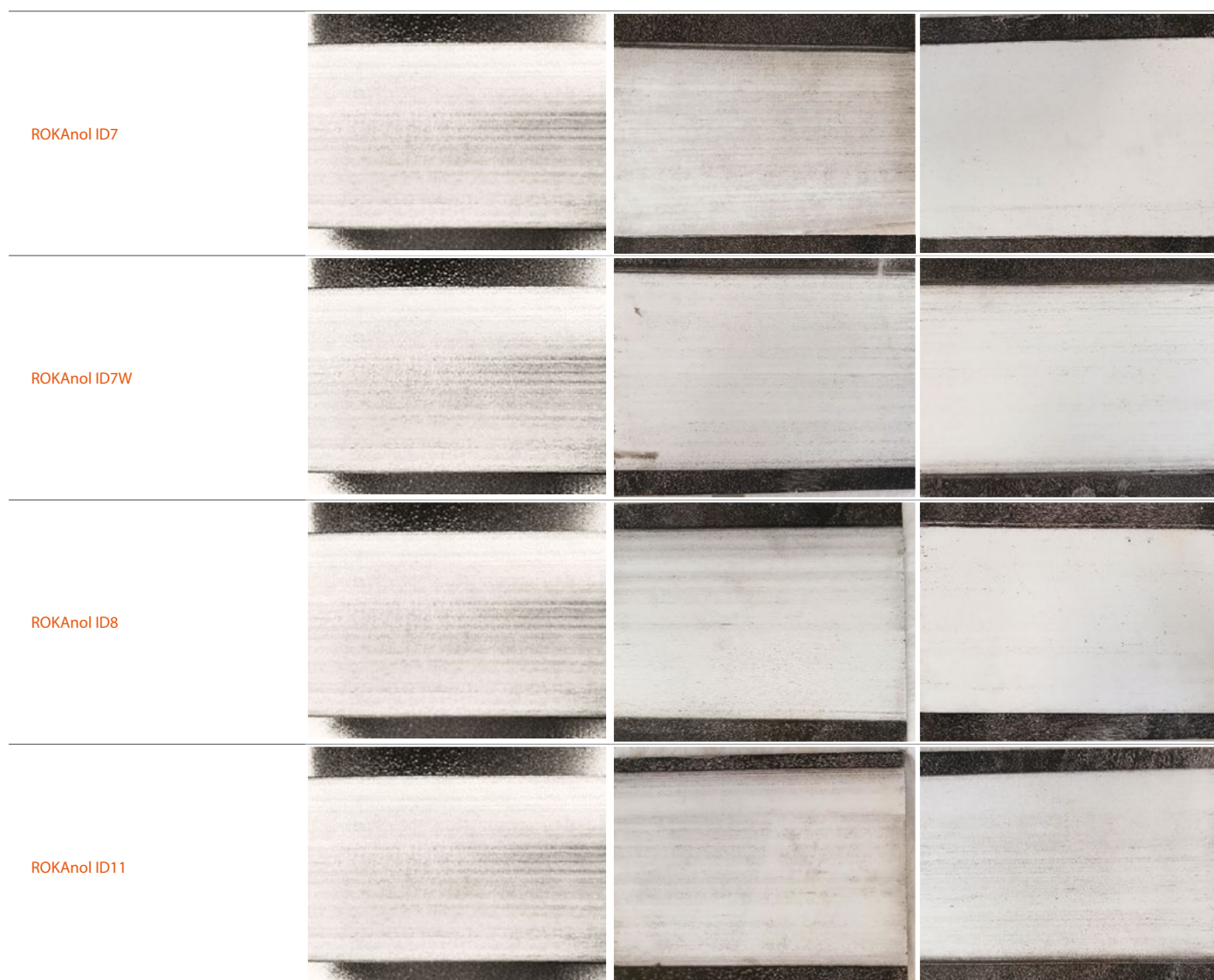
Pic. 19A/19B Degreasing capability. Dynamic test, ROKAnol ID11 (concentration of 5.0 g/l) after 2 min and 5 min

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.

<div>Product name</div> <div>Concentration [g/l]</div>	0	2	5
ROKAnol ID3			
ROKAnol ID5			
ROKAnol ID5W			
ROKAnol ID6			
ROKAnol ID6W			



### Detergency on hard surface results in $dL^*$ units

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:

$$dL^* = L^*T - L^*S,$$

where:

T – tested sample (plate after cleaning process)

S – standard to which the tested sample is compared (fabric before the detergency test).

The higher the  $dL^*$  value, the better the detergent effectiveness.

Product	ROKAnol ID3		ROKAnol ID5		ROKAnol ID5W		ROKAnol ID6		ROKAnol ID6W	
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	2 g/l	5 g/l
$ dL^* ^a$	3.0	0.6	5.3	4.0	4.6	1.5	0.7	0.7	8.2	1.9

Product	ROKAnol ID7		ROKAnol ID7W		ROKAnol ID8		ROKAnol ID11	
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
$ dL^* ^a$	8.8	1.3	4.4	1.2	2.3	0.9	4.2	4.0

<sup>a</sup>The arithmetic average of 5 measurements; the lower the  $|dL^*|$  value, the better the detergent effectiveness



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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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