ROKAcet LPK
and its formulations for cleaning

pcc Exol

ROKAcet LPK

Chemical description

ROKAcet LPK is a non-ionic surfactant. It is ethoxylated and propoxylated coconut acid.
Due to the natural origin of the raw material, ROKAcet LPK is classified as ecofriendly product.

Applications:

- Industrial and Institutional cleaning
- Laundry detergents
- Hard surface cleaning
- Lubricants industry
- Textile industry

Benefits:

- effective ingredient of laundry agents
- good cleaning properties
- excellent solubilizing properties
- good wetting properties
- non-classified product
- good temperature resistance
- compatible with synthetic base stocks, especially with PAGs
- compatible with other additives

Additional information

Physicochemical parameters	ROKAcet LPK
CAS	96873-84-6
Molecular weight [g/mol]	–
Appearance at temperature (20÷25)°C	clear yellow liquid
Color (Gardner) at (20 ÷ 25)°C	max. 2
pH of the solution in water [10%]	6.0 ÷ 7.5
Saponification number, mg KOH/g	60 ÷ 70
Cloud point (butyldiglycol/water solution)	60 ÷ 64
Water, % (m/m)	max. 0.5
Density at 20°C, g/ml	approx. 1.03
Density at 25°C, g/ml	1.028
Viscosity at 20°C, cP	approx. 160
Surface tension of 0.1% solution at 25°C, mN/m	35
Solidification point, °C	approx. +3
Cloud temperature point, °C	+7
Clarification temperature point, °C	+13

Solubility

The solubility of ROKAcet LPK in water and other solvents has been shown in the table below:

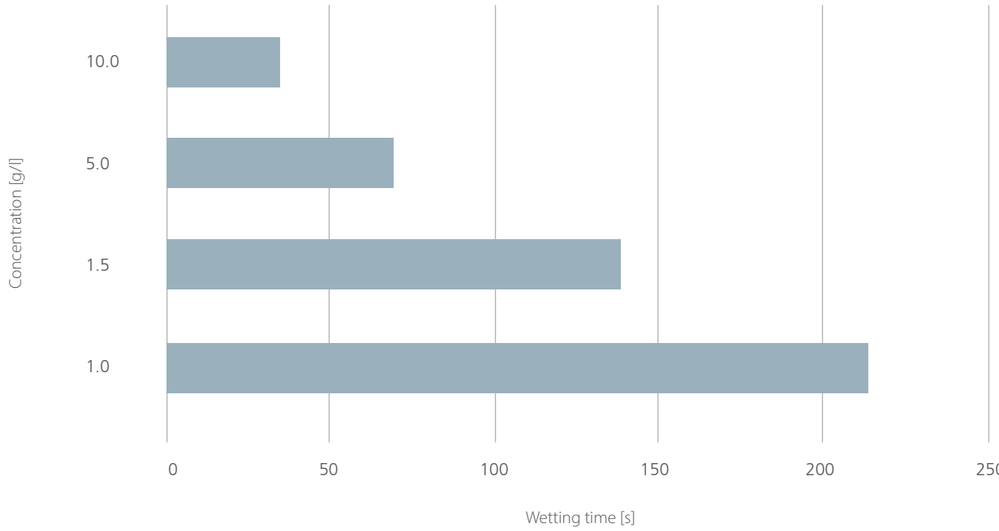
PRODUCT NAME	CONCENTRATION [%]	DEMINERALIZED WATER	METHANOL	ACETONE	ETHYL ETHER
ROKAcet LPK	1	●	●	●	●
	10	●	●	●	●
	50	●	●	●	●

● soluble ● insoluble ● partially soluble

Wetting capability

Surfactants reduce the surface tension of liquids in which they are dissolved. Thanks to them, any liquid (usually water) has greater wetting capability, which increases its ability to get as close as possible to the solid. This is very important for many surfactant applications, especially in cleaning processes.
The capability of wetting cotton fabric was determined in accordance to PN-EN 1772:2001 Standard. The wetting capability results of ROKAcet LPK has been shown in the graph below.

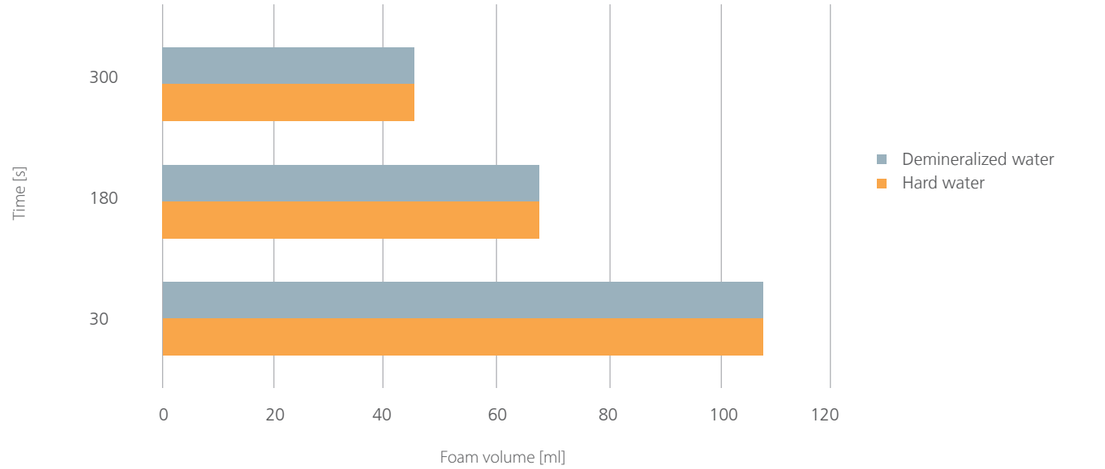
Wetting capability of ROKAcet LPK (20°C with demineralizated water)



Foaming capability

Foam is a heterogeneous system in which the liquid is the continuous phase and the dispersed phase is a gas. Foams, as well as emulsions, are thermodynamically unstable systems, so surfactant molecules on the interface are required to stabilize them. The ability to foam a substance is important in many industrial applications including the detergents, where it prevents re-dirt in the washing or cleaning processes. The determination of the foaming capability was performed according to PN-ISO 696: 1994 Standard (the modified Ross-Miles method) at a temperature of 25°C, for a surfactant concentration of 1.0 g/l, in both demineralized and hard (17°d) water. The foaming stability results of ROKAcet LPK has been shown in the graph below.

Foaming stability of ROKAcet LPK (concetration 1.0 g/l, 25°C)



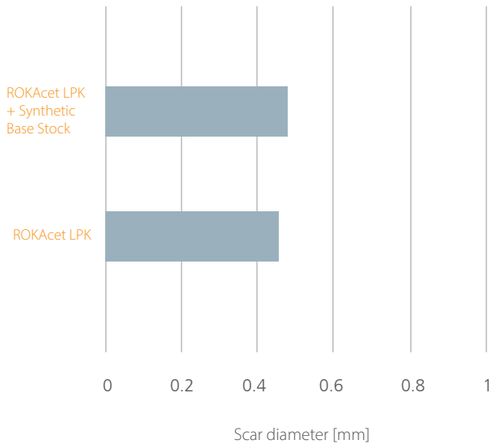
Lubricating properties

Taking into account the properties of ROKAcet LPK, it can be used in textile industry, because it has very good tribological properties: anti-wear and extreme pressure. ROKAcet LPK can be used as a base and as an additive in lubricating formulations. It is compatible with water-soluble, synthetic bases of the PAG products. ROKAcet LPK is classified according to ISO 46-68 viscosity grade. The viscosity index (VI) for ROKAcet LPK is above 180, which proves the excellent stability of the kinematic viscosity with temperature changes. Its characteristic, low viscosity enables efficient use and non-sticking of materials in devices used in the textile industry. The lubricating results of ROKAcet LPK has been shown in the graphs and tables below.

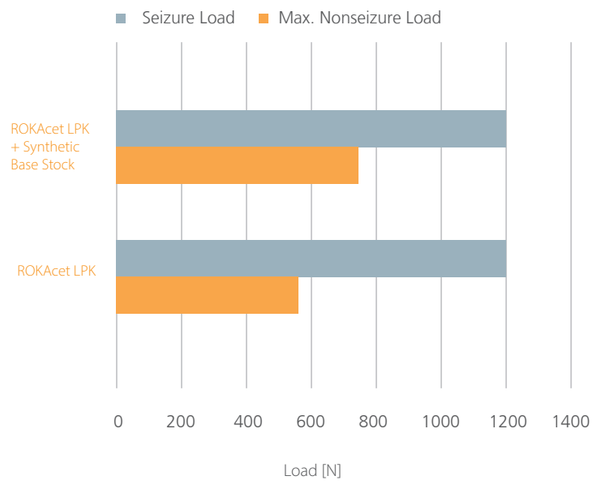
PRODUCT NAME	KINEMATIC VISCOSITY AT 40°C [CST]	KINEMATIC VISCOSITY AT 100°C [CST]	VISCOSITY INDEX [-]	VISCOSITY GRADE ACCORDING TO ISO
ROKAcet LPK	53.78	10.38	186	46 ÷ 68
ROKAcet LPK + Synthetic Base Stock	95.00	18.11	211	100

PRODUCT NAME	EXTREME - PRESSURE PROPERTIES (EP) ACCORDING OF ASTM D2783			ANTI-WEAR PROPERTIES (AW) ACCORDING OF ASTM D4172	
	MAX. NONSEIZURE LOAD [N]	SCAR DIAMETER [MM]	SEIZURE LOAD [N]	USED LOAD (METHOD B)	SCAR DIAMETER [MM]
ROKAcet LPK	618	0.30	1236	392	0.46
ROKAcet LPK + Synthetic Base Stock	784	0.34	1236	392	0.50

Anti-wear Properties



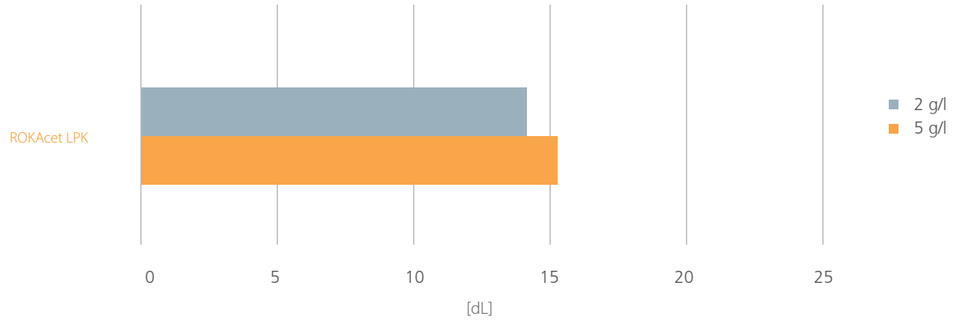
Extreme Pressure Properties



Detergency on a cotton fabric

Determination of detergency on a cotton fabric is tantamount to assessing the effectiveness of washing with the use of surfactants. Detergency tests were performed according to PCC EXOL SA own method, using EMPA 125 fabric (cotton), soiled with a mixture of oils and pigments that were washed in ROKAcet LPK solutions (2 g/l and 5 g/l).

Cotton fabric detergency results in dL units



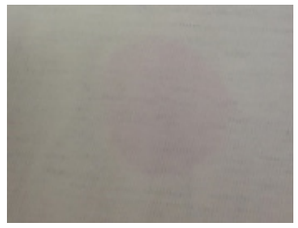
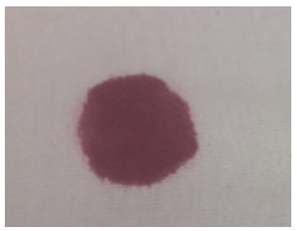
The detergency process is described by the dL parameter in accordance with the CIE LAB method. The standard is the soiled fabric, so the higher the value of the dL parameter, the better the tested fabric is cleaned.

Lubricant removal test

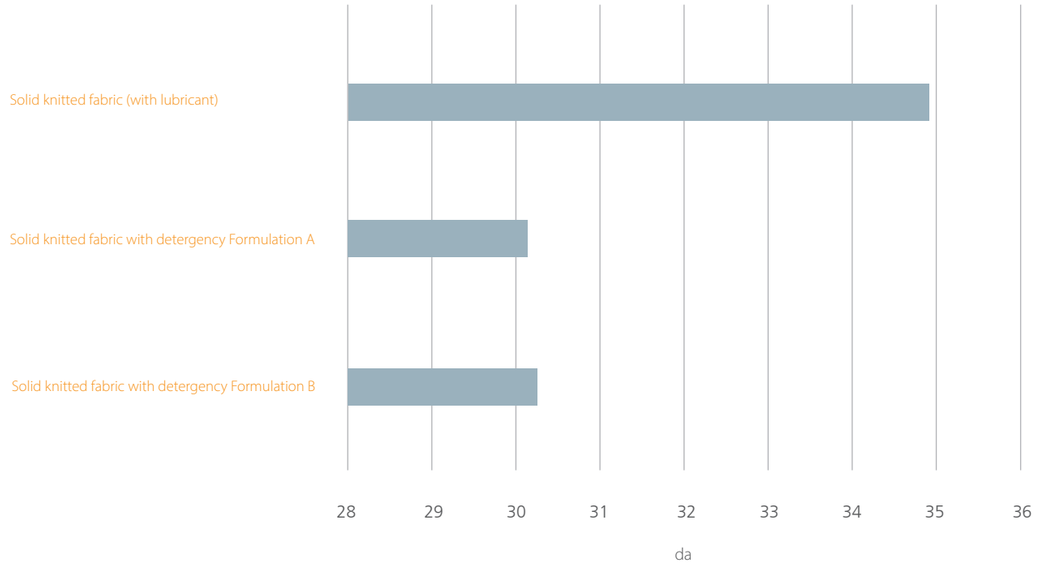
Lubricant removal tests were performed according to PCC EXOL SA own method, using raw cotton fabric (100% combed cotton, weave left-right single bearing, area weight of 150 g/m2). A lubricant (ROKAcet LPK), colored with Sudan Red 7B, is applied to the knitted fabric. The next step of the stain removal test is carried out at temperature 95°C for 60 minutes. After rinse the fabric with water, neutralization process and dry of cotton, the effectiveness of the stain removal from the knitted fabric was assessed. The da parameter from the CIE LAB scale was used, as the difference in the intensity of pink staining of the stain before washing and after washing.

The composition of the washing baths is presented below

PRODUCT NAME	COMPOSITIONS, g/l	
	FORMULATION A	FORMULATION B
NaOH (110 g/l solution)	11.3	11.3
ROKAcet LPK	-	2
water	up to 1000	up to 1000

FORMULATIONS	KNITTED FABRIC BEFORE LUBRICANT REMOVAL TEST	KNITTED FABRIC AFTER LUBRICANT REMOVAL TEST
Formulation A		
Formulation B		

Lubricant removal test - results in da units



The lubricant removal tests are described by the da parameter in accordance with the CIE LAB method.
The standard is the soiled fabric, so the higher the value of the da parameter, the better the tested fabric is cleaned.

Alkali and acid resistance

Surfactants used in industrial cleaning have to be resistant to strong acids or alkalis. Acidic cleaning agents are mainly used to remove mineral deposits from acid-resistant surfaces, while alkaline agents are known primarily for their remarkable degreasing ability.

The analysis of this stability for ROKAcet LPK has been performed in accordance with the PN-EN 14712:2005 Standard.

NAOH CON. [g/l] PRODUCT NAME	10	20	30
ROKAcet LPK	•	•	º

H_2SO_4 CON. [ml/l] PRODUCT NAME	1	120	125	135	140	225
ROKAcet LPK	•	•	•	•	•	•

HCL CON. [ml/l] PRODUCT NAME	1	120	140	225
ROKAcet LPK	•	•	•	º

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

Formulations

DISHWASHER RINSE AIDS

Brand name	Chemical name	Content [%]	Function
ROKAcet LPK	Coco acids, ethoxylated propoxylated	5-6	Cleaner / wetting agent
ROKAnol LP700	Fatty alcohol alkoxylate	8-9	Cleaner
Citric Acid	Citric Acid	3	Cleaner / pH regulator
Sodium cumene sulfonate	Sodium cumene sulfonate	5	Solubilizer / hydrotrope
Water & additives	Water & additives	up to 100%	Solvent and additives

Chemical properties

appearance at 20-25°C	clear liquid
pH at 25°C	2 ÷ 3
Cloud point, °C	none
solidification point in high temperature, °C	+59÷ +62
clarification temperature in high temperature, °C	+56 ÷ +59
solidification point, °C	+0,5 ÷ +1
clarification temperature, °C	+6.0

Procedure:

1. Mix Citric Acid with water until dissolved.
2. Add ROKAcet LPK and mix.
3. Add ROKAnol LP700 and mix.
4. Mix until a homogenous solution is obtained.
5. Add other additives.

ACIDIC AGENT FOR CLEANING STAINLESS STEEL AND ALUMINUM

Brand name	Chemical name	Content [%]	Function
ROKAcet LPK	Coco acids, ethoxylated propoxylated	10	Cleaner / wetting agent
ROKAmina K30	Cocamidopropyl Betaine	5	Foaming agent / foam stabilizer
ROKAnol DB7	C12-15 Pareth-7	2	Cleaner / wetting agent / degreaser
Butyl glycol	Butyl glycol	5	Solvent
Phosphoric acid (75%)	Phosphoric acid (75%)	2	Cleaner / pH regulator
Water & additives	Water & additives	up to 100%	Solvent and additives

Chemical properties

appearance at 20-25°C	clear liquid
pH at 25°C	2 ÷ 3
cloud point, °C	none
solidification point, °C	-1.0
clarification temperature, °C	+3.0

Procedure:

1. Mix hosphoric acid with water until dissolved.
2. Then add ROKAcet LPK and mix.
3. Then add ROKAmina K30 and mix.
4. Then add ROKAnol DB7and mix.
5. Add butyl glycol.
6. Mix until a homogenous solution is obtained.
7. Add other additives.

HIGHLY RESISTANT, ALKALINE CLEANER

Brand name	Chemical name	Content [%]	Function
ROKAcet LPK	Coco acids, ethoxylated propoxylated	10	Cleaner / wetting agent
Na_2CO_3 solid	Na_2CO_3 solid	3	pH regulator / active filler
ROKAnol NL8	Alcohols, C9-C11, ethoxylated	3	Cleaner / wetting agent
EDTA	EDTA	1	Chelator
Water & additives	Water & additives	up to 100%	Solvent and additives

Chemical properties

appearance at 20-25°C	clear liquid
pH at 25°C	10 ÷ 11
cloud point, °C	none
solidification point, °C	-1.0
clarification temperature, °C	+4.0

Procedure:

1. Mix Na_2CO_3 solid with water until dissolved.
2. Then add ROKAcet LPK, ROKAnol NL8 and mix.
3. Then add EDTA and mix.
4. Mix until a homogenous solution is obtained.
5. Add other additives.

ALKALINE CARPET CLEANER

Brand name	Chemical name	Content [%]	Function
ROKAcet LPK	Coco acids, ethoxylated propoxylated	5	Cleaner / wetting agent
$Na_2SiO_3 \cdot 5\ H_2O$ solid	$Na_2SiO_3 \cdot 5\ H_2O$ solid	1	pH regulator / active filler
ROKAnol DB7	C12-15 Pareth-7	2	Cleaner / wetting agent / degreaser
Butyl glycol	Butyl glycol	2	Solvent
Water & additives	Water & additives	up to 100%	Solvent and additives

Chemical properties

appearance at 20-25°C	clear liquid
pH at 25°C	12 ÷ 13
cloud point, °C	none
solidification point, °C	0
clarification temperature, °C	+3.0

Procedure:

1. Mix $Na_2SiO_3 \cdot 5\ H_2O$ solid with water until dissolved.
2. Then add ROKAcet LPK, ROKAnol DB7 and mix.
3. Then add butyl glycol and mix.
4. Mix until a homogenous solution is obtained.
5. Add other additives.

DEGREASER CLEANER

Brand name	Chemical name	Content [%]	Function
ROKAcet LPK	Coco acids, ethoxylated propoxylated	7	Cleaner / wetting agent
ROKAnol ID8	Isodeceth-8	3	Cleaner / wetting agent
EXOlat C40	Acrylic resin	4	Sequestrant
Na_2CO_3 solid	Na_2CO_3 solid	2	pH regulator / active filler
Sodium cumene sulfonate	Sodium cumene sulfonate	5	Solubilizer / hydrotrope
Water & additives	Water & additives	up to 100%	Solvent and additives

Chemical properties

appearance at 20-25°C	clear liquid
pH at 25°C	10 ÷ 11
cloud point, °C	none
solidification point, °C	0
clarification temperature, °C	+5.0

Procedure:

1. Mix Na_2CO_3 solid with water until dissolved.
2. Then add ROKAcet LPK and mix.
3. Add ROKAnol ID8, EXOlat C40, sodium cumene sulfonate and mix.
4. Mix until a homogenous solution is obtained.
5. Add other additives.

UNIVERSAL DEGREASER AGENT

Brand name	Chemical name	Content [%]	Function
ROKAcet LPK	Coco acids, ethoxylated propoxylated	5	Cleaner
ROKAnol NB8W	Alcohols, C9-16, ethoxylated	4	Cleaner / wetting agent
EXOsoft PC35	Potassium Cocoate	2	Cleaner / wetting agent / degreaser
Sodium citrate	Sodium citrate	1	Sequestrant
Butyldiglycol	Butyldiglycol	3	Solvent
Water & additives	Water & additives	up to 100%	Solvent and additives

Chemical properties

appearance at 20-25°C	clear liquid
pH at 25°C	7 ÷ 8
cloud point, °C	none
solidification point, °C	+1.0
clarification temperature, °C	+6.0

Procedure:

1. Mix sodium citrate and water until dissolved.
2. Then add ROKAcet LPK and mix
3. Then add ROKAnol NB8W, EXOsoft PC35 and mix.
4. Add solvent – butyldiglycol and mix.
5. Mix until a homogenous solution is obtained.
6. Add other additives.

FACADE CLEANER

Brand name	Chemical name	Content [%]	Function
ROKAcet LPK	Coco acids, ethoxylated propoxylated	4	Cleaner / wetting agent
ROKAnol GT9	Alcohols, C9-16, ethoxylated	9	Cleaner / wetting agent/ degreaser
ROKAmer PP450	Polypropylene glycol	1	Antifoaming agent / cleanning booster
EXOlat ZA	Acrylic resin	2	Sequestrant
Ethyl lactate	Ethyl lactate	3	Green solvent
Synthetic distilled diesters	Synthetic distilled diesters	2	Solvent booster
Water & additives	Water & additives	up to 100%	Solvent and additives

Chemical properties

appearance at 20-25°C	clear liquid
pH at 25°C	5 ÷ 6
cloud point, °C	none
solidification point, °C	0
clarification temperature, °C	+3.0

Procedure:

1. Mix ROKAcet LPK with water until dissolved.
2. Then add ROKAnol GT9, ROKAmer PP450, EXOlat ZA and mix.
3. Add Ethyl lactate and Synthetic distilled diesters and mix.
4. Mix until a homogenous solution is obtained.
5. Add other additives.

PCC EXOL S.A.
Sustainable technologies for new generations

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

PCC EXOL S.A. 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 S.A. carries out new investment projects and implements innovative technologies based on the global sustainability trends.

PCC EXOL S.A. portfolio includes surfactants with a broad range of applications. Besides of the mass production for personal care and detregents industry, the substances produced by PCC EXOL S.A. 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 facilities, flexible production, knowledge as well as experienced personnel.

PCC EXOL S.A. 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 S.A. investor is PCC SE, operating on international markets of the chemical raw materials, transport, energy, coal, coke, petrol, plastics and metallurgy. PCC SE includes 82 companies operating in 41 different locations in 18 countries.

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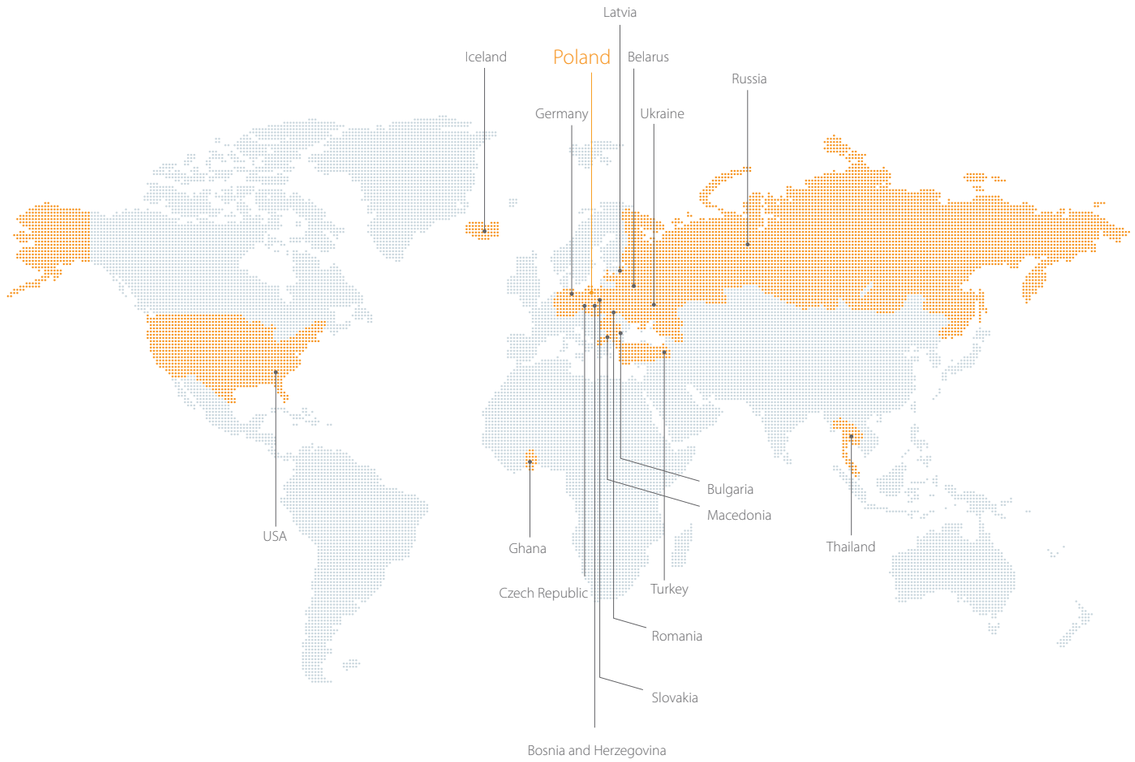

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