



Cleaning Solutions for the Brewing Industry

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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• Household & industrial Cleaners, Detergents and Personal Care Products	• Energy Production	• Intermodal transport • Road Haulage • Rail Transport	• Microsilica • Silicon Metal	• Portfolio Management • Project Development

Cleaning solutions for the brewing industry

Brewing installations include mash tuns, lauter tuns, brew kettles, fermenters, maturation tanks, pipelines, heat exchangers and filling equipment, where different types of soils accumulate during production. The main brewery deposits include proteins, starches, sugars, hop residues, yeast cells and mineral scale (beer stone). Organic soils may form sticky films and strongly adhere to surfaces, while mineral deposits such as calcium oxalate and calcium carbonate can reduce heat transfer efficiency and equipment hygiene.

Cleaning is performed using CIP (Cleaning-In-Place) and OPC (Open Plant Cleaning) procedures. CIP is applied to closed systems such

as tanks, pipelines and heat exchangers using alkaline and acidic detergents to remove organic and inorganic deposits. OPC is used for accessible surfaces, including floors, drains, conveyors and external equipment, where foam cleaning provides efficient soil removal and longer contact time.

Brewing cleaning formulations combine alkaline agents, acids, surfactants, chelating agents and corrosion inhibitors. Surfactants such as ethoxylated alcohols and EO/PO copolymers improve wetting, soil penetration, emulsification of hydrophobic residues and dispersion of deposits, supporting effective cleaning under industrial brewing conditions.

Proposed formulation based on our products

Brew kettle alkaline CIP

- pH (solution 1%) ~12
- Alkaline formula
- Effective for brew kettle caramelized soils
- Suitable for hard water

Ingredient	Mass percentage [%]	Function
ROKAnol NL9	2	Detergency, wetting
Sodium metasilicate	3	Builder, metal protection
ROKAmer 2100	0.5	Defoamer
NaOH (50%)	6	pH adjuster
Na ₄ EDTA (40%)	4	Sequestrant
Aqua	Up to 100	Solvent



Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard



Foam after (60 s)

V (5 s)	V (60 s)	V (180 s)
0 ml	0 ml	0 ml

Application test

- Concentration: 1%
- Water: Hard
- Temprature: 60°C
- Dipping time: 10 minutes
- Result: approx. 87%



Tile before



Tile after

Proposed formulation based on our products

Brew kettle acidic CIP

- pH (solution 1%) ~2
- Next step after Brew kettle alkali CIP
- Removes scale and inorganic deposits
- With corrosion inhibitor

Ingredient	Mass percentage [%]	Function
ROKAnol LP610	2	Detergency, wetting
HEDP Na	1.5	Corrosion inhibitor
Nitric acid	30	pH adjuster
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
6 ml	0 ml	0 ml

Application test

- Concentration: 1%
- Water: Hard
- Temperature: 60°C
- Dipping time: 10 minutes
- Result: approx. 88%



Tile before



Tile after

Proposed formulation based on our products

Fermenter alkali cleaner

- pH (solution 1%) ~12
- Recommended for fermentator
- Effectively removes organic residues

Ingredient	Mass percentage [%]	Function
ROKAnol EH6	1.5	Deterency, wetting
Sodium metasilicate	3	Builder, metal protection
NaOH (50%)	6	pH adjuster
Na ₄ EDTA (40%)	4	Sequestrant
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
0 ml	0 ml	0 ml

Application test

- Concentrtion: 1%
- Water: Demi
- Temprature: 60°C
- Dipping time: 10 minutes
- Result: approx. 80%



Tile before



Tile after

Proposed formulation based on our products

Fermenter acidic cleaner

- pH (solution 1%) ~2
- Mix of acids
- Recommended for fermentators
- High content of nitric acid

Ingredient	Mass percentage [%]	Function
ROKAnol ID8	1.5	Deterency, wetting
ROKAnol LP220	0.5	Detergency
ROKAnol LP60	2	Defoamer
Isoprpanol	15	Solvent
Nitric acid	15	pH adjuster
Phosphoric acid	15	pH adjuster
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
0 ml	0 ml	0 ml



Application test

- Concentrtion: 1%
- Water: Demi
- Temprature: 60°C
- Dipping time: 10 minutes
- Result: approx. 89%



Tile before



Tile after



Proposed formulation based on our products

Pipeline acidic CIP

- pH (solution 1%) ~3
- Effectively removes beerstone
- Recommended for pipelines
- Suitable for hard water

Ingredient	Mass percentage [%]	Function
ROKAnol LP3135	2	Detergency, wetting
HEDP Na	1	Sequestrant
EXOtrope SCS40	0.5	Solubilizer
Phosphoric acid	15	pH adjuster
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
0 ml	0 ml	0 ml

Application test

- Concentrtion: 1%
- Water: Demi
- Temperature: 60°C
- Dipping time: 10 minutes
- Result: approx. 89%



Tile before



Tile after

Proposed formulation based on our products

Heat exchange alkali CIP

- pH (solution 1%) ~12
- For heat exchanger
- Excellent wetting properties
- Suitable for hard water

Ingredient	Mass percentage [%]	Function
ROKAnol ID8	0.2	Wetting, detergency
ROKAnol NL8P4	1.5	Detergency
EXOtrope SCS40	4	Solubilizer
NaOH(50%)	7	Builder
Na ₄ EDTA (40%)	5	Sequestrant
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
20 ml	6 ml	4 ml



Application test

- Concentration: 1%
- Water: Hard
- Temperature: 60°C
- Dipping time: 10 minutes
- Result: approx. 85%



Tile before



Tile after



Proposed formulation based on our products

Heat exchange acid CIP

- pH (solution 1%) ~2
- Effectively removes scale residues
- Low foaming
- With corrosion inhibitor

Ingredient	Mass percentage [%]	Function
ROKAnol LP400	2	Wetting, detergency
Butyldiglycol	1	Detergency
EXOtrope SCS40	2.5	Solubilizer
HEDP NA	0.5	Corrosion inhibitor, sequestrant
Phosphoric acid	30	pH adjuster
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
50 ml	2 ml	0 ml

Application test

- Concentrtion: 1%
- Water: Demi
- Temprature: 60°C
- Dipping time: 10 minutes
- Result: approx. 91%



Tile before



Tile after

Proposed formulation based on our products

External device alkali OPC

- pH (solution 1%) ~11
 - Moderate foam
- Suitable for hard water

Ingredient	Mass percentage [%]	Function
ROSulfan AOS	25	High foam, detergency
ROKAnol IT7	2	Detergency, wetting
Isopropanol	5	Solvent
NaOH (50%)	1	Builder
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
70 ml	64 ml	64 ml

Application test

- Concentrtion: 1%
 - Water: Demi
 - Temprature: 60°C
- Dipping time: 10 minutes
 - Result: approx. 86%



Tile before



Tile after

Proposed formulation based on our products

External device APC

- pH (solution 1%) ~7
- Viscosity 1000 cP
- Concentrated formula
- Multipurpose

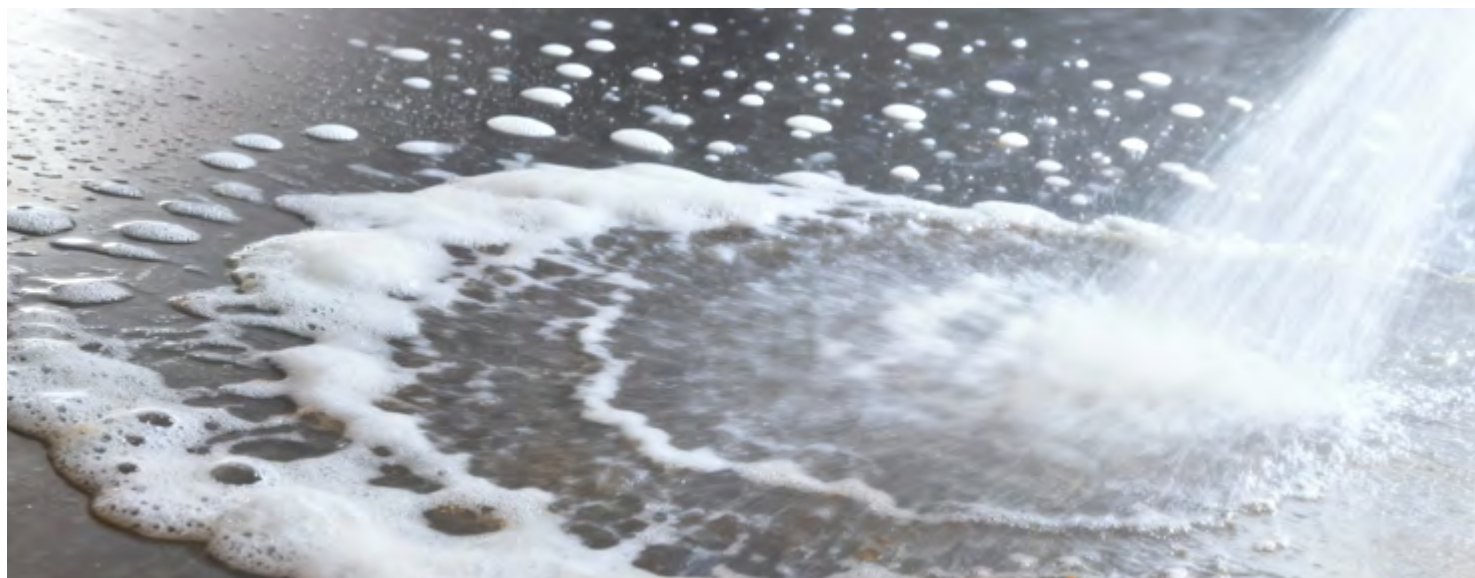
Ingredient	Mass percentage [%]	Function
ABSNa 50	21.6	Detergency
SULFOROKAnol L270/1	1.6	High foam, deergency, wetting
ROKAnol IT9	4	Wetting
ROKAmid KAD	0.8	Foam stabilizer
Propylene glycol	4	Co-solvent
BIT	0.1	Preservative
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
140 ml	114 ml	104 ml



Application test

- Concentrtion: 1%
- Water: Demi
- Temprature: 60°C
- Dipping time: 10 minutes
- Result: approx. 89%



Tile before



Tile after



Cleaning solutions for bottle and can washing

Maintaining the cleanliness of returnable bottles and aluminum cans is essential for product safety, process efficiency, and supporting circular economy goals. Surfactants play a central role in removing soils, adhesives, oils, and forming residues, while

also improving wetting, rinsing, and surface preparation. Their proper selection directly impacts both hygiene standards and the recyclability or reusability of packaging materials.

Bottle cleaning

For beverage producers, effective cleaning of returnable glass bottles is critical for product safety, hygiene, and packaging quality. Residues, odors, adhesives, and microbial contamination may compromise product integrity and cause operational issues, including line stoppages and product complaints. Efficient cleaning also supports the sustainability of returnable packaging by extending bottle service life. A glass bottle can typically withstand

20–50 reuse cycles; however, its lifetime is often limited by surface scuffing. Repeated mechanical contact between bottles and conveyors produces grey, dull abrasion marks that degrade visual appearance despite effective cleaning. Although scuffing does not significantly affect structural integrity, it reduces aesthetic quality and may lead to premature bottle rejection.

Proposed formulation based on our products

Caustic cleaner

- Low foaming
- pH ~13
- For dipping or spray cleaning in bottle washer
- Removes organic residues

Ingredient	Mass percentage [%]	Function
ROKAmer 3100	2	Detergency, wetting
NaOH	1.4	pH adjuster
Aqua	Up to 100	Solvent

Formulation performance

Foaming properties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
50 ml	10 ml	0 ml

Application test

Glass tiles representing returnable bottles were coated with 10 g of simulated brewery soil per tile, consisting of CaCO_3 , oxalic acid, and brewery slurry. The contaminated tiles were dried at 100°C for 24 h to simulate dried and baked-on brewery deposits. Cleaning was performed by immersion in a 1 wt.% solution of the tested

formulation at 40°C for 10 min, followed by rinsing with running water. Cleaning efficiency was assessed visually and gravimetrically, achieving approximately 87% soil removal. Residual CaCO_3 deposits were considered mineral scale and were intended to be removed during the subsequent acid cleaning stage.



Tile before



Tile after



Proposed formulation based on our products

Water spots cleaner

- pH (solution 1%) ~11
- Low foaming
- High effective for mineral deposits
- Glossy effect

Ingredient	Mass percentage [%]	Function
ROKAnol LP2227	2	Detergency, low foam
Na ₄ EDTA	1.35	Sequestrant
Exotrop SCS40	2	Hydrotrope
Aqua	Up to 100	Solvent

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (20s)	V (60 s)
5 ml	0 ml	0 ml

Application test

A mineral scale suspension was prepared by mixing 15 wt.% CaCO₃ with 85 wt.% demineralized water. The suspension was applied to the bottle surface and dried in an oven at 50°C for 10 min. The dried

mineral scale was then treated by spraying the tested formulation onto the surface 10 times. Cleaning performance was assessed visually based on the degree of mineral scale removal.



Bottle before



Bottle after

Proposed formulation based on our products

Labels remover

- pH (solution 1%) ~12
- Effectively removes labels from glass surface
- High detergency

Ingredient	Mass percentage [%]	Function
Aqua	Up to 100	Solvent
Butyldiglycol	50.4	Solvent, penetrant
Monoethanolamine	1	Glue dissolver
ROKAnol NL6	6	Wetting, detergency
ROKAnol ID3	3	Wetting
KOH (50%)	0.15	Ph adjust

Formulation performance

Foaming propeties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V(180 s)
>250 ml	250 ml	230 ml

Application test

The label removal performance was evaluated under immersion conditions. Glass bottles with commercial paper labels were immersed in a 1% (w/w) working solution of the formulation prepared with hard water and maintained at 60°C for 10 minutes. After the test, the effectiveness of label removal and adhesive detachment was assessed visually.



Bottle before and after

Aluminum can cleaning

Can cleaning is an essential operation in the manufacturing process, ensuring the effective removal of process contaminants such as forming lubricants, metal fines, oxides, and particulate matter.

A properly designed cleaning process prepares the metal surface for subsequent operations, including conversion coating, internal and

external coating, printing, and decoration. Cleaning performance directly influences coating adhesion, corrosion resistance, product quality, and overall production efficiency. This section outlines the key objectives, process requirements, and factors affecting cleaning performance in modern can manufacturing.

Proposed formulation based on our products

Anti smutting cleaner

- Low foaming
- pH ~1,4
- Removes aluminum oxides
- Removes smut residues after aluminum manufacturing

Ingredient	Mass percentage [%]	Function
Aqua	Up to 100	Solvent
Phosphoric acid 75%	11.2	pH adjuster
Citric acid 50%	6.7	pH adjuster
Butyldiglycol	0.6	Solvent
ROKAnol LP3135	11.2	Detergency, wetting

Formulation performance

Foaming properties

- Concentration: 1%
- Water: Hard

V (5 s)	V (60 s)	V (180 s)
10 ml	0 ml	0 ml



Application test

A 2% working solution was prepared, and an oxide-coated aluminum panel was immersed halfway into the solution for 1 hour. After the exposure period, the panel was removed and

visually inspected. The immersed and non-immersed sections were compared to evaluate the cleaning performance and the effect of the formulation on the oxide-coated aluminum surface.



Left half of tile before, right one after

A total of 0.1 g of soot was uniformly spread over the entire surface of an aluminum panel. A 5% working solution was then prepared using hard water. The contaminated panel was sprayed 30 times

using a spray nozzle, after which the cleaning performance was evaluated by visual inspection.



Tile before



Tile after

Formulation selection matrix

Formulation	Industry	pH	Main soil	Typical application	Dosage	Foam profile	Page
Brew kettle alkaline CIP	Beverage	Alkaline	Proteins, fats, sugar	Tanks, pipes, mixers, kettles	Spraying, 1-2%	Very low	4
Brew kettle acidic CIP	Beverage	Acid	Scales	Tanks, pipes, mixers, kettles	Spraying, 1-2%	Very low	6
Fermenter alkali cleaner	Beverage	Alkaline	Caramelized sugar, proteins, fats	Tanks, pipes, mixers, fermenters	Spraying, Dipping 1-2%	Very low	7
Fermenter acidic cleaner	Beverage	Acid	Scales	Tanks, pipes, mixers, fermenters	Spraying, 1-2%	Very low	8
Pipeline acidic CIP	Beverage	Acid	Scales	Tanks, pipes, mixers, fermenters	Spraying, 1-2%	Very low	9
Heat exchange alkali CIP	Beverage	Alkaline	Fouling	Heat exchanger	Spraying, 1-2%	Low	11
Heat exchange acid CIP	Beverage	Acid	Scales	Heat exchanger	Spraying, 1-2%	Low	13
External device alkali OPC	Beverage	Alkaline	Proteins, fats, sugar	Conveyor belts, floors, drains, tanks	Spraying, 1-2%	High	14
External device APC	Beverage	Light alkaline	Light all soils	Conveyor belts, floors, drains, tanks	Spraying, 1-2%	High	15
Caustic cleaner	Beverage	Alkaline	Caramelized sugar, proteins, fats	Bottles	Spraying, Dipping 1-2%	Low	17
Water spots cleaner	Beverage	Alkaline	Inorganic scale	Bottles	Spraying, Concentrated	Very low	19
Labels remover	Beverage	Alkaline	Glue, etiquets	Bottles	Dipping 1-2%	High	20
Anti smutting cleaner	Beverage	Acid	Oxides, smut	Cans, Tanks	Spraying, 1-2%	Very low	21

Methods

Foaming properties

In house method

The foaming performance test was conducted using a 1.0 wt.% solution of the tested surfactant prepared in hard water (3 mmol/L Ca^{2+} hardness). A 100 g sample was prepared in a graduated glass cylinder fitted with a stopper, taking care to avoid foam formation during preparation. The sample was conditioned at $22 \pm 3^\circ\text{C}$ or at the required test temperature. The solution was mixed by inverting

the cylinder at a rate of 1 inversion/s for 60 s. Foam height was measured 5, 60, and 180 s after mixing, as the distance between the liquid surface and the top of the foam layer. In the case of an uneven foam surface, the reported foam height was calculated as the average of the highest and lowest foam levels.

Application tests (brewing industry)

In house method

The foaming performance test was conducted using a 1.0 wt.% solution of the tested surfactant prepared in hard water (3 mmol/L Ca^{2+} hardness). A 100 g sample was prepared in a graduated glass cylinder fitted with a stopper, taking care to avoid foam formation during preparation. The sample was conditioned at $22 \pm 3^\circ\text{C}$ or at the required test temperature. The solution was mixed by inverting

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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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