

The background of the slide is a composite image. The top half features a semi-transparent blue and yellow gradient overlay. Below this, the main image shows a laboratory setting with several glass beakers and test tubes on a white surface. A yellow liquid is being poured from a test tube into one of the beakers. The image is overlaid with various geometric shapes, including triangles and polygons, in shades of blue, yellow, and grey, creating a modern, scientific aesthetic.

# Construction chemistry

## Sustainable Technologies





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# PCC Group

## We build value through sustainable innovation



Operating in 17 countries,  
in 39 different locations,  
PCC SE currently employs  
3000 people.

Each project or venture with a long-term success story shares one common thing – it’s based on in-depth market research and on the knowledge acquired through years of experience. It is knowledge and experience that enables us to constantly aim higher and deliver greater value through dynamic and sustainable world-wide development of the PCC Group.





The companies, operating as a part of the PCC Group, act with responsibility and care. We only embark on new business challenges when we are certain that we have the skills and knowl-

edge to achieve success. We operate in three major markets: chemicals, energy and logistics. Several dozen business units, managed by PCC SE, work in synergy to generate the greatest possible competitive advantage in both local and international markets. Each day nearly three thousand professionals contribute their energy, and effort, to secure the sustainable development of the PCC Group. The key element of our strategy is to ensure the development of each individual business unit through taking advantage of innovative technology and new market

applications. We achieve our goals in a sustainable and responsible way – we care about the environment and the society within we operate. We are always ready to reach our strategic goal. Efficient and dynamic management helps our employees to fully develop their potential and therefore enhances the overall PCC Group value. Joint enterprises and individual initiatives of our companies are the results of the entrepreneurship culture promoted within the PCC Group. Our philosophy is built on simple values - integrity, trust and reliability. We

believe that following those principles is the only way to build a long-term competitive advantage. The PCC Group currently employs nearly 3000 people. We operate in 17 countries, in 39 different locations around the world. Our portfolio includes eight basic segments. Individual operational responsibility is assigned to seven of them - Polyols, Surfactants, Chlorine, Specialty Chemicals, Consumer Products, Energy and Logistics. Each of these segments is supported by 19 business units, all under the management of the PCC Group.

### The divisions, segments and business units of the PCC Group

Divisions	Segments	Business units	Divisions	Segments	Business units
Chemicals	 Polyols	<ul style="list-style-type: none"><li>• Polyols</li><li>• Polyurethane Systems</li></ul>	Energy	 Energy	<ul style="list-style-type: none"><li>• Renewable Energies</li><li>• Conventional Energies</li></ul>
	 Surfactants	<ul style="list-style-type: none"><li>• Anionic Surfactants</li><li>• Non-ionic Surfactants</li><li>• Amphoteric Surfactants (Betaines)</li></ul>	Logistics	 Logistics	<ul style="list-style-type: none"><li>• Intermodal Transport</li><li>• Road Haulage</li><li>• Rail Transport</li></ul>
	 Chlorine	<ul style="list-style-type: none"><li>• Chlorine</li><li>• MCAA</li><li>• Other Chlorine Downstream Products</li></ul>	Holding	 Holding	<ul style="list-style-type: none"><li>• Portfolio Management</li><li>• Projects</li><li>• Services</li></ul>
	 Specialty Chemicals	<ul style="list-style-type: none"><li>• Phosphorus and Naphthalene Derivatives</li><li>• Alkylphenols</li><li>• Chemicals and Commodities Trading</li><li>• Quartzite</li></ul>			
	 Consumer Products	<ul style="list-style-type: none"><li>• Household and Industrial Cleaners, Detergents and Personal Care Products</li><li>• Matches and Firelighters</li></ul>			

\*Consolidated sales

60  
mln €

571  
mln €

1994

2015



# Chemical raw materials and additives for construction industry applications



## PLASTER-CARDBOARD PANELS

Plaster-cardboard panels are widely used in finishing works. Their production is more water and energy efficient owing to the surfactants and plasticizers. These components also reduce production costs and help to protect the environment.

## WALL AND FLOOR LININGS

The main ingredient of wall and floor linings are plasticizers, e.g. phosphoric esters, which additionally reduce the flammability of materials.

## ONE COMPONENT FOAMS

OCFs are made from polyols; the content of flame retardants assures the high security level.

## RAW MATERIALS AND CONCRETE ADMIXTURES

Different raw materials and chemical admixtures give concrete a broad scope of application. One example is superplasticizers, base materials for producing admixtures, which allow for obtaining concrete with very good durability parameters. It is a crucial feature in building large elements of concrete constructions with high a carrying capacity. Surfactants, on the other hand, are used as aeration and deaeration agents in the production of concrete admixtures. As components of cleaning agents they allow effective removal of dirt from concrete surfaces and construction machines.



## PCC Rokita SA

### Innovations for the future



PCC Rokita SA is one of the leading chemical companies operating in Central and Eastern Europe. We provide high-tech solutions in the area of chemical production to deliver unique products for a wide range of industrial applications.

PCC Rokita SA is one of the leading chemical companies operating in Central and Eastern Europe. We provide high-tech solutions in the area of chemical production to deliver unique products for a wide range of industrial applications. Our key focus is the engineering, manufacturing and distribution of chemical products vital for broad range of businesses including plastics, construction, textiles, coating, and many others. We run our activity on a global basis. Sales outside of Poland represent approximately 60% of the total company revenue. Of this revenue, the most important market is Germany, which generates about 40% of our total sales. Our product portfolio includes over 250 products that may be divided into four product groups:

- polyols
- PAG (polyalkylene glycols)
- alkalis, chlorine and chlorine derivatives
- phosphorus and naphthalene derivatives

The Company runs its activity based on strategic business units.

#### CHLORINE BUSINESS UNIT

The Chlorine Business Unit runs one of the most high-tech, environmentally friendly installations of membrane electrolysis. We provide – among many other products - chlorine and alkalis. Chlorine is a key raw material used in the production of 55% of all the products in the chemical industry. PCC Rokita SA is the biggest supplier of chlorine to water installations in Poland. Apart from chlorine, the unit also manufactures sodium hydroxide, chlorobenzene and hydrochloric acid.

#### POLYOLS BUSINESS UNIT

The Polyols Business Unit is one of the biggest European manufacturers of polyether polyols registered under the ROKOPOL® trade name. The ROKOPOL® product line finds its application mainly in the production of flexible foams, rigid foams and CASE applications. The foams are being used in the furniture industry, automotive industry and many others. The unit's other important product line is ROKOLUB® - a wide range of PAG (polyalkylene glycols) providing the base stock for lubricants.

#### PHOSPHORUS CHEMISTRY BUSINESS UNIT

The Phosphorus Chemistry Business Unit is the biggest producer of phosphorus flame retardants, for polyurethane foams, in Eastern Europe. We also provide naphthalene based super plasticizers for large infrastructure investments in Central and Eastern Europe. Moreover, the portfolio of the business unit also includes innovative products like polymer additives (e.g. flame retardant plasticizers, antioxidants, heat stabilizers) as well as fire-resistant hydraulic fluids and lubricant additives.

As a dominating business entity, PCC Rokita SA runs the PCC Capital Group, which includes over a dozen companies operating mainly in the chemical industry and specialist services industry. These companies provide services both for the PCC Capital Group and for the external market. The strategic investor of the PCC Rokita Group is the German company - PCC SE, which operates on multiple international markets including raw materials for chemistry, transport, energy, coal, coke, fuels, plastics and metallurgy. The International PCC SE Group consociate 78 companies operating in 17 countries of the world.



Flame Retardants  
PCC Rokita SA Phosphorus Chemistry Business Unit

PRODUCT NAME	CHEMICAL NAME	CAS No	PARAMETERS		APPLICATION	FEATURES
Roflam P	tris(2-chloro-1-methylethyl) phosphate	13674-84-5	Appearance:	homogenous, colourless liquid	• isolations • one-component foams • technical paints • acoustic elements • putty	• excellent flame retardancy properties • viscosity reducer • good processing properties • good compatibility
			Colour [Hazen units]:	50 max		
			Acid value [mg KOH/g]:	0.1 max		
			Refraction index n <sub>D</sub> <sup>25</sup> :	1.462 -1.465		
			Viscosity, at 25°C [mPa·s]:	61-89		
			Phosphorus content [% (w/w)]:	9.5		
			Chlorine content [% (w/w)]:	32.5		
Roflam 6	diethyl bis(2-hydroxyethyl) aminomethyl phosphonate	2781-11-5	Appearance:	yellowish to brownish liquid	• isolations • laminates • technical paints • mastics • adhesives	• excellent flame retardancy properties • halogen free • good compatibility • low emission • reactivity
			Acid value [mg KOH/g]:	8.0 max		
			Water content [% (w/w)]:	1.0 max		
			Viscosity, at 25°C [mPa·s]:	100-300		
			Phosphorus content [% (w/w)]:	12.2		
Roflam F5	phenol, isopropylated, phosphate (3:1)	68937-41-7	Appearance:	homogenous, clear liquid	• acoustic isolations • OCF systems • spray foam systems • technical paints • intumescent coatings • CASE (Coatings, Adhesives, Sealants, Elastomers) • engineering plastics	• good flame retardancy • viscosity reducer • impact modifier • halogen free
			Viscosity, at 25°C [mPa·s]:	46 - 64		
			Phenol content [% (w/w)]:	0.05 max		
			Phosphorus content [% (w/w)]:	8.5		
Roflam B7	phenol, isobutyleneated, phosphate (3:1)	68937-40-6	Appearance:	homogenous, clear liquid	• CASE (Coatings, Adhesives, Sealants, Elastomers) • engineering plastics	• non-flammable properties • good plasticizing properties • halogen free product
			Flash point [°C]:	min. 230		
			Viscosity, at 25°C [mPa·s]:	67 - 85		
			Phosphorus content [% (w/w)]:	8.5		



Did you know that...

- Even people in ancient Egypt were interested in trying flame retardants on wood. Its resistance to burning was increased by painting the wood with wine vinegar. The ancient Greeks in turn delayed wood burning by impregnating it with alum.
- Flame retardants applied at present were launched in the market in the 1970's.
- In the last 10 years the number of fatal fire victims has decreased by 20%.
- The research shows that the application of flame retardants in construction and its materials prolongs the time for escape during a fire by at least 15 minutes and decreases the amount of emitted heat by 75%.

Plasticizers  
PCC Rokita SA Phosphorus Chemistry Business Unit

PRODUCT NAME	CHEMICAL NAME	CAS No	PARAMETERS		APPLICATION	FEATURES
Roflex 50	phenol, isopropylated, phosphate (3:1)	68937-41-7	Appearance:	homogenous, clear liquid	• foil and films • cables • technical floor finishing • conveyor belts • curtains • tarpaulins	• excellent plasticizing properties • non-flammable properties • halogen free
			Viscosity, at 25°C [mPa·s]:	48-67		
			Phenol content [% (w/w)]:	0.05 max		
			Phosphorus content [% (w/w)]:	8.5		
Roflex 65	phenol, isopropylated, phosphate (3:1)	68937-41-7	Appearance:	jednorodna, klarowna ciecz	• hoses • cables • conveyor belts • seals	• good plasticizing properties • non-flammable properties • low migration • halogen free
			Viscosity, at 25°C [mPa·s]:	64-75		
			Phenol content [% (w/w)]:	0.05 max		
			Phosphorus content [% (w/w)]:	8.1		
Roflex 95	phenol, isopropylated, phosphate (3:1)	68937-41-7	Appearance:	homogenous, clear liquid	• hoses • cables • conveyor belts • seals	• good plasticizing properties • non-flammable properties • low migration • halogen free
			Viscosity, at 25°C [mPa·s]:	91-115		
			Phenol content [% (w/w)]:	0.05 max		
			Phosphorus content [% (w/w)]:	7.6		
Roflex T70	phenol, isobutyleneated, phosphate (3:1)	68937-40-6	Appearance:	homogenous, clear liquid	• foil and films • cables • technical floor finishes • conveyor belts • curtains • tarpaulins	• non-flammable properties • good plasticizing properties • halogen free product
			Flash point [°C]:	min. 230		
			Phenol content [% (w/w)]:	65-90		
			Phosphorus content [% (w/w)]:	8.5		



Did you know that...

- Appropriately produced concrete positively influences our environment as it absorbs air pollution up to even 45% and reduces the level of smog in urbanised city centres. The project developed by Dutch scientists from the Technological University in Eindhoven was completed in the town Hengelo in the eastern Netherlands. The research results were surprising: they showed a significant reduction of nitrogen oxide and a reduction of the amount of harmful substances by an average of 19%.

Thermal stabilizers/Antioxidants  
PCC Rokita SA Phosphorus Chemistry Business Unit

PRODUCT NAME	CHEMICAL NAME	CAS No	PARAMETERS		APPLICATION	FEATURES
Rostabil TNF	tri(nonylphenyl) phosphite	26523-78-4	Appearance:	homogeneous liquid		
			Colour [Hazen units]:	150 max		
			Acid number [mg KOH/g]:	0.3 max		
			Free nonylphenol content [%]:	4 max		
			Viscosity, at 50°C [mPa·s]:	350 - 700		
Rostabil TPP	triphenyl phosphite	101-02-0	Appearance:	homogeneous, clear liquid	• tarpaulins	
			Colour [Hazen units]:	50 max		
			Acid number [mg KOH/g]:	0.5 max	• seals	
			Phenol content [%]:	1.0 max		
			Density, at 25°C [g/cm³]:	1.180 - 1.186	• conveyor belts	• anti-aging properties
Rostabil TTDP	triisotridecyl phosphite	77745-66-5	Appearance:	clear liquid		
			Colour [Hazen units]:	100 max	• artificial leathers	• thermal stabilization during processing
			Acid number [mg KOH/g]:	0.2 max		
			gęstość w 20°C [g/cm³]:	0.87- 0.91	• wires	
Rostabil DPDP	isodecyl diphenyl phosphite	26544-23-0	Appearance:	clear liquid	• hoses	
			Colour [Hazen units]:	100 max		
			Acid number [mg KOH/g]:	0.1 max		
			Free nonylphenol content [%]:	1.0 max	• foil	
			Density, at 20°C [g/cm³]:	1.030 - 1.050		
Rostabil DDP	diisodecyl phenyl phosphite	25550-98-5	Appearance:	clear liquid		
			Colour [Hazen units]:	100 max		
			Acid number [mg KOH/g]:	0.1 max		
			Free nonylphenol content [%]:	1.0 max		
			Density, at 20°C [g/cm³]:	0.940 - 0.960		

Did you know that...

- Concrete wood is a product which perfectly imitates natural wood, but differs in that it is resistant to frost and scrubbing and so it doesn't decay or rot. Its appearance does not differ from its real equivalent at all as it has its texture, colour and rings.
- Products made of concrete wood are used in elements of landscaping. So the material finds an application in architectural and garden arrangements such as garden paths, curbs, edges, facades, terraces, summer-houses, stairs and floors. Thanks to this modern technology it is possible to use sleepers on flower beds or to place a parquet on a garden path. Both products resemble wooden products but they are made of coloured concrete thanks to which they are durable and resistant to mechanical damage.



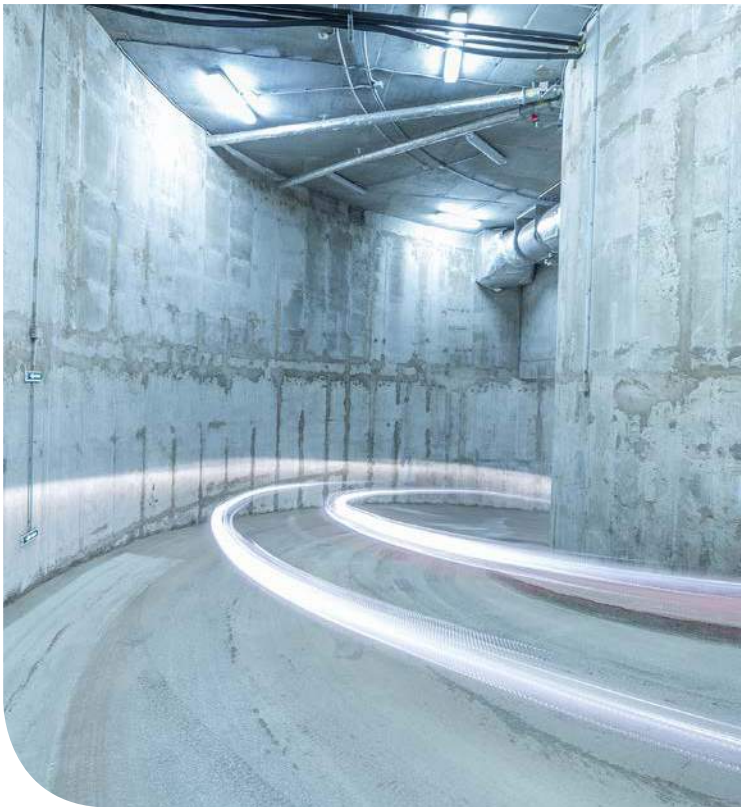


Superplasticizers  
PCC Rokita SA Phosphorus Chemistry Business Unit

PRODUCT NAME	CHEMICAL NAME	CAS No	PARAMETERS	APPLICATION	FEATURES
Superplastyfikator CP	naphthalenesulfonic acid, polymer with formaldehyde, calcium salt	37293-74-6	Appearance: pH of 3% solution Chlorides [% (w/w)]: Water content [% (w/w)]:	light brown powder 6.5 – 9.5 0.05 max 10 max	<ul style="list-style-type: none"><li>excellent gypsum plasticizing and liquidising in plasterboard production</li><li>components of plasticizing and liquidizing admixtures to concrete and mortars</li><li>fluidizers for plasterboard production</li></ul>
Superplastyfikator CA 40 FF	naphthalenesulfonic acid, polymer with formaldehyde, calcium salt	37293-74-6 91078-68-1 EINECS 293-351-6	Appearance: pH of 5% solution: Density, at 20°C [g/cm³]: Chlorides [% (w/w)]: Dry matter [% (w/w)]: Free formaldehyde [ppm]:	dark brown liquid 6.5 – 8.5 1.19 – 1.21 0.05 max 39 – 41 10 max	<ul style="list-style-type: none"><li>enhances labour cost savings by reducing the drying time of plasterboards (superplasticizers provide lower water content in gypsum)</li><li>helps to obtain stable board structure</li><li>plasticises and liquidises dry building mortars</li><li>powder products for dry mortars</li><li>fluidizers for gypsum products</li></ul>

Did you know that... \_\_\_\_\_

- On the sections of the roads with traffic intensity of 20 000 vehicles per hour it is worth to use concrete type of pavements. This type has got a high load capacity, decreasing 11.5 tonne per axle and is resistant to rutting.
- In 1942 german economy ran down with key resources, including steel. This was one of reasons why engineers returned to abandoned idea of concrete ship construction. The main construction centre was located in Rugenwalde (today's Darlowo).



Superplasticizers  
PCC Rokita SA Phosphorus Chemistry Business Unit

PRODUCT NAME	CHEMICAL NAME	CAS No	PARAMETERS	APPLICATION	FEATURES
Superplastyfikator BG97 40	naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4	Appearance: pH of 5% solution: Density, at 20°C [g/cm³]: Chlorides [% (w/w)]: Sulphates (VI) [% (w/w)]: Dry matter [% (w/w)]:	dark brown liquid 7.5 – 10.5 1.20 – 1.21 0.02 max 0.8 max 40 min	
Superplastyfikator BG40 FF	naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4	Appearance: pH of 5% solution: Density, at 20°C [g/cm³]: Chlorides [% (w/w)]: Sulphates (VI) [% (w/w)]: Dry matter [% (w/w)]: Free formaldehyde [ppm]:	dark brown liquid 7.5 – 10.5 1.190 – 1.205 max. 0.02 max. 0.8 39-41 10 max	
Superplastyfikator BGP	naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4	Appearance: pH of 2% solution: Sulphates (VI) [% (w/w)]: Water content [% (w/w)]:	light brown powder 7.5 – 10.5 1.5 max 10 max	
Rocrete S	naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4 91078-68-1 EINECS 293-351-6	Appearance: pH of 5% solution: Density, at 20°C [g/cm³]: Chlorides [% (w/w)]: Sulphates (VI) [% (w/w)]: Dry matter [% (w/w)]:	dark brown liquid 7.5 – 9.5 1.19 – 1.21 0.05 max 2 max 39 – 41	<ul style="list-style-type: none"><li>reduces the quantity of water used for mixing concrete from 20 to 25%</li><li>delays concrete setting time</li><li>components of plasticizing and liquidising admixtures to concrete and mortars</li></ul>
Rocrete SP	naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4 91078-68-1 EINECS 293-351-6	Appearance: pH of 2% solution: Chlorides [% (w/w)]: Sulphates (VI) [% (w/w)]: Water content [% (w/w)]:	light brown powder 7.5 – 10.5 0.1 max 5 max 10 max	<ul style="list-style-type: none"><li>decreases amount of cement used in concrete mix design</li><li>enables concrete to mix in air temperature as low as -5°C</li><li>fluidizers for plasterboard production</li></ul>
Rofluid M	aqueous solution of polycarboxylate ether	27599-56-0	Appearance: pH: Density, at 20°C [g/cm³]: Dry matter [% (w/w)]: Viscosity [mPa·s]:	light brown liquid 5.0 – 7.0 1.10 ± 0.01 49 – 51 500 ± 100	<ul style="list-style-type: none"><li>reduces labour cost by improving workability of concrete and minimizing pumping time</li><li>powder products for dry mortars</li></ul>
Rofluid P	aqueous solution of polycarboxylate ether	27599-56-0	Appearance: pH: Density, at 20°C [g/cm³]: Dry matter [% (w/w)]: Viscosity [mPa·s]:	light brown liquid 5.0 – 7.0 1.11 ± 0.01 49 – 51 500 ± 100	
Rofluid H	aqueous solution of polycarboxylate ether	27599-56-0	Appearance: pH: Density, at 20°C [g/cm³]: Dry matter [% (w/w)]: Viscosity [mPa·s]:	light brown liquid 5.0 – 7.0 1.11 ± 0.01 49 – 51 500 ± 100	
Rofluid T	aqueous solution of polycarboxylate ether	27599-56-0	Appearance: pH: Density, at 20°C [g/cm³]: Dry matter [% (w/w)]: Viscosity [mPa·s]:	light brown liquid 5.5 – 7.5 1.11 ± 0.01 49 – 51 300 ± 100	



Polyether Polyols for CASE applications  
Products of Polyols Business Unit

ROKOPOL®	HYDROXYL NUMBER (mg KOH/g)	VISCOSITY AT 25°C (cP)	MOLECULAR WEIGHT	APPLICATIONS	MARKET
Rokopol® D450*	230 - 270	60 - 70	450		-
Rokopol® D1002	108 - 116	130 - 170	1000		
Rokopol® D2002	53 - 59	280 - 380	2000		
Rokopol® DE320	31-37	550-800	3200		
Rokopol® DE4020	27 - 31	700 - 900	4000		
Rokopol® M5000	35 - 37	700 - 900	4800		
Rokopol® M5020	33 - 38	700 - 1000	4800		
Rokopol® M6000	27 - 29	1050 - 1250	6000		
Rokopol® MS5240	20 - 23	4000 - 8000	4800		
Rokopol® G441	330 - 360	260 - 340	440		
Rokopol® G500	290 - 310	240 - 340	560		
Rokopol® G700	225 - 250	220 - 270	700		
Rokopol® G1000	155 - 165	200 - 300	1000		
Rokopol® F3600	45 - 50	540 - 620	3600		
EP - products	Products for specific applications - for more details please contact us				

- components for the production of coat-  
ings, adhesives, sealants and elastomers
- polymers, CASE

Polyether polyols for Rigid Foam  
Products of Polyol Business Unit

ROKOPOL®	HYDROXYL NUMBER (mg KOH/g)	VISCOSITY AT 25°C (cP)	MOLECULAR WEIGHT	APPLICATIONS	MARKET
Rokopol® D1002	108 - 116	130 - 170	1000		
Rokopol® G1000	155 - 165	200 - 300	1000		
Rokopol® G700	225 - 250	220 - 270	700		
Rokopol® G500	290 - 310	240 - 340	560		
Rokopol® RF551	400 - 440	3000 - 5000	800		
Rokopol® RF55	475 - 515	9200	550		
Rokopol® GS364	340 - 380	2000 - 4000	700		
Rokopol® GS484	460 - 500	6500 - 10000	530		
Rokopol® TD35	390 - 460	5000 - 15000	500		
Rokopol® T	400 - 480	600 - 2500	500		
Rokopol® RF151	440 - 460	15000 - 30000	700		
Rokopol® RF151V	440 - 480	5000 - 12000	700		
Rokopol® RF165MB	370 - 430	4000 - 8000	300		

- 1 component for the production of poly-  
urethane rigid foams, semi-rigid, one – and  
two – component foams and polyurethane  
systems

- polyurethane rigid foam (block, moulding)  
component in the production of sandwich  
panels, polyurethane systems, systems for  
pipe insulation

- building &  
construction,  
insulation

- polyurethane spray foam systems, polyure-  
thane system and systems for sandwich pa-  
nels

\* Some polyols are produced on request only after prior consultation with the sales department.



Did you know that...

- Architectural concrete – whereas in the United States it has been known for 9 years, in Poland it still represents a novelty. What is it? It is glass fibre reinforced concrete or GRC which contrary to a “mere” concrete (façade, facing, construction or reinforced concrete) is reinforced with glass fibre (not less than 5%) of different length. Naturally it gives it specific properties – high density, lightness, strength and resistance to crumbling and uniform texture/smoothness, all of them very important in production of small items/elements.  
The applied technology of reinforcing with glass fibre gives infinite opportunities in creating space, not only industrial or public space. It is used in jewellery industry, art or in production of furniture. Thanks to high representation of details we may create concrete earrings, lamps, vases, candlesticks, dishes and other decorative elements (handles for furniture) and all limited only by our imagination.

## Sodium hydroxide and 1,2-Dichloropropane PCC Rokita SA Chlorine Complex Products

### SODIUM HYDROXIDE

Sodium hydroxide (sodium hydroxide) is an inorganic chemical compound also known as **caustic soda**. It is marketed in the following forms:

- white crystalline solid, whose melting point is 318°C
- liquid, which is water solution of maximum concentration 50%.

### APPLICATIONS

Sodium hydroxide is among principal chemicals used in nearly all types of industries. This versatile substance is essential in building chemistry, one of numerous PCC Group's areas of activity.

Sodium hydroxide is produced on one of the most modern installations in the world, owned by PCC Rokita SA. It meets the highest European and global quality standards. This ensures that our clients include foremost producers and distributors of chemical products.

Sodium hydroxide is used in building industry mostly in the production of:

- water glass from silica, an ingredient of quality silicone adhesives and paints
- titanium white, one of the basic ingredients of paints
- synthetic pigments
- specialist surfactants for building and construction industry as:
  - **sodium carrier** in syntheses of specialist ionic surface active agents
  - **catalyst** (reagent) in ethoxylation and propoxylation
  - **neutralizer** (reagent) in sulphonation
- additives to concrete and cement mortar (super-

The product is one of the strongest alkalis, therefore it is easily soluble in water and alcohols. It is highly hygroscopic. It has multiple applications in chemical industry, whose annual demand for sodium hydroxide is estimated at 17mln tonnes, which corresponds to nearly 40% of world consumption.

plasticizers, dispersants) as a neutralizer

- in the final stage of the production of additives to plastics, used e.g. in building, as a neutralizer.

Chemical industry is a key area of the use of sodium hydroxide for synthesizing various organic and inorganic compounds. Owing to high reactivity with other substances as well as other properties, sodium hydroxide is an excellent reagent in many technological processes typical of most industries, such as paper and pulp, textile and clothing, pharmaceutical, medical and mining industry, and many other.

#### Packaging and transport:

Rail cisterns of 50-tonne loading capacity and road cisterns of 24-tonne loading capacity.

Sodium hydroxide is subject to ADR/RID regulations.

UN no 1824.

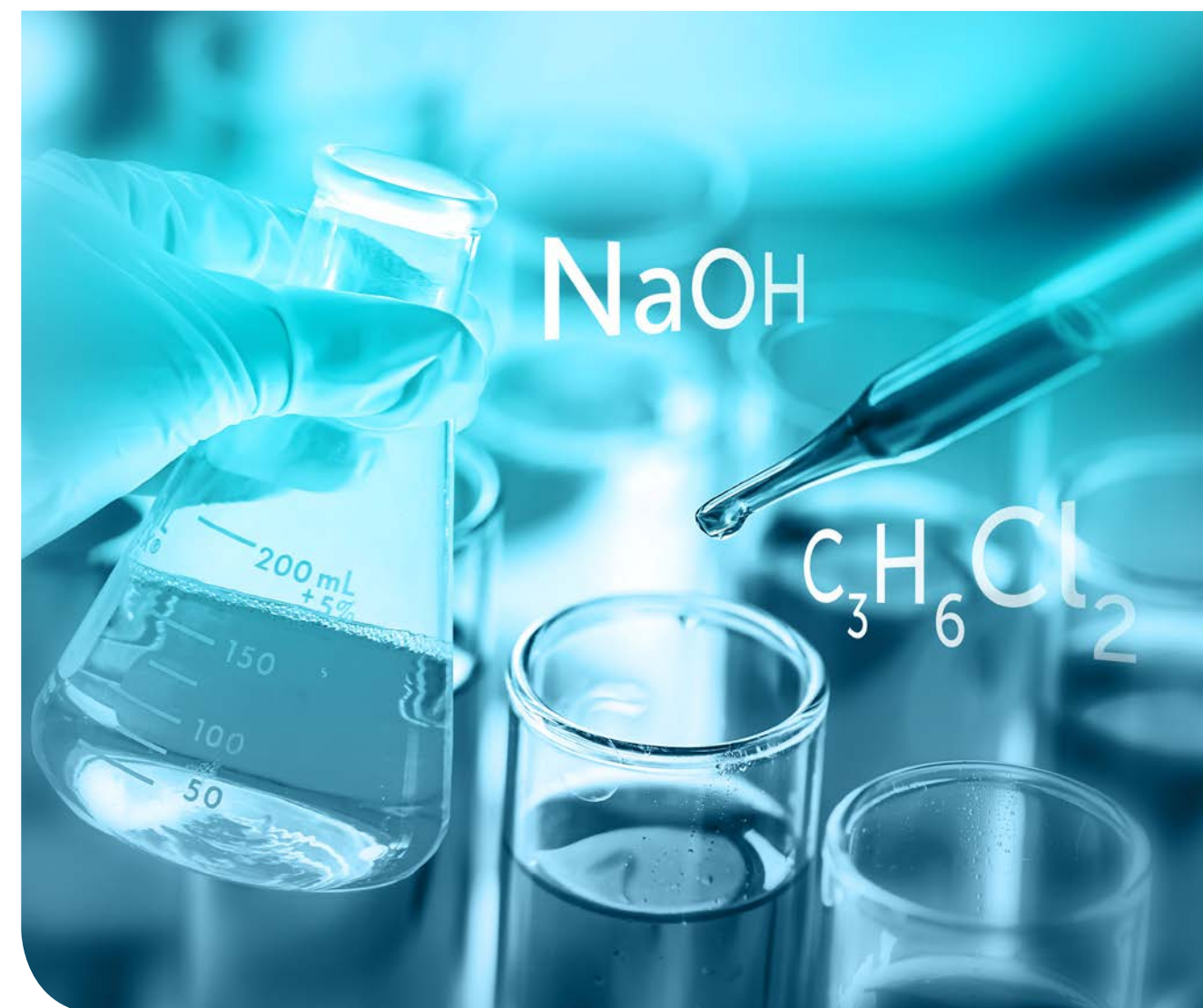
#### Proper shipping name (ADR):

SODIUM HYDROXIDE IN SOLUTION

#### Official shipping name (RID):

SODIUM HYDROXIDE, SOLUTION  
Class 8.

Packaging group II



### DICHLOROPROPAN

1,2-dichloropropane (propylene dichloride) is a long life colourless liquid with sweetish aroma resembling chloroform, used as a solvent for resins, rubbers, waxes, greases, lubricants, tars and asphalts. This compound can be applied in many technological processes, including impregnation, cleaning and degreasing of metal surfaces in electrogalvanizing processes, removing paints, dry cleaning and removing lead from petrol. It is an ingredient of fumigants and insecticides. Also used in the synthesis of tetrachloroethylene and carbon tetrachloride.

#### Packaging and transport:

Road cisterns of ca. 24-tonne loading capacity

Dichloropropane is subject to ADR/RID regulations.

UN no 1279.

#### Proper shipping name (ADR):

1,2- DICHLOROPROPANE

#### Official shipping name (RID):

1,2-DICHLOROPROPANE  
Class 3.

Packaging group II



## PCC EXOL SA

### Sustainable technologies for new generations



PCC Exol SA is a combination of the latest technology with experience in production and distribution of surfactants.

PCC Exol SA is a combination of the latest technology with experience in production and distribution of surfactants. The company has its headquarters in Brzeg Dolny, Poland, where the manufacturing units of anionic, nonionic and amphoteric surfactants are located. Flexibility of production enables us to offer a wide range of surfactants adjusted to the current customer needs. As one of the leading chemical products manufacturers, we continue to undertake investment activities based on the principle of sustainable development. Our products have numerous industrial applications. Our surfactants are used as raw materials for various markets including: household

chemicals, textile, agrochemicals, metalworking, oilfield industries, construction industry, paints & coatings, pulp and paper, and many others. Over the years, PCC Exol SA has developed core expertise in manufacturing specialty surfactants. We meet our customers' needs with a unique and versatile product portfolio, a broad expertise in surfactants chemistry and a high degree of flexibility. Through close customer relationships and by maximizing the synergy of customers' application experience combined with our knowledge of chemistry, we continuously strive to offer tailor-made products and system solutions that contribute to your success.

We are continuously expanding our product range with new surfactants, focusing on safe chemistry and being friendly to people and environment. Our operations are conducted in full compliance with legal and other requirements, including environmental requirements, the design, production and sale of large volumes of specialist, often unique, chemical products for further processing requires coordinated cooperation of many services at the Company's disposal. A certified quality management system and environmental management system has proven to be very useful. Those two integrated systems help our employees to be aware of their roles

in reaching quality and environmental goals. Our specialists know that in the end, by carrying out their tasks in accordance with procedures applicable to their positions and other internal regulations, we provide our clients with exactly what they expect from us, acting within conditions of reasonable and legal usage with regard to the environment. Our strategic investor is the German company PCC SE, which operates internationally in three divisions: Chemical, Energy and Logistics.

Surfactants for the Construction Industry  
PCC EXOL SA Products

PRODUCT	INCI NAME	CAS NUMBER	APPEAR- -ANCE	HLB	ACTIVE SUBST- -ANCE %	CONCRETE	GYPSUM	ASPHALT	TUNNELLING	FUNCTION
ALKYLBENZENE SULFONATES										
ABSNa 30	sodium dodecyl- benzene-sulfonate	68411-30-3	liquid	-	30	•				• active agent in aerating admixtures for concrete
ABSNa 50	sodium dodecyl- benzene-sulfonate	68411-30-3	paste/ liquid	-	48-52	•				• aerating agent for concrete; im- proves workability and resistance to freezing/thawing
ALKYL SULFONATES										
Rosulfan D	sodium decyl sulfate	142-87-0	liquid	-	35-40	•			•	• aerating agent for concrete and friction reducer in tunnelling
Rosulfan L	sodium lauryl sulfate	85586-07-8	liquid	-	27.5-30	•	•			• aerating agent for concrete, foam- ing agent for gypsum; increases air content and improves concrete re- sistance to freezing/thawing
ALKYL ETHER SULFATES										
Sulforokanol L225/1	sodium laureth sulfate +2 EO	68891-38-3	liquid	-	25-27	•	•			• concrete aerating agents; increase air content and improve concrete resistance to freezing/thawing
Sulforokanol L227/1	sodium laureth sulfate +2 EO	68891-38-3	liquid	-	68-72	•	•			
Sulforokanol L270/1	sodium laureth sulfate +2 EO	68891-38-3	paste	-	68-72	•	•			
Sulforokanol L327/1	sodium laureth sulfate +2 EO	68891-38-3	liquid	-	26-28	•	•			
Sulforokanol L327	sodium pareth sulfate +3 EO	125301-92-0	liquid	-	26-28	•	•			
Sulforokanol L370	sodium pareth sulfate + 3 EO	12-5301-92-0	paste/gel	-	68-72	•	•			• excellent foaming agent in the production of plasterboard panels; used as a foaming agent
Sulforokanol N232P	sodium C9-C11 pareth sulfate	160901-28-0	liquid	-	31-33	•	•			

Surfactants for the Construction Industry  
PCC EXOL SA Products

PRODUCT	INCI NAME	CAS NUMBER	APPEAR- -ANCE	HLB	ACTIVE SUBST- -ANCE %	CONCRETE	GYPSUM	ASPHALT	TUNNELLING	FUNCTION
SULFOSUCCINIC ACIDS										
DOSS sulfosuccinic acid	di (2-ethylhexyl) sulfos- uccinic acid, sodium salt	577-11-7	liquid	-	min. 60.0	●	●			• excellent wetting agent; reduc- es the surface tension in such mixtures as paints, adhesives and plaster; wetting agent for dust
DOSS sulfosuccinic acid 70GP	di (2-ethylhexyl) sulfos- uccinic acid, sodium salt	577-11-7	liquid	-	min. 70.0	●	●			
BETAINES										
Rokamina K30	cocoamidopropyl betaine		liquid		29-32	●	●			• products characterized by good foaming and foam stabi- lizing properties; excellent wet- ting properties; can be mixed with anionic, cationic and non- ionic surfactants
Rokamina K40	cocoamidopropyl betaine		liquid		min. 37.0	●	●			
ALCOHOL ETHOCYLATES										
Rokanol NL6	alcohol, C9-11, branched and linear +6 EO	68439-45-2	liquid	12.3	min. 99.5	●	●			• improve wetting power of hard surfaces; plasticizers for concrete; nonionic foaming agents for plasterboard panels; improve workability and resist- ance to freezing/thawing
Rokanol NL8	alcohol, C9-11, branched and linear +8 EO	68439-45-2	liquid	13.8	min. 99.0	●	●			
Rokanol ID5	alcohol, C13-Iso + 3 EO	69011-36-5	liquid	8.0	min. 99.0					• wetting and aerating agents for concrete; improve workability
Rokanol IT3	alcohol, C13-Iso + 3 EO	69011-36-5	liquid	8.0	min. 99.0	●				
Rokanol IT5	alcohol, C13-Iso + 3 EO	69011-36-5	liquid	8.0	min. 99.0					
Rokanol IT7	alcohol, C13-Iso + 7 EO	69011-36-5	liquid	12.1	min. 99.0	●				
Rokanol IT7W	alcohol, C13-Iso + 7 EO	69011-36-6	liquid	12.1	min. 99.0	●				



Surfactants for the Construction Industry  
PCC EXOL SA Products

PRODUCT	INCI NAME	CAS NUMBER	APPEAR- -ANCE	HLB	ACTIVE SUBST- ANCE %	CONCRETE	GYP SUM	ASP HALT	TUN NELLING	FUNCTION
Rokanol L4	alcohol, C12-14 + 4 EO	68002-97-1	liquid	10.0	min. 99.5	•	•			• oil-soluble emulsifier; owing to its good emulsifying properties, it is used as an intermediate product in the production of plaster panels and concrete
Rokanol L7	alcohol, C12-14 + 7 EO	103819-01-8	liquid	12.9	min. 99.5	•	•			
Rokanol L7W	alcohol, C12-14 + 7 EO	103819-01-8	liquid	12.9	89-92	•	•			• nonionic foaming agents; used as intermediate products in production of plaster panels and concrete, decreases density of plaster panels; improves stability during freezing-defrosting; wetting agents
Rokanol L10	alcohol, C12-16 + 10 EO	103819-01-8	paste	13.8	min. 99.7	•	•			
Rokanol L10/80	alcohol, C12-14 + 10 EO	103819-01-8	viscous liquid	13.8	min 80.0	•	•			• solid admixture for the construction industry; wetting agent for small particles, improves plasticization and workability of mortar; used in the production of bitumen emulsion
Rokanol T18	alcohol, C16-18 + 18 EO	68439-49-6	wax	15.8	min. 99.0	•	•	•		
Rokanol RZ4P11	alcohol, C16-18 + EO/PO	68002-96-0	liquid	-	min. 99.0	•				• antifoaming liquid for the construction industry; can be used in adhesives for ceramic tiles, construction glues, sealants, self-levelling concretes with superplasticizers and in EVA modified concretes
Rokanol LP2023	alkohol, C16-C18 + EO/PO	68002-96-0	liquid	-	min. 99.5	•				• antifoaming liquid for construction industry
Rokanol LP2126	alcohol, C16-C18 + EO/PO	68002-96-0	liquid	-	min. 99.5	•				• antifoaming liquid for construction industry

Surfactants for the Construction Industry  
PCC EXOL SA Products

PRODUCT	INCI NAME	CAS NUMBER	APPEAR- -ANCE	HLB	ACTIVE SUBST- ANCE %	CONCRETE	GYP SUM	ASP HALT	TUN NELLING	OTHER	FUNCTION
NONYLPHENOL ETHOXYLATES											
Rokafenol N5	nonylphenol + 5 EO	127087-87-0	oily liquid	10.0	min. 99.0	●					<ul style="list-style-type: none"><li>wetting agents and plasticizers used for concretes and mortars; resistant to hard water; stabilize freezing-defrosting process; wetting power decreases and foaming increases along as EO rises</li></ul>
Rokafenol N6	nonylphenol + 6 EO	127087-87-0	oily liquid	11.0	min. 99.0	●					
Rokafenol N8	nonylphenol + 9 EO	127087-87-0	oily liquid	12.8	min. 99.0	●					
Rokafenol N10	nonylphenol + 10 EO	127087-87-0	oily liquid	13.3	min. 99.0	●					
Rokafenol N14	nonylphenol + 15 EO	127087-87-0	oily liquid	15.0	min. 99.0	●					
Rokafenol N22	nonylphenol + 22 EO	127087-87-0	paste/wax	16.2	min. 99.0	●					
Rokafenol N22/30	nonylphenol + 22 EO	127087-87-0	liquid	16.2	25-26.5	●					
Rokafenol N40/70	nonylphenol +30 EO	127087-87-0	liquid	17.8	69-71	●					
Rokafenol N40	nonylphenol + 40 EO	127087-87-0	wax	17.6	min. 99.0	●					
FORMULATIONS											
EXOc <span>lean</span> CR	mixture		liquid			●					<ul style="list-style-type: none"><li>EXOc<span>lean</span> CR is a mixture based on selected organic acids for removing remains of concrete from metal elements and tools. Suitable mixture of organic hydroxy-acids helps quickly and effectively to remove the concrete remains from cleaned surfaces. The product does not contain mineral acids, which cause smoke corrosion during application.</li></ul>
EXOc <span>lean</span> MC	mixture		liquid			●					<ul style="list-style-type: none"><li>EXOc<span>lean</span> MC is a substance for cleaning and degreasing metal surfaces before the application of coatings. The product is a mixture of surfactants and corrosion inhibitor. It is suitable for different metal surfaces: galvanized steel, cast iron, steel, non-ferrous alloys.</li></ul>
EXOemul RO1	mixture		liquid			●					<ul style="list-style-type: none"><li>EXOemul RO1 is an emulsifying system for emulsifying oily substances like natural oils or methyl esters of fatty acids. It is a nonionic product used mainly for emulsifying such systems as oil in water used for industrial applications. Emulsifying system for oils in concrete release agents.</li></ul>

Surfactants for the Construction Industry  
PCC EXOL SA Products

PRODUCT	INCI NAME	CAS NUMBER	APPEAR- -ANCE	HLB	ACTIVE SUBST- STANCE %	CONCRETE	GYP SUM	ASPHALT	TUN NELLING	FUNCTION
ETHOXYLATED FATTY ACIDS										
Rokacet K7	cocoate + 7 EO	61791-29-5	liquid	11.6	min. 99.0	●				● nonionic surfactants for aerating agents for concrete
Rokacet O7	oleate + 7 EO	9004-96-0	liquid	10.6	min. 99	●				
FATTY AMIDE ETHOXYLATES										
Rokamid KAD	cocoamide DEA	-	liquid	-	min. 99		●			● foam stabilizer and sliding agent for PVC pipes
Rokamid RAD	oleamide DEA	68603-38-3	liquid	-	90.0		●			● foam stabilizer
FATTY AMINE ETHOXYLATES										
Rokamin K15	cocamine + 15 EO	61791-14-8	liquid	15.5	min. 97.0			●		● emulsifiers for the production of bitumen emulsions
Rokamin SR22	alkoxylated tallow amine	68213-26-3	liquid		min. 99.0			●		
EO/PO BLOCK COPOLYMERS										
Rokamer 2000	PEG/PPG copolymer	9003-11-6	liquid	-	min. 99.0	●	●			● liquid skimmers for the construction industry; used in a variety of products and construction processes; suitable for concrete, mortar, plasters and self-levelling floors with superplasticizers and other construction products
Rokamer 2600	PEG/PPG copolymer	9003-11-6	liquid	-	min. 99.0	●	●			
Rokamer 2100	PEG/PPG copolymer	9003-11-63	liquid	3.4	min. 99.0	●	●			
Rokamer 1010	PEG/PPG copolymer	9003-11-6	wax	16.6	min. 99.0	●	●			● plasticizers for concrete, wetting agents for small particles; improve workability
Rokamer 1010/50	PEG/PPG copolymer	9003-11-6	liquid	16.6	>50.0	●	●			

Surfactants for the Construction Industry  
PCC EXOL SA Products

PRODUCT	INCI NAME	CAS NUMBER	APPEAR- -ANCE	HLB	ACTIVE SUBST- ANCE %	CONCRETE	GYP SUM	ASPHALT	TUN NELLING	FUNCTION
POLYETHYLENE GLYCOLS										
Polikol 200	polyoxyethylene glycol	25322-68-3	liquid	-	min. 99.0	●	●			● increase resistance of mortar to freezing-defrosting cycles; stabilizers, reduce sedimentation; reduce water loss in hardened concrete
Polikol 300	polyoxyethylene glycol	25322-68-3	liquid	-	min. 99.0	●	●			
Polikol 400	polyoxyethylene glycol	25322-68-3	liquid	-	min. 99.0	●	●			
Polikol 600	polyoxyethylene glycol	25322-68-3	liquid	-	min. 99.0	●	●			● improves lubricating properties; agents maintaining moisture of adhesives
Polikol 1500	polyoxyethylene glycol	25322-68-3	wax	-	min. 99.0	●	●			
Polikol 1500 flakes	polyoxyethylene glycol	25322-68-3	flakes	-	min. 99.0	●	●			
Polikol 4500	polyoxyethylene glycol	25322-68-3	wax	-	min. 99.0	●				● possess lubricating properties and improve surface finish
Polikol 4500 flakes	polyoxyethylene glycol	25322-68-3	flakes	-	min. 99.0	●				
METHOXY POLYETHYLENE GLYCOLS *PCC Exol continues to develop a portfolio for this product category while taking client needs into consideration.										
MPEG 1000	methoxy polyethylene glycol	9004-74-4	solid body	-	min. 99.0	●				● raw material for producing polycarboxylic ethers, superplasticizers used as a water reducing agent
AMINES										
Raw triethano-lamine	triethanolamine	102-71-6	liquid	-	min. 85.0	●				● accelerator: shortens setting time of fresh concrete; improves resistance of concrete to crumbling during freezing and defrosting



# PCC PRODEX

## Polyurethane serves you better!



PCC Prodex. Rigid and semi-rigid materials for thermal insulation, acoustic isolation and waterproofing for roofs, attics, walls, floors and foundations.

### Did you know that...

- Polyurethane was first known in 1937, when two German scientists published and patented a method of preparing it.
- At present, polyurethane (PU) is one of the most popular and most widely used polymers in the world.
- Today it is often said that polyurethane, as a material, has almost unlimited possibilities of use and is also one of the most important contemporary plastic.

Since 1979, PCC PRODEX Sp. z o. o. (formerly PRO-DEX-SYSTEM Sp. z o. o.) has been involved in the continual production of one and two-component polyurethane systems. The polyurethane solutions delivered by PCC PRODEX find their application in the production of adhesives, sealants, semi-rigid and rigid insulating materials as well as components made from integral and elastic foams. Thanks to our highly qualified staff with their experience and excellent understanding of polyurethane processing, the company offers a wide range of polyurethane systems (over 150) intended for application in construction,

cooling and heating sectors, the automotive industry as well as in mining and sport & recreation. Owing to our in-house research and development facilities located in Brzeg Dolny and Żółwin (near Warsaw), the company can quickly adapt its offer to the specific customers' needs and also changes appearing on the market. The company places emphasis on the continuous improvement of the production process and product quality, making sure the offer meets the highest world standards. In 2010, PCC PRODEX company merged into the international company, PCC SE, that operates on the world's markets of chemical raw mate-

rials, transportation, energy, coal, coke, fuels, plastics and metallurgy. In October 2012, PCC Rokita SA concluded a contract with the PCC SE company located in Duisburg for the purchase of PCC Prodex Limited (Sp. z o. o.) company. As a result, PCC Rokita SA acquired 100% of the company shares. The polyurethane systems in the PCC PRODEX offer were granted a series of certificates and approvals of research institutes and certifying centres such as ITB, IMBiGS, GIG, OBAC, DNV, BV and PZH.

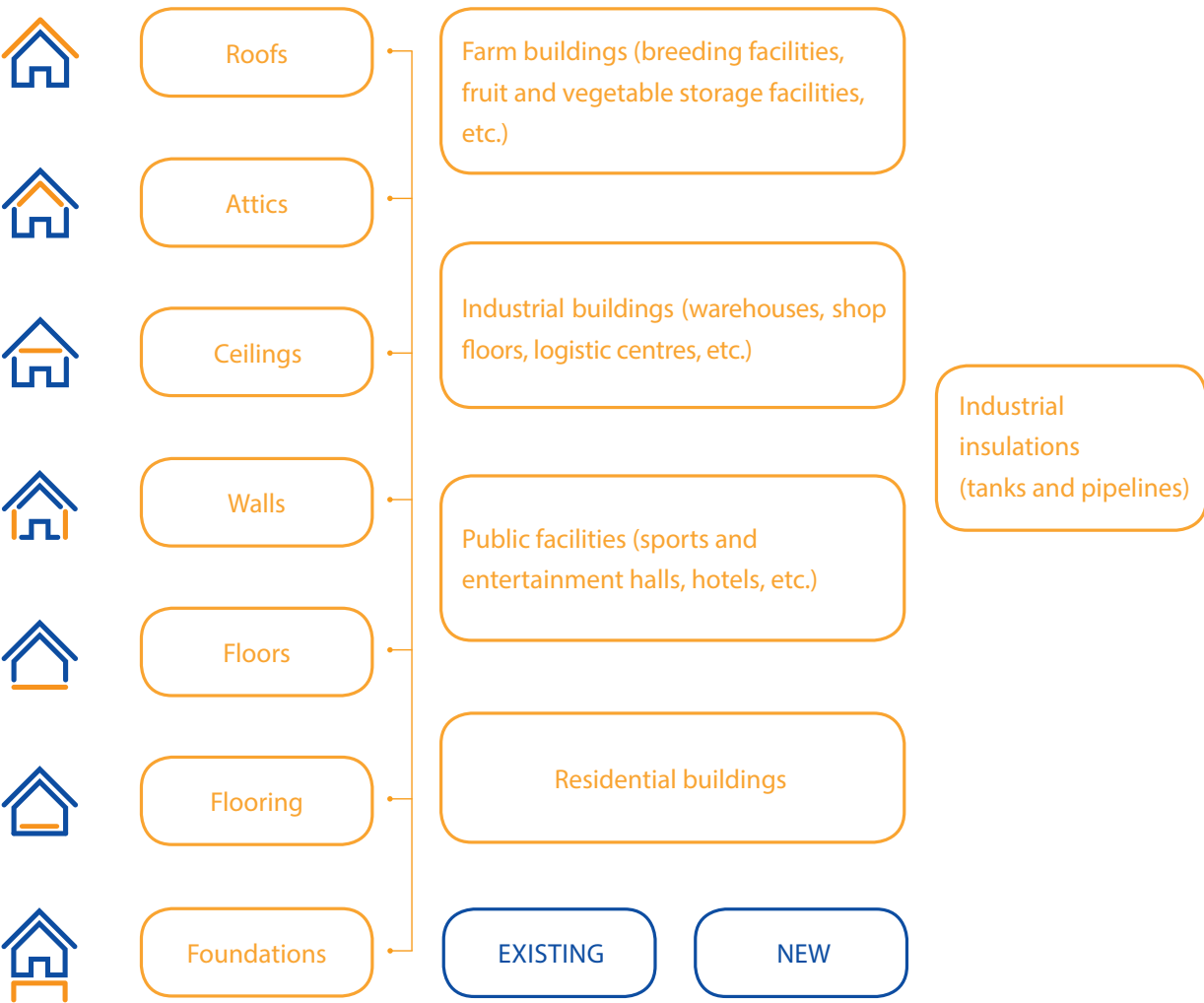
## Spray Polyurethane Foam System PCC Prodex Products

Spray foams are used for making seamless thermal and acoustic insulations, waterproofing and reinforcing layers, especially in high densities. Polyurethane foams are sprayed in a special technology consisting in placing insulation layers directly on the surface of an insulated object. This technology requires special high-pressure dispense equipment, which allows precise mix-

ing of polyurethane products and accurate application of insulation layers. We have expanded our offer of spray polyurethane foam systems with products for making pour and injection PU foams:

- EKOPRODUR PM 4032 (slow)
- EKOPRODUR PM 2032 (fast)

Where can injection foam insulations be applied?



## APPLICATIONS

- insulating roofs, attics, ceilings, walls, floors and foundations in farm, industrial and residential buildings, public facilities; both new and existing (designated for renovation)
- insulating industrial tanks, e.g. chemical tanks and pipelines
- reinforcing surfaces by spraying layers of increased mechanical resistance



## ADVANTAGES OF POLYURETHANE FOAM INSULATIONS

- quick and easy application regardless of the complexity of the surface
- one of the lowest thermal conductivity coefficient ( $\lambda \leq 0.021 \text{ W/(m}\cdot\text{K)}$ )
- no thermal bridges responsible for heat loss (seamless insulation)
- excellent adhesion to different materials and surfaces
- high stability of parameters throughout service lifetime
- high efficiency (e.g. up to 1000m<sup>2</sup> of a flat roof daily), which reduces workload and does not overly absorb the users of the building
- insulation is light and multifunctional (thermal and acoustic in one)
- resistance to mould and mildew

PRODUCT	STRUCTURE	KIND	FOAM TYPE	DENSITY	EFFICIENCY	USE
SPRAY POLYURETHANE FOAM						
Ekoprodur S0310	open cell	two-component mixture	semi-rigid	9 ± 1	0.10 kg per 1m <sup>2</sup> (1cm thickness)	• interior thermal and acoustic insulation of attics
Ekoprodur S0329	closed cell	two-component mixture	rigid	36 ± 2	0.38 kg per 1m <sup>2</sup> (1cm thickness)	• interior thermal insulation of walls, interior and exterior thermal insulation of ceilings
Ekoprodur S0540	closed cell	two-component mixture	rigid (reinforced strength)	50 ± 5	0.50 kg per 1m <sup>2</sup> (1cm thickness)	• interior thermal insulation of floors, exterior waterproofing, thermal insulation and wind barrier of roofs and foundations
Ekoprodur 05200	closed cell	two-component mixture	rigid (reinforced strength)	150 - 400	od 1.5 kg per 1m <sup>2</sup> (1cm thickness)	• reinforcement of structures, on surfaces requiring mechanical reinforcement, e.g. shower bases, bathtubs, car body elements, etc.



## Polyurethane adhesives PCC Prodex Products



Polyurethane  
adhesives can be  
used without solvents

Another product group comprises one- and two-component polyurethane adhesives. On account of relatively low viscosity, this group can be used without solvents. This minimizes adverse effect on the environment and facilitates bonding damp materials as well as materials which are not resistant to chemicals (e.g. expanded polystyrene).

### APPLICATIONS

- bonding sandwich panels
- connecting construction elements
- bonding wood and wood-like elements with steel, aluminium, concrete

### ADVANTAGES OF POLYURETHANE ADHESIVES

- variety of applications: perfect for bonding sandwich panels, wood, expanded polystyrene, tar paper, paper, cardboard and typical building materials, such as concrete and sheet metal
- excellent adhesion to porous materials thanks to self-defoaming properties
- waterproof joint
- extended temperature tolerance (including very low temperatures)

### PRODUCTS

**One-component adhesives:** prepolymers with proper reactivity and NCO groups matched to the application. These adhesives harden by reaction with air moisture:

- EKOPRODUR RB2
- EKOPROMER G15
- EKOPROMER G18
- EKOPROMER G21

**Two-component adhesives** work on the basis of a reaction between component A and component B in properly matched proportions. They do not contain organic solvents.

- EKOPRODUR 1331 B2
- EKOPRODUR KW1
- EKOPRODUR KW3
- Ekoprodur KW-A2

At present we are extending our offer of two-component adhesives with antistatic polyurethane adhesives **PROMOSTAT**, which are designed for sealing cracked building structures, particularly in places with high risk of explosion.





## Crossin Insulations – modern polyurethane insulation. New trademark in PCC Group



Crossin Insulations is one of the latest and the most innovative product lines at Group PCC. Crossin Insulation trademark represents high-tech polyurethane insulation systems used for complex and professional building insulation. This modern product line is based on exceptional quality and reliable approach to the customer. The brand essence is to establish the best possible relationships with architects, designers, contractors, and above all investors. The effectiveness of the products is a result of Crossin highly qualified staff and is based on years of experience and knowledge in the field of polyurethane insulation.

Crossin Insulations line includes two types of high-tech insulation: PU spray insulations systems and PU systems based on rigid foam boards. Products innovation is the keystone on

which customers comfort, safety and satisfaction are built. Every day Crossin experts work on creation of new systematic solutions that are based on the philosophy of sustainable technologies and continuous development. This lead to the creation of a strong brand which is drawn on conscious choices made not only by our business partners, but above all by modern and conscious families.

**Crossin spray insulation systems** are the systems of spray polyurethane foam designed for rapid and efficient thermal and acoustic insulation of roofs, walls and foundations. These systems are used in residential, industrial, agricultural, and public buildings.

All products of Crossin Spray Insulation group are highly recommended for the insulation of large areas of both, outside and inside buildings.

In this modern line of insulation, we find ready-made, two-component polyurethane systems, which differ from each other by physico-mechanical properties. Among the insulations of Crossin Spray Insulations there are systems for closed cell rigid foam having different densities, and a system for semi-rigid open-cell foam, with a comparatively low density. In addition to the highest quality product, Crossin offer also includes a comprehensive service for the execution of building insulation.

**Crossin Insulations systems based on PU rigid foam boards** are modern thermal insulation solutions that consist of construction panels made of rigid polyurethane foam, adhesives, primers, finishers, fiberglass meshes and other products that match system type and purpose. Crossin Insulations solutions are used through-

out the investment process.

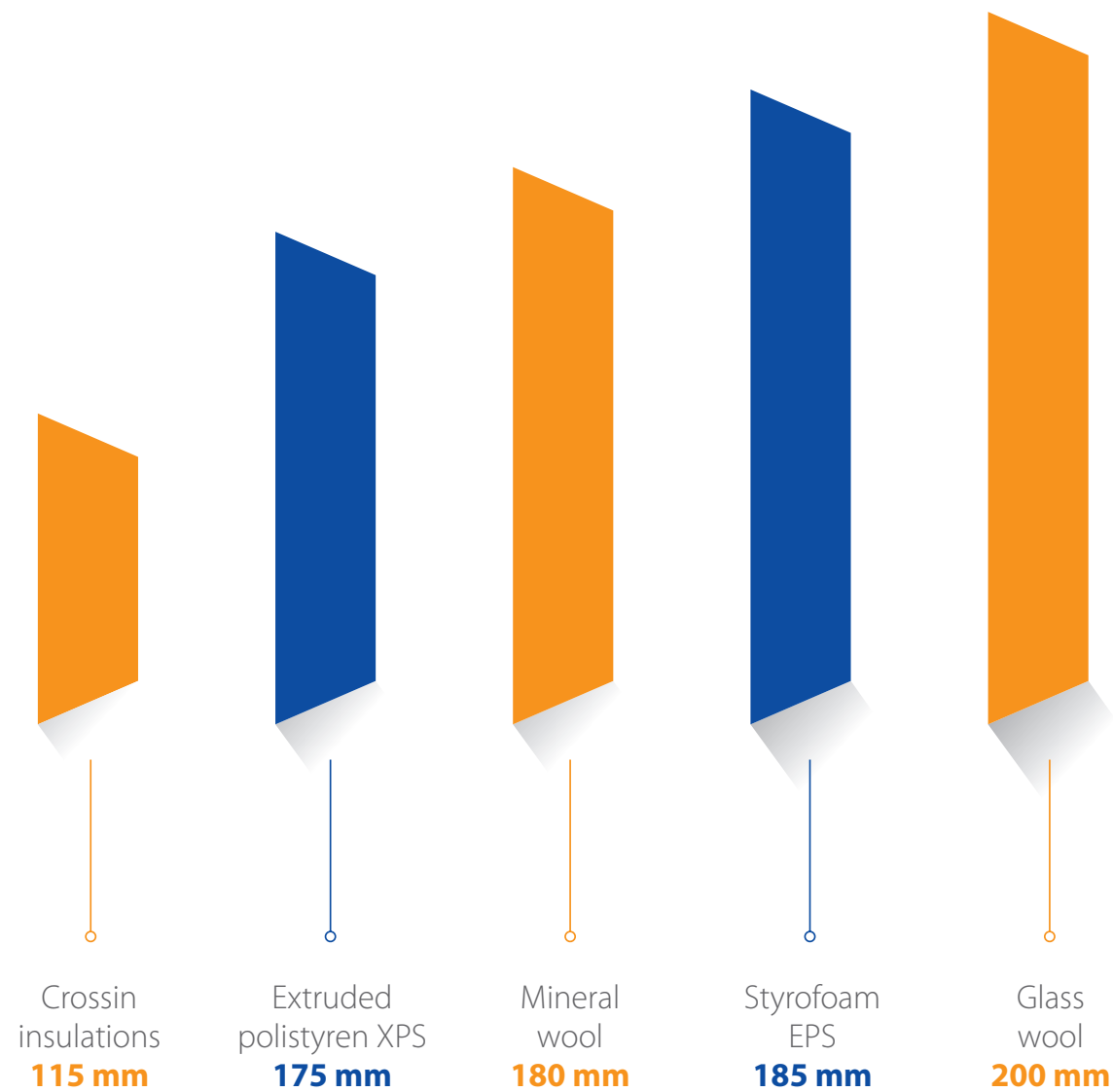
It works perfectly in carrying out technical insulation and walls insulation, also according to ETICS, in multi-layer walls and as a thermal insulation of floors and foundation insulation. Crossin Insulations systems based on PU-rigid foam boards are designed to meet certain requirements of end-users.

These systems are lightweighted and easy to handle, do not require special equipment for application.

Crossin Insulations systems involve excellent parameters contributing to clear cost savings through reduction of losses of energy needed for heating.



## Thickness of an Insulation layer at the heat transfer coefficient $U=0.2 \text{ W}/(\text{m}^2\cdot\text{K})$ depending on the material type



Crossin Insulations systems are high quality insulation systems that ensure comfort and safety for many years.

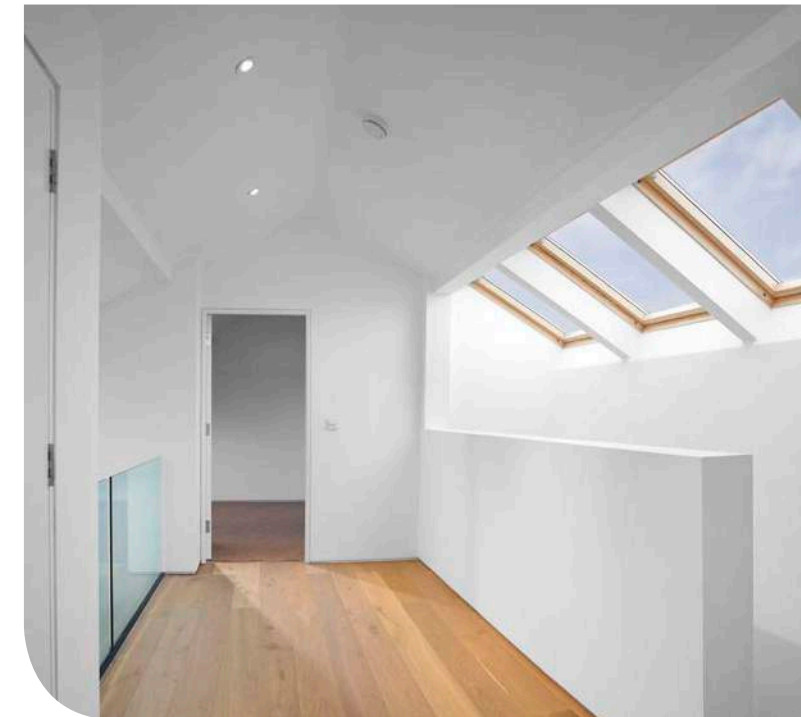
## Applications of Crossin Insulations

### • construction sector

external and internal insulation of roofs, walls and floors in both newly-built and existing buildings (renovation and thermal insulation); floor and foundation insulations; buildings with limited space for insulation; reinforcement of building surfaces; real estate development, residential blocks

### • industry

insulation for such industrial facilities as warehouses, production halls and logistics centers; insulation for tanks and pipelines



### • agriculture

insulation and thermal insulation for warehouses, fruit and vegetable stores and farm buildings such as pig farms, stables, cow sheds and hen houses

### • public utility buildings

insulation and thermal insulation of hotels, hospitals, schools, sports halls, offices, etc.

### • objects of high architectural significance

insulations of architectural monuments, historic buildings, tenement houses, castles, modern architecture monuments



# Crossin Insulations Products

## Base: Closed-cell PU spray foam

### • Crossin Floor

internal thermal and hydro insulation for floors, foundations and floorings, with the yield of 0.5 kg per 1 sq. m of insulated surface, providing a 1 cm thick layer

### • Crossin Wall

internal wall insulation, with the yield of 0.38 kg per 1 sq. m of insulated surface, providing a 1 cm thick layer

### • Crossin Attic Hard

internal and external insulation for floors and ceilings, with the yield of 0.38 kg per 1 sq. m of insulated surface, providing a 1 cm thick layer

### • Crossin Roof

external roof insulation providing enhanced strength, with the yield of 0.5 kg per 1 sq. m of insulated surface, providing a 1 cm thick layer

## Base: Open-cell PU spray foam

### • Crossin Attic Soft

lightweight internal insulation of attics, with the yield of 0.1 kg per 1 sq. m of insulated surface, providing a 1 cm thick layer



# Crossin Insulations Systems

## Base: Closed-cell PU boards

### • Crossin Front System

moister, water and dirt-repellent thermal insulation composite system (ETICS). External walls Insulation. Persistent and effective system with an excellent thermal insulation parameters.

### • Crossin Slot System

complex thermal insulation and moisture barrier used inside cavity walls based on lightweight and handy Crossin PUT TPD plates. Perfect insulation of minimal thickness.

### • Crossin Facade System

high-quality insulation of ventilated façades with an excellent thermal insulation parameters. Ease fitting of the shape and thickness of the plate to every ventilated façade system.

### • Crossin Level System

easy to handle, moister and water repellent floor insulation system with high resistance to mechanical loads. Perfect Insulation of floors and ceilings in a heated rooms/a heated indoor area.

### • Crossin Base System

insulation system for foundations that prevents forming of thermal bridges and allows to maintain constant insulation surface along all the circumference. Resistant system used in the toughest conditions.

### • Crossin Shell System

insulation system for technical installations that is compression-resistant and permanently temperature-resistant; not affected by ageing processes or moisture. Perfect insulation for different shapes of installations and technical devices.





## Advantages of SPF-based insulation

extraordinary lightness and mechanical, chemical and biological resistance of the material

one of the lowest thermal conductivity levels ( $\lambda \leq 0.021 \text{ W/m}\cdot\text{K}$ )

fast, easy and effective application

resistance to mold and fungi, insects and rodents

very good adhesion to substrate made of various construction materials – spray insulations

durabile and unchanging in time parameters

high resistance to water and moisture – close-cell systems

excellent sealing parameters

jointless insulation means that there are no thermal bridges responsible for heat losses

high efficiency (e.g. flat roof – even up to 1.000 sq. m a day)

## Advantages

### Comprehensive cost savings

Crossin Insulations systems can significantly reduce energy losses and bills for heating and electricity, which account for the largest share of building maintenance costs. In addition, Crossin Insulations systems make it possible to reduce the consumption of building materials and significantly reduce the time and costs associated with the investment.

### Insulation durability

High strength and stability of Crossin Insulations parameters guarantee steady insulation efficiency. Crossin Systems do not shrink and do not degrade. This allows to extend the life cycle of the building and reduce costs of repairs and maintenance.



### Versatility

Crossin Insulations allow both to obtain acoustic-proof, water-repellant, thermal and wind insulation as well as strengthen the structure mechanically at low load.

### High quality of life

Crossin Insulations Systems allow you to get the same insulating properties at a comparatively thinner layer of insulation. Using Crossin Insulations we can minimize losses in the area for a more usable space.





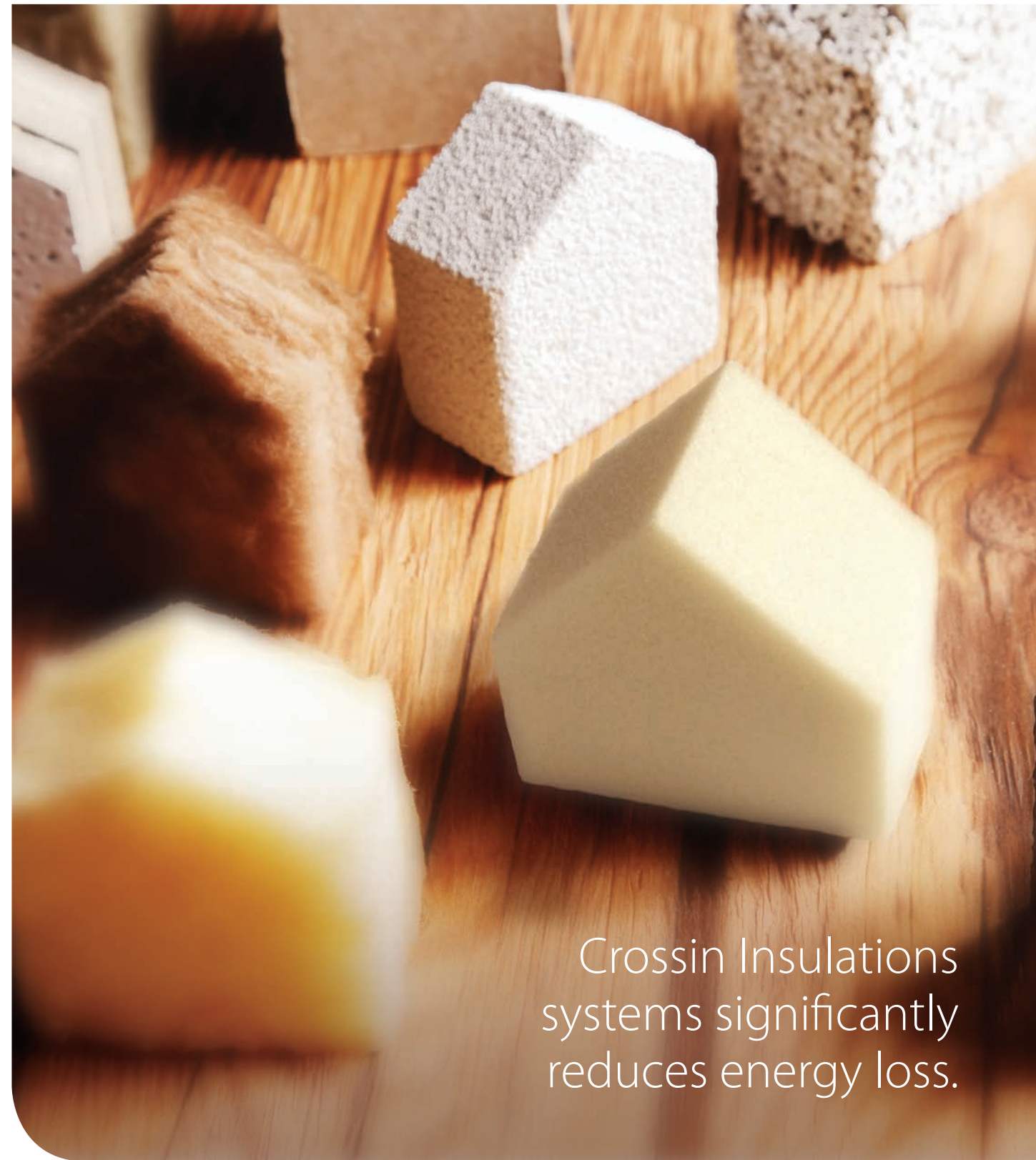


### Ultra lightweight

Crossin Insulations are innovative insulation solutions, which exhibit relatively low volume weight. Therefore, it is not excessively charged to the building structure. This allows for effective insulation of buildings without the need to increase the strength of building truss and foundation.

### Health and safety

Crossin Insulations do not contain foaming agents that deplete the ozone layer, in accordance with the European Union regulations, and other hazardous substances. Thus, Crossin polyurethane insulation does not emit harmful gases, not pollen and do not contain fiber, which can irritate the respiratory system, eyes and skin.



Crossin Insulations systems significantly reduces energy loss.



# PCC Group - Industrial Park in Brzeg Dolny, Poland

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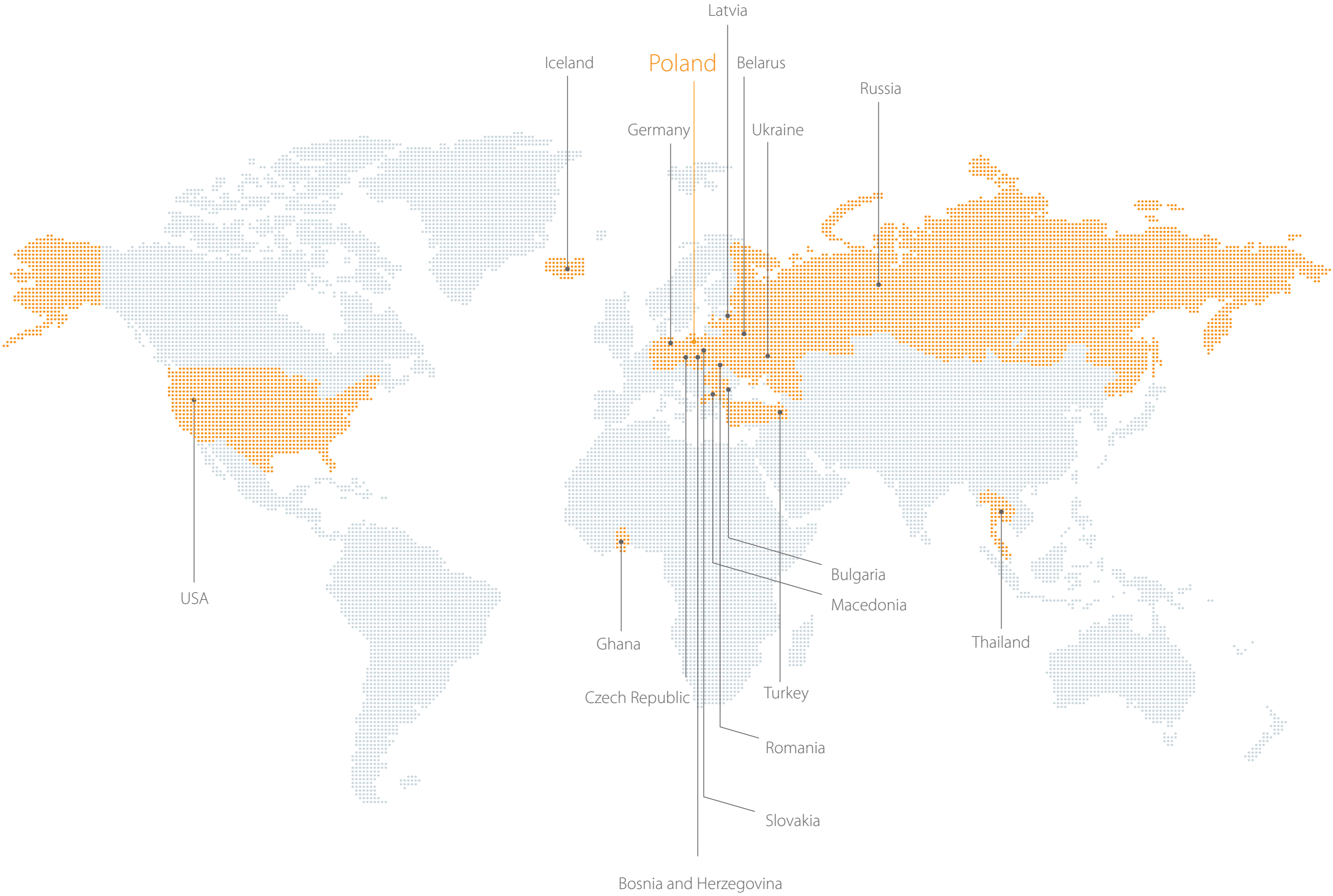
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