



ANTI-FOAM Surfactants

Non-ionic surfactant series

ANTI-FOAM Surfactants

Chemical description

The ROKAmers and ROKAnols are anti-foaming non-ionic surfactants. ROKAmers are block copolymers of ethylene oxide (EO) and propylene oxide (PO). ROKAnols are polyoxyalkylene fatty alcohols.

ROKAmers are block copolymers of ethylene oxide (EO) and propylene oxide (PO) and can be represented by the following formula:



where: $x+y$ – average number of ethylene oxide units
 y – average number of propylene oxide units

ROKAnols are ethylene and propylene oxide adducts to various types of alcohols and can be represented by the following structures:



where: R = fatty alcohol chain
 x = average number of ethylene oxide units
 y = average number of propylene oxide units



Application

The anti-foaming surfactants are very useful for low-foam and no-foam applications. They are especially suitable as rinse aids, hard surface cleaners, metal cleaners and machine dishwashing. Antifoaming surfactants are also used in pulp & paper, food processing, textile processing, agriculture, paint & coating and other applications.



Agriculture



Textile industry



Paints and coatings



Pulp and paper



Food processing



Laundry detergents



Metal cleaning



Hard surface cleaners



Automatic dishwashing detergents and rinse aids



Basic physical and chemical properties

Anti-foaming agents have several properties responsible for their efficient operation, such as:

- low viscosity,
- effectively eliminating foam and preventing of foam formation,
- high proliferation in the foamed surface,
- lack of silicone components,
- long shelf life.

Basic information concerning ROKAmers physical and chemical properties are summarized in table.

Basic physical and chemical properties	ROKAmer 2000	ROKAmer 2600	ROKAmer 2950	ROKAmer PP2000	ROKAmer PP4000	ROKAmer R2800
Appearance at 25°C	clear or slightly turbid liquid	clear or turbid liquid	viscous liquid or semi-liquid paste	clear liquid	liquid	clear liquid
Concentration [%]	approx.99	approx.99	approx.99	approx.99	approx.99	approx.99
Hazen colour at 40°C	max. 50	max. 50	–	max. 50	max.100	approx. 20
Method A 1% in water solution	23-27	16-20	–	12-18	–	–
Modified Method A 10% in water solution	–	–	54-60	–	–	–
Method B 1% solution in 5% NaCl solution	approx.14	below 10	–	–	–	–
Method C 1% solution in 10% NaCl solution	–	–	–	–	–	–
Method D 10% solution in 25% BDG solution	approx. 40	approx. 38	–	–	below 10	28-31
Method E 16.7% solution in 25% BDG solution	max. 40	33-37	–	12-18	below 10	–
Average molar mass [g/mol]	approx. 1800	approx. 2600	approx. 2900	approx.2000	approx. 4000	approx. 2800
Water content [%; by weight]	max. 1	max. 1	max. 1	max. 0.5	max. 0.5	max. 0.5
Solidification point [°C]	below -20	below -22	below 15	below - 20	below - 20	5-7 1% solution
pH in deionized water, at 20°C	4.6 - 7.4 (1% solution)	4.6 - 7.4 (1% solution)	4.6 - 7.4 (10% solution)	–	5.5 – 7.0 (1% solution)	4.0-7.0 (1% solution)
Density at 25°C [g/cm ³]	approx.1.01	approx. 1.02	approx. 1.04	approx. 1.04	approx. 1.02	approx. 1.01
Viscosity at 20°C [cP]	approx. 400	approx. 600	approx. 1200	280-380	approx. 840	approx. 550
Surface tension at 25°C [mN/m]	33	35	41	38	40	36

Basic information concerning ROKAmers physical and chemical properties are summarized in table.

Basic physical and chemical properties	ROKAmer 3800	ROKAmer 1000	ROKAnol LP2126	ROKAnol LP1319	ROKAnol LP60	ROKAnol RZ4P11	ROKAnol LP2023
Appearance at 25°C	liquid	clear liquid	clear or turbid liquid	clear liquid	clear liquid	liquid	clear liquid
Concentration [%]	approx. 99	approx. 99	approx. 99	approx. 99	approx. 99	–	approx. 99
Hazen colour at 40°C	max. 100	–	max. 100	max. 150	max. 200	–	max. 100
Method A 1% in water solution	16-20	–	–	12-18	–	–	–
Modified Method A 10% in water solution	–	–	–	–	–	–	–
Method B 1% solution in 5% NaCl solution	–	–	–	–	–	–	–
Method C 1% solution in 10% NaCl solution	–	–	–	–	–	–	–
Method D 10% solution in 25% BDG solution	–	–	21-26	–	14-18	–	–
Method E 16.7% solution in 25% BDG solution	16-52	39-43	–	13-19	–	23-27	20-23
Average molar mass [g/mol]	approx. 4000	approx. 1000	approx. 1340	approx. 1530	approx. 770	approx. 1080	approx. 1060
Water content [%, by weight]	max. 0.5	max. 1	max. 0.5	max. 0.5	max. 1	–	max. 0.5
Solidification point [°C]	below -20	below -20	below -20	below -20	below -20	below 0	below -10
pH in deionized water, at 20°C	5-8 (5% solution)	5-7 (1% solution)	–	–	–	5.5-8.5 (1% solution)	–
Density at 25°C [g/cm ³]	approx. 1.02	approx. 1.02	approx. 0.98	approx. 98	approx. 0.960	approx. 0.97	approx. 0.97
Viscosity at 20°C [cP]	approx. 1150	approx. 170	approx. 250	approx. 200	approx. 90	approx. 110	approx. 120
Surface tension at 25°C [mN/m]	37	44	33	32	36	33	32

Basic information concerning specialty blends of antifoaming material physical and chemical properties are summarized in table.

Basic physical and chemical properties	EXOantifoam S100	EXOantifoam FAA6	TensiAntiFoam STP	EXOantifoam PPE73
Appearance at 25°C	homogenous emulsion, white to straw yellow colour	clear yellow liquid with sediment	clear liquid	white liquid
Concentration [%]	approx. 10	100	100	approx. 30
Solidification point [°C]	below -10	below -15	below -15	below 0
pH in deionized water, at 20°C	5.5-8 (5% solution)	8.5 (1% solution)	4.7 (1% solution)	8.8 (1% solution)
Density at 25°C [g/cm³]	approx. 1.00	approx.1.00	approx.1.00 (20°C)	approx.1.00
Viscosity at 20°C [cP]	approx. 120	approx. 45	approx. 70	approx. 50
Surface tension at 25°C [mN/m]	25	31	32	34

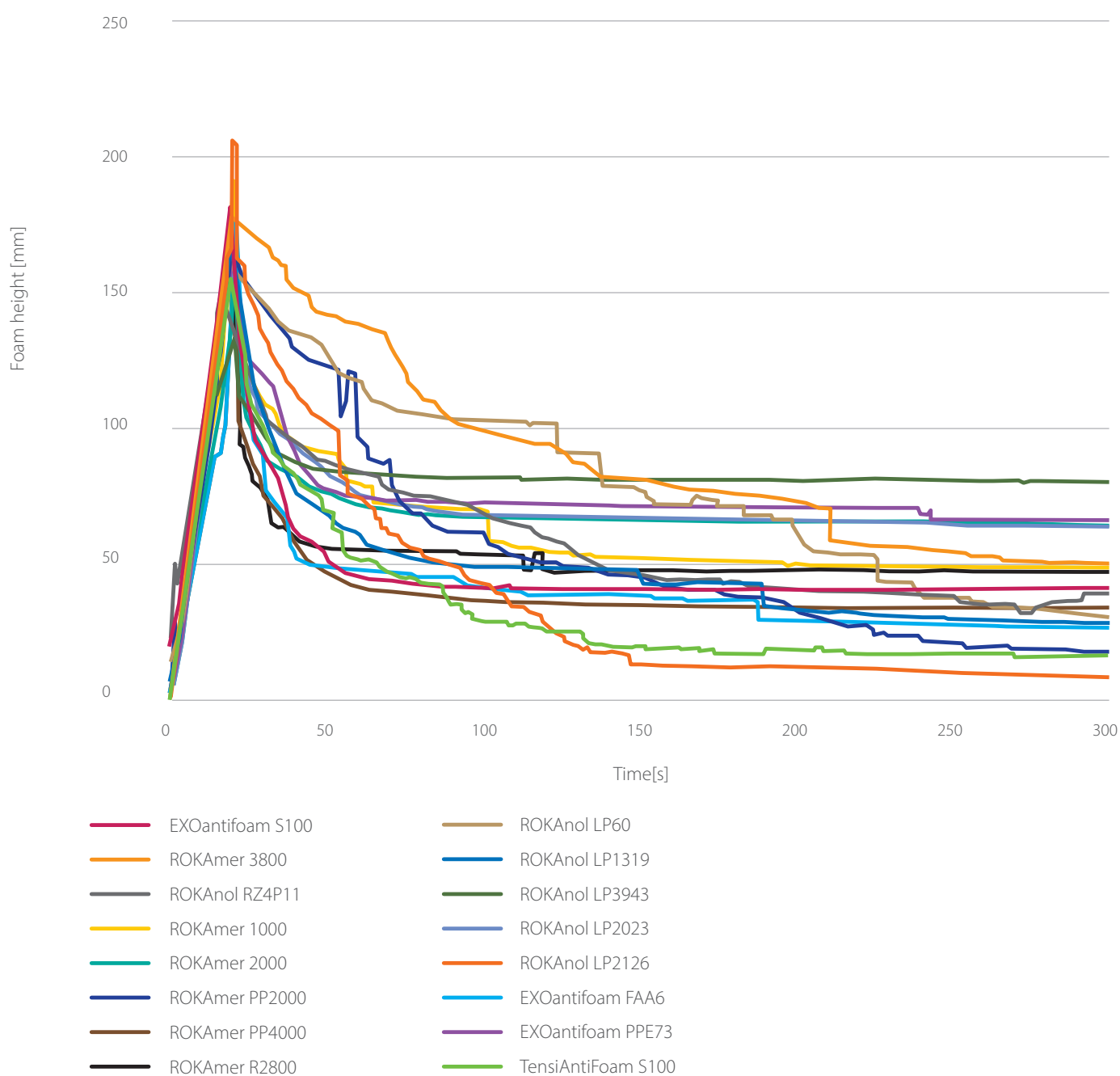


Anti-foaming capability

Anti-foaming properties were tested using the internal test method by Dynamic Foam Analyzer (DFA) that allows to determine the ability to extinguish the foam produced by the standard solution.

The method is based on measuring the foam volume generated by the foaming agent solution, which degrades over time, by injection of a solution to the surface of the test compound antifoam.

Anti-foaming properties of PCC Exol products are shown in a graph below (for hard water solutions).



PRODUCT FDA and BfR QUALIFICATIONS

Product 21 CFR (FDA) Qualifications

ROKAmers are approved for CFR (Code of Federal Regulations) applications. According to FDA's CFR regulations the listed substances in 21 CFR title, section 174-178 are permitted to use as indirect food additives. The table details FDA's CFR status and applicable codes for ROKAmers. The information detailed in this list is only for reference. Customers should verify the CFR clearances for their own application.

Product	172.808	173.340	175.105	175.300	176.170	176.180	176.210	177.1210	177.1680	178.1010	178.3400	178.3570	BfR Qualification
ROKAmer 2000	•	•					•	•	•	•		•	•
ROKAmer 2600	•	•					•	•	•	•		•	•
ROKAmer 2950	•	•					•	•	•	•		•	•
ROKAmer R2800	•	•					•	•	•	•		•	•
ROKAmer 3800	•	•					•	•	•	•		•	•
ROKAmer PP2000			•	•	•	•	•				•		•
ROKAmer PP4000			•	•	•	•	•				•		•
ROKAnol LP1319													•
ROKAnol LP2023													•





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PCC EXOL SA

Sustainable technologies for new generations



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

PCC EXOL SA portfolio includes surfactants with a broad range of applications. Besides of the mass production for personal care and detergents industry, the substances produced by PCC EXOL SA also include specialized products used in various branches, such as textile, agrochemical, metal cleaning, oil drilling, building & construction, paints & coatings, paper industry, extraction & drilling, and many others. The company comprehensive portfolio is continuously enriched with new innovative products, which meet even the strictest market requirements and adapt to the individual needs of customers. This is possible due to the dynamic development of the research faci-

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

ties, flexible production, knowledge as well as experienced personnel.

PCC EXOL SA has the key competence necessary for a worldwide production of surfactants. The ongoing projects will soon bring the new opportunities for the company's 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 meet individual customer demands. The strategic PCC EXOL SA investor is PCC SE, operating on international markets of the chemical raw materials, transport, energy, coal,

coke, petrol, plastics and metallurgy. PCC SE includes 80 companies operating in 39 different locations in 17 countries.

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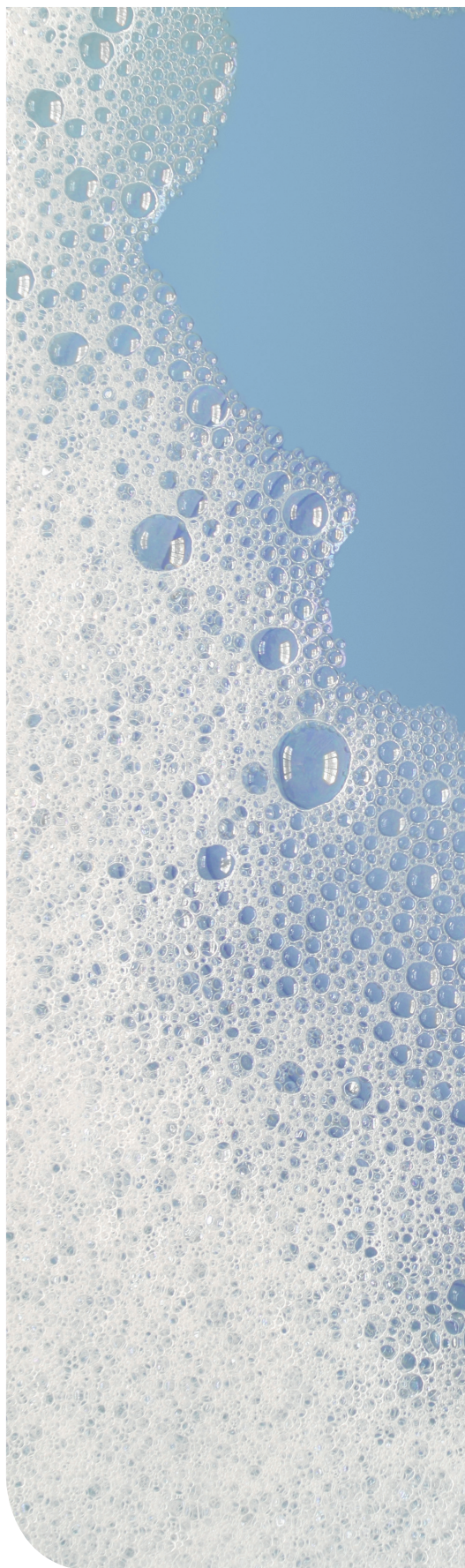
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PCC Exol SA

Sienkiewicza St. 4
56-120 Brzeg Dolny
Poland

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