

Construction chemistry

Sustainable Technologies



pcc

*More than
Chemistry*



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01 / CONCRETE

CONCRETE

Today, thanks to various raw materials and chemical admixtures, the properties of concrete allow it to be used across a wide spectrum of applications. For example, superplasticizers, which are a base for the production of admixtures, enable obtaining concrete with excellent strength parameters.

This is a very important feature in the construction of large concrete structures with high load capacity. Surfactants, on the other hand, are used as aerating and deaerating agents in the production of concrete admixtures. As components of cleaning agents, they also enable effective removal of dirt from concrete surfaces and construction machines.

Raw materials for the production of concrete admixtures

Superplasticizers

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	pH	ACTIVE SUBSTANCE %	CHLORIDE % (m/m)	SULFUR (VI) % (m/m)	DESCRIPTION	FUNCTION
Superplastyfikator BG40 FF	Sodium naphthalene sulfonic acid polymer with formaldehyde	9084-06-4	Liquid	7.5-10.5	39-41	max. 0.02			
Superplastyfikator BGP	Sodium naphthalene sulfonic acid polymer with formaldehyde	9084-06-4	Powder	7.5-10.5	>90	max. 0.8	max. 1.5		
Rocrete S	Sodium naphthalene sulfonic acid polymer with formaldehyde	9084-06-4	Liquid	7.5-9.5	39-41	max. 0.05	max. 2	A component of concrete admixtures and gypsum products	<ul style="list-style-type: none"> • Water reduction in concrete • Liquefaction of a concrete mix • Delays the onset of the cement • Production of concretes with high consistency classes
Rocrete SP	Sodium naphthalene sulfonic acid polymer with formaldehyde	9084-06-4	Powder	7.5-10.5	min. 90	max. 0.1	max. 5		
Superplastyfikator BG97 40	Sodium naphthalene sulfonic acid polymer with formaldehyde	9084-06-4	Liquid	7.5-10.5	min. 40	max. 0.02	max. 0.8		

Raw materials for the production of concrete admixtures

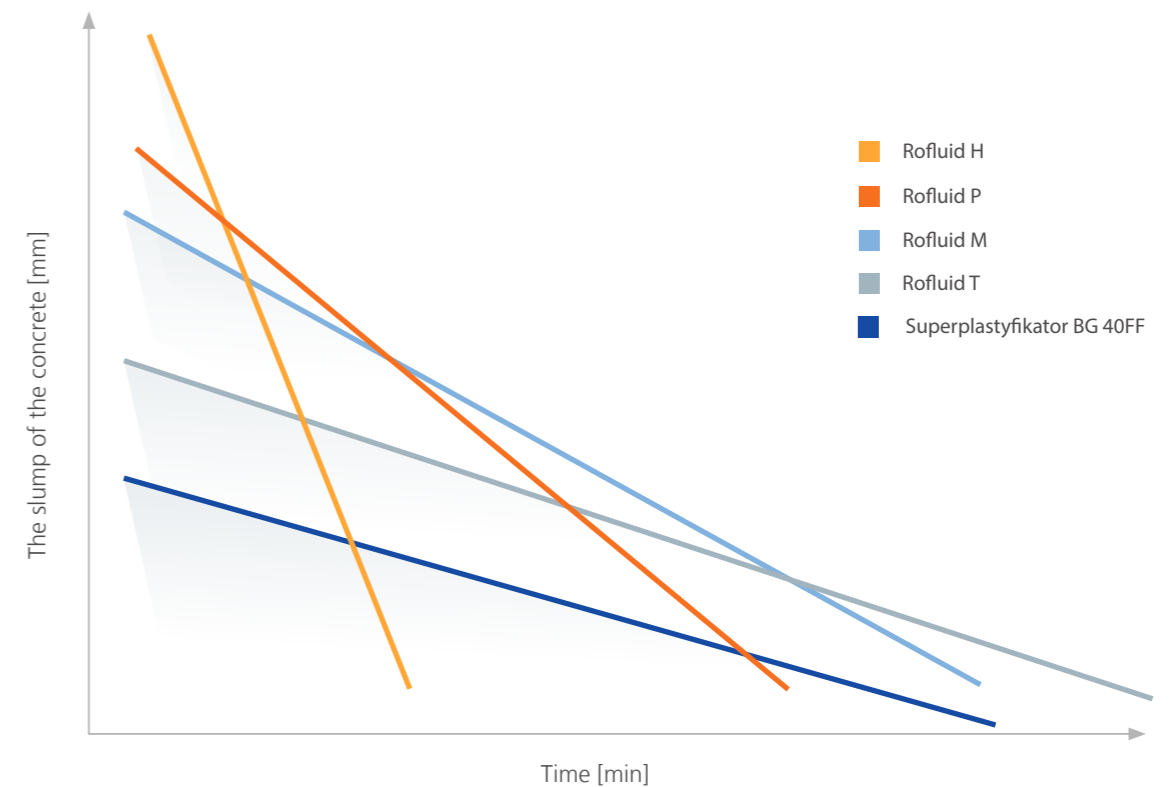
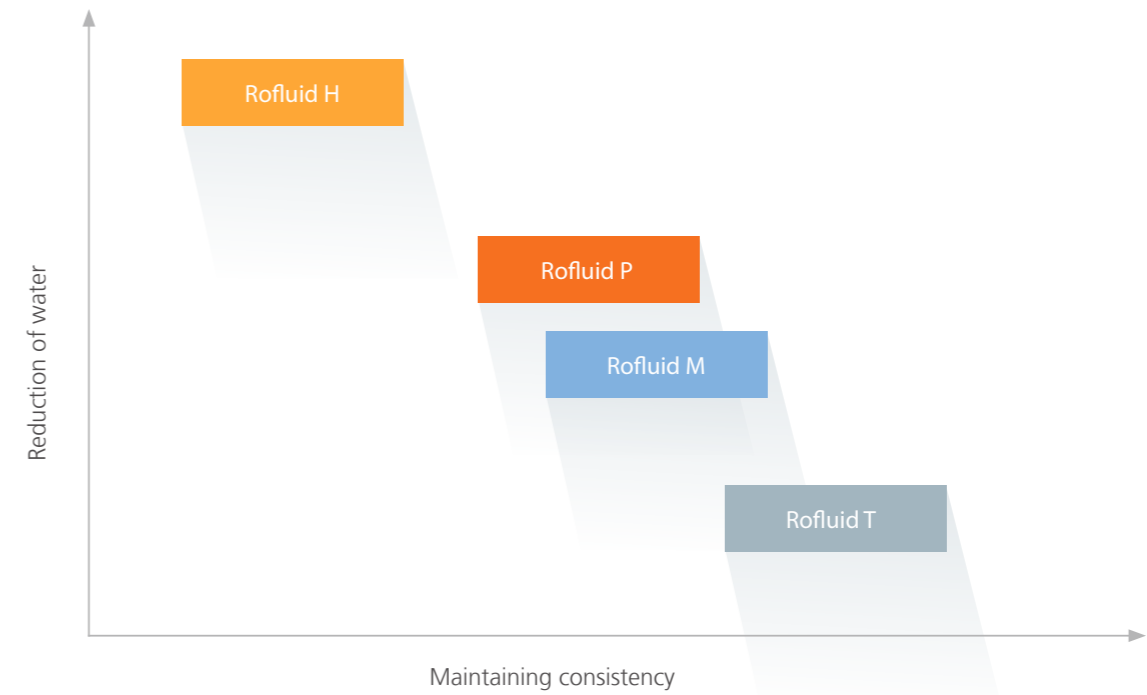
Superplasticizers

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	pH	ACTIVE SUBSTANCE %	CHLORIDE % (m/m)	SULFUR (VI) % (m/m)	DESCRIPTION	FUNCTION
Rofluid H	An aqueous solution of polycarboxy ether	27599-56-0	Liquid	5.0-7.7	49-51				
Rofluid M	An aqueous solution of polycarboxy ether	27599-56-0	Liquid	5.0-7.0	49-51				<ul style="list-style-type: none"> • Reduction of the mixing water • Delaying the onset of cement • Reduction of the amount of cement in the concrete compared to the control mixture
Rofluid P	An aqueous solution of polycarboxy ether	27599-56-0	Liquid	5.0-7.0	49-51				<ul style="list-style-type: none"> • The possibility of producing ready-mixed concrete at reduced / elevated air temperature conditions • Improving the workability of the concrete • Production of SCC concrete
Rofluid T	An aqueous solution of polycarboxy ether	27599-56-0	Liquid	5.5-7.5	49-51				

The raw material used to obtain PCE superplasticizers.

Semi-finished products

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
MPEG 1000	Methoxy polyethylene glycol	9004-74-4	Solid	~100	The raw material used to obtain PCE superplasticizers.



Rofluid H and P is dedicated to the concrete fabrication industry.
 Rofluid M and T is dedicated to the production of precast concrete.

Air entraining agents

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
Sulforokanol AES27	Sodium laureth sulfate	68891-38-3	Liquid	25 - 28	Anionic surfactant, an alkyl ether sulfate type. The product is a mixture of surfactants. Used as a high- performance component of air entraining admixtures.
EXOcon L25	Sodium laureth sulfate	68891-38-3	Liquid	25 - 27	Anionic surfactant (SLES). The basic component of air entraining admixtures enables the introduction of fine and stable air bubbles into the concrete mass. It works synergistically with air bubble stabilizers.
Sulforokanol L270/1	Sodium laureth sulfate	68891-38-3	pasta	68 - 72	Concentrated SLES. Ingredient of air entraining admixtures. It works synergistically with air bubble stabilizers.
Rosulfan L	Sodium laureth sulfate	85586-07-8	Liquid	27 -30	Anionic surfactant recommended as a foaming agent in the production of foam concrete. SLS can be the active substance of an air entraining admixture. The product has a minimal effect on the consistency of the concrete.
Rosulfan A	Ammonium lauryl sulfate		Liquid	26 - 28	Ammonium salt of sulfated alcohol. A great alternative to SLS. The product is compatible with air bubble stabilizers.
ABSNa 50	Sodium dodecylbenzenesulfonate	68411-30-3	Paste	48 -52	The active ingredient of concrete air entraining admixtures. The product enables plasticizing of fresh mix and good air stability in concrete mass. Compatible with air bubble stabilizers.
ABSNa 30	Sodium dodecylbenzenesulfonate	68411-30-3	Liquid	28- 32	
EXOcon B27	Mixture		Liquid	25 - 28	A mixture with excellent foam-forming properties. It can be a base of plasticizing and air entraining admixtures.
Betoplast MF2	Mixture		Liquid	29- 34	Concentrate of specialized air entraining admixture. Properly selected formula ensures significantly prolonged stability of air bubbles in fresh cement mortars and concrete. The concentrate, if the appropriate dose for cement is used, enables the production of fine pores and gives excellent results of strength tests.
Betoplast K	Mixture		Liquid	min. 3	Aqueous solution of non-ionic and anionic compounds. Admixture with air entraining and plasticizing properties, ensures proper consistency in the production of vibro-pressed elements. The product is especially recommended for the production of paving stones and concrete pumping. Betoplast K is also an excellent base for air entraining admixture, thanks to excellent compatibility with other surfactants.

Concrete preparation:

- Cement CEM 142.5R
- Tap water
- Rinsed river sand and pebble gravel
- w/c=0,55

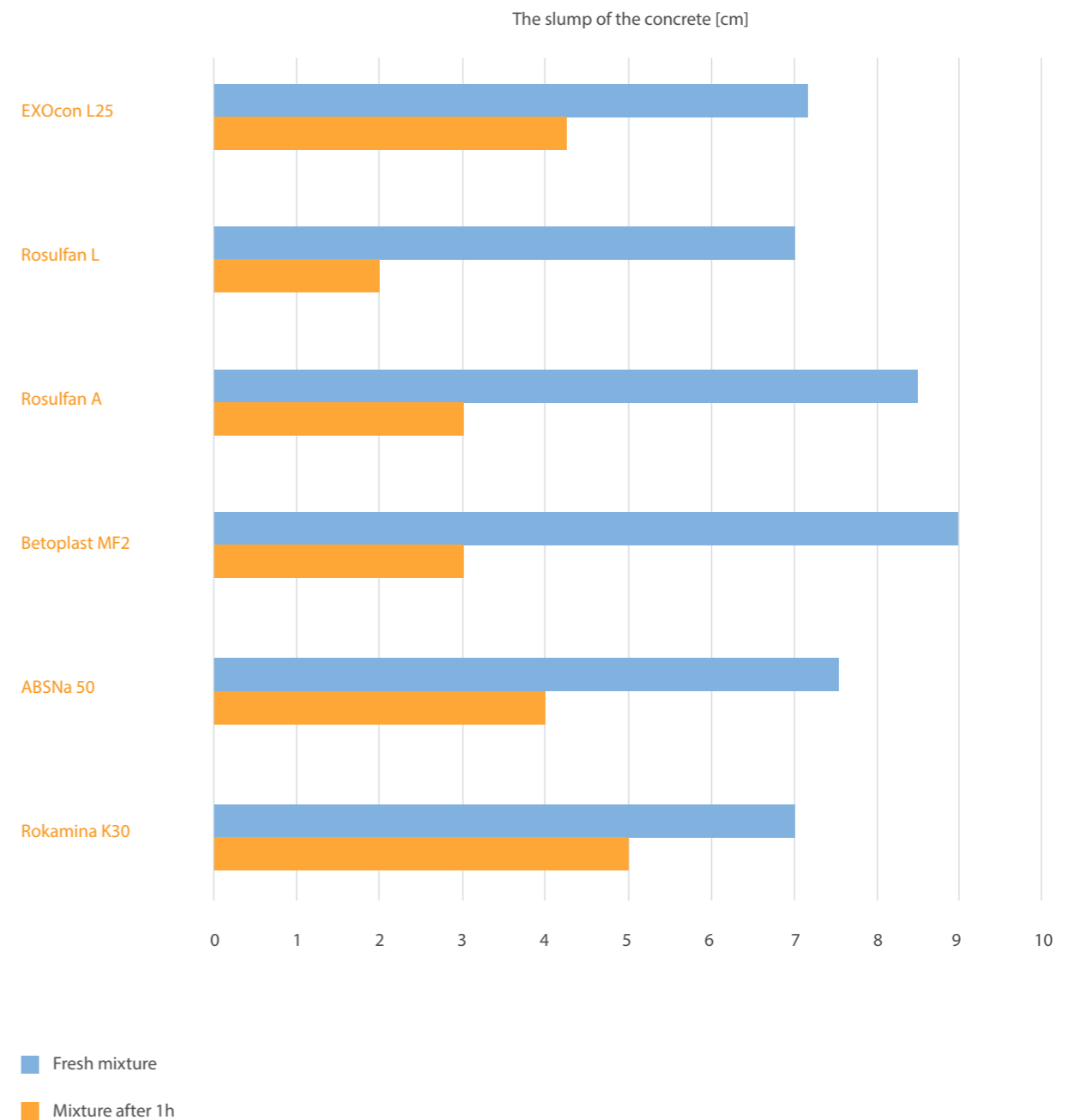


Figure 1. Measurement of consistency using the concrete slump test (air content -4.5%)

Compressive strength [MPa]

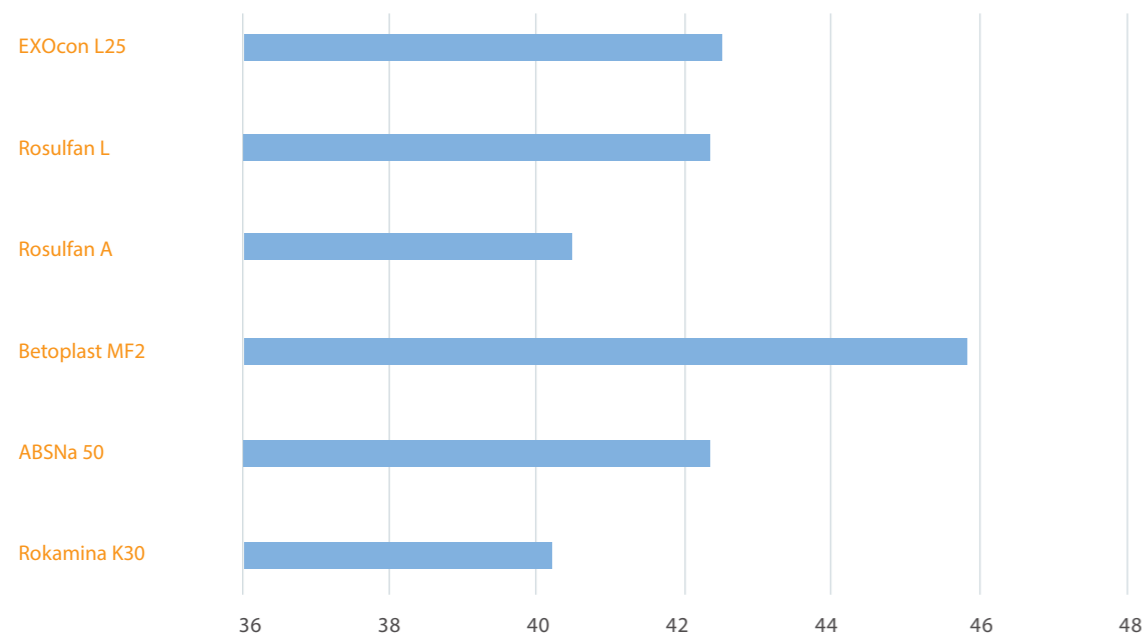


Figure 2. Compressive strength of aerated concrete blocks after 28 days of maturation (air content - 4.5%)

Air loss after 1 hour [%]

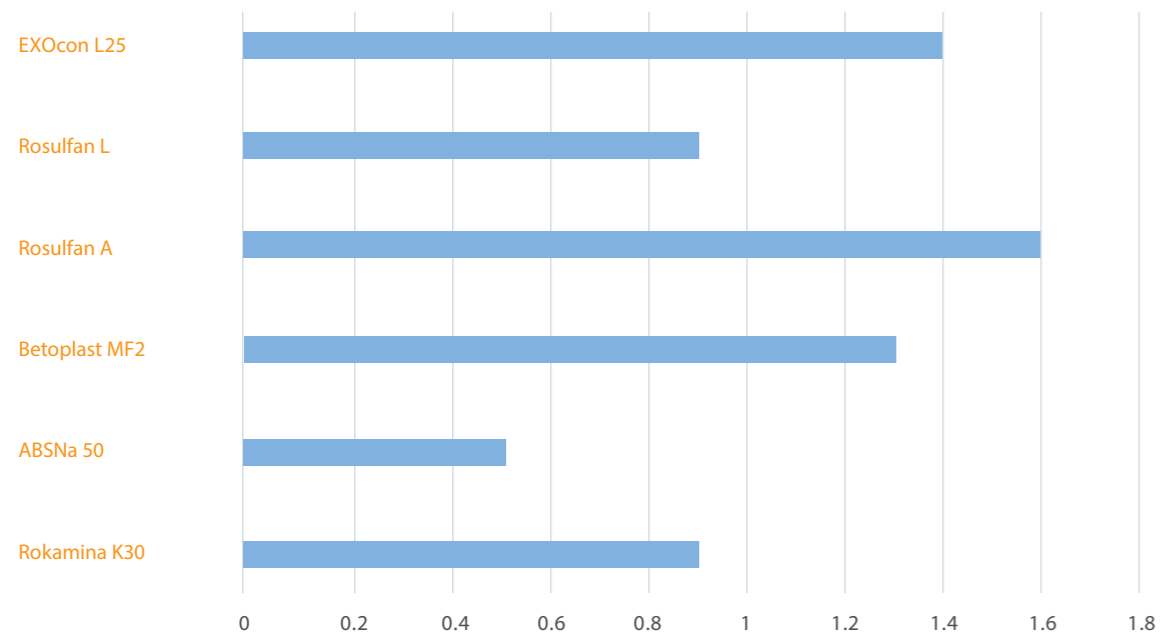


Figure 3. Air losses at the initial aeration value of 5.5%

Defoamers

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
EXOantifoam CPD3	Mixture	-	Liquid	~100	A specialized deaerating agent for concrete dispensed directly to the PCE superplasticizer. The product significantly changes the properties of the liquefying admixtures. Due to the synergistic effect it enables the deaeration and significantly prolongs the liquefaction time.
EXOantifoam S100	Mixture	-	Liquid	~100	A special silicone emulsion designed for strong and immediate deaeration of fresh concrete mix.
Rokanol® LP2023	Alcohol, C16-C18 + EO/PO	68002-96-0	Liquid	~100	A surface-active compound based on alkoxyated alcohol. Enables concrete deaeration after being added directly to the concrete mass.
Rokanol® RZ4P11	Alcohol, C16-C18 +EO/PO	68002-96-0	Liquid	~100	The product increases the efficiency of wetting of cement grains.
Rokamer 2000	PEG/PPG copolymer	9003-11-6	Liquid	~100	EO / PO block copolymer with excellent deaeration capability of concrete and cement mortars.



Accelerators

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
Diethanolamine W	Diethanolamine	111-42-2	Liquid	89- 91	Binding accelerator. The product has properties that inhibit metal corrosion.
Triethanolamine S	Triethanolamine	102-71-6	Liquid	~100	

Wetting agents

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
EXOwet N5	Alcohol + EO	78330-20-8	Liquid	~100	Non-ionic surfactant with excellent wetting properties of cement grains. The product improves the effect of the liquefaction admixture and increases the strength of the bound concrete.
Rokanol® GA5	Alcohol, C10+EO	160875-66-1	Liquid	~100	Wetting agent, additionally aiding deaeration of concrete.
Rokanol® GA7W	Alcohol, C10+EO	160875-66-1	Liquid	84-86	
Rokanol® IT3	Alcohol, C13-Iso + 3EO	69011-36-5	Liquid	~100	Non-ionic surfactant with wetting effect. Improves the liquefaction effect of the admixture, an alternative to agents based on ethoxylated nonylphenols.
Rokanol® IT5	Alcohol, C13-Iso + 5EO	69011-36-5	Liquid	~100	
Rokanol® NL6	Alcohol, C9-C11 + 6 EO	68439-46-3	Liquid	~100	
Sulfobursztynian DOSS 70GP	Di(2-ethylhexyl) sulfosuccinic acid, sodium salt	577-11-7	Liquid	68-72	An excellent wetting product, dedicated to ready-mixed concrete. It also acts as a wetting agent for dust suppressor.
Rokafenol N6	4-Nonylphenol, branched, ethoxylated	127087-87-0	Liquid	~100	A universal compound with high efficiency of wetting of cement grains. The product is based on nonylphenol.

Foam stabilizers

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
Rokamina K30	Cocamidopropyl betaine		Liquid	29 - 32	Amphoteric surfactant. It works synergistically in combination with anionic surfactants, stabilizing and reducing the size of air bubbles in a fresh concrete mix.
Rokamid KAD	Cocamide DEA			~100	An air bubble stabilizer added to the admixtures to adjust the size of the air bubbles. Very effective in low concentrations. The product additionally demonstrates the properties of a corrosion inhibitor.
Rokamid RAD	Oleamide DEA	68603-38-3		~100	

Humectants

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
Poilkol 200	Polyoxyethylene glycol	25322-68-3	Liquid	~100	The products reduce water loss in a fresh concrete mix. They prevent concrete shrinkage and increase the strength of the material after setting. An excellent ingredient for many admixtures.
Polikol 400	Polyoxyethylene glycol	25322-68-3	Liquid	~100	
Polikol 600	Polyoxyethylene glycol	25322-68-3	Liquid	~100	



Raw materials used in mold release agent

Emulsifiers

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
EXOemul RO1	Mixture	-	Liquid	~100	The product is used in the emulsification of anti-adhesive liquids based on rapeseed oil.
EXOemul OM3 LSP	Mixture	-	Liquid	~100	The agent is used in the emulsifying process of anti-adhesive liquids containing mineral oil.
Rokolub 50-B-100	Copolymer	-	Liquid	~100	
Rokolub 50-B-150	Copolymer	-	Liquid	~100	The product is used in the emulsification process and as a viscosity modifying agent for the anti-adhesive liquid.
Rokolub 60-D-1000	Copolymer	-	Liquid	~100	

The PCC Group's offer includes products for use in anti-adhesive liquids, as mould release agents for concrete. These additives are emulsifying packages for emulsion products. The product intended for agents based on vegetable oils is EXOemul RO1 - an emulsifying package that ensures stability of the emulsion over time. The second package for anti-adhesive fluids is EXOemul OM3 LSP that works with mineral bases. This product also ensures stability of the emulsions over time. In addition to proven solutions, we are also able to adapt our offer to the client's product.



Raw materials for concrete injections, waterproofing and coatings of resin flooring

Polyether polyols

PRODUCT NAME	HYDROXYL VALUE mgKOH/g	VISCOSITY 25°C, mPa·s	MOLECULAR WEIGHT g/mol	APPLICATION	SECTOR
Rokopol® D450*	230 - 270	60 - 70	450		
Rokopol® DI 002	108 - 116	130 - 170	1000		
Rokopol® D2002	53 - 59	280 - 380	2000		
Rokopol® DE4020	27 - 31	700 - 900	4000		
Rokopol® M5000	35 - 37	700 - 900	4800		Building Industry
Rokopol® M5020	33 - 38	700 - 1000	4800	The component for the production of coatings, adhesives, sealants and polyurethane elastomers based on one and two-component systems.	Polymers, coatings, adhesives, sealants and elastomers
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		

Flame retardants

PRODUCT NAME	CHEMICAL NAME	DENSITY, 25°C, g/ml	VISCOSITY, 25°C, mPa·s	ACID VALUE, mgKOH/g	PHOSPHORUS CONTENT %	CHLORINE CONTENT %	TYPE OF FLAME RETARDANT	ADVANTAGES
Roflam P	Tris(2-chloro-1-methylethyl) phosphate	1.28	66	max 0.1	9.5	32.5	additive	High efficiency Reduction of viscosity
Roflam 6*	Diethyl bis(2-hydroxy ethyl) aminomethylphosphonate	1.16	200	max 8.0	12.2	-	reactive	Halogen-free High phosphorus content
Roflam B7	Phenol, isobutylated, phosphate (3:1)	1.18	72	max 0.1	8.5	-	additive	Halogen-free
Roflam F5	Phenol isopropylated phosphate	1.17	53	max 0.1	8.3	-	additive	Halogen-free

* Product available on special order

Roflam products are a perfect solution in resin floor systems used in public places, i.e. parking lots, garages, warehouses or production halls. The addition of liquid flame retardants has many benefits - the excellent fire protection and viscosity reduction of the resin system. In addition, the Roflam flame retardants have a synergistic effect with widely available organic fillers (among others, aluminum hydroxide, zinc borate), providing excellent flame retardancy and improvement in the levelling of floor systems.

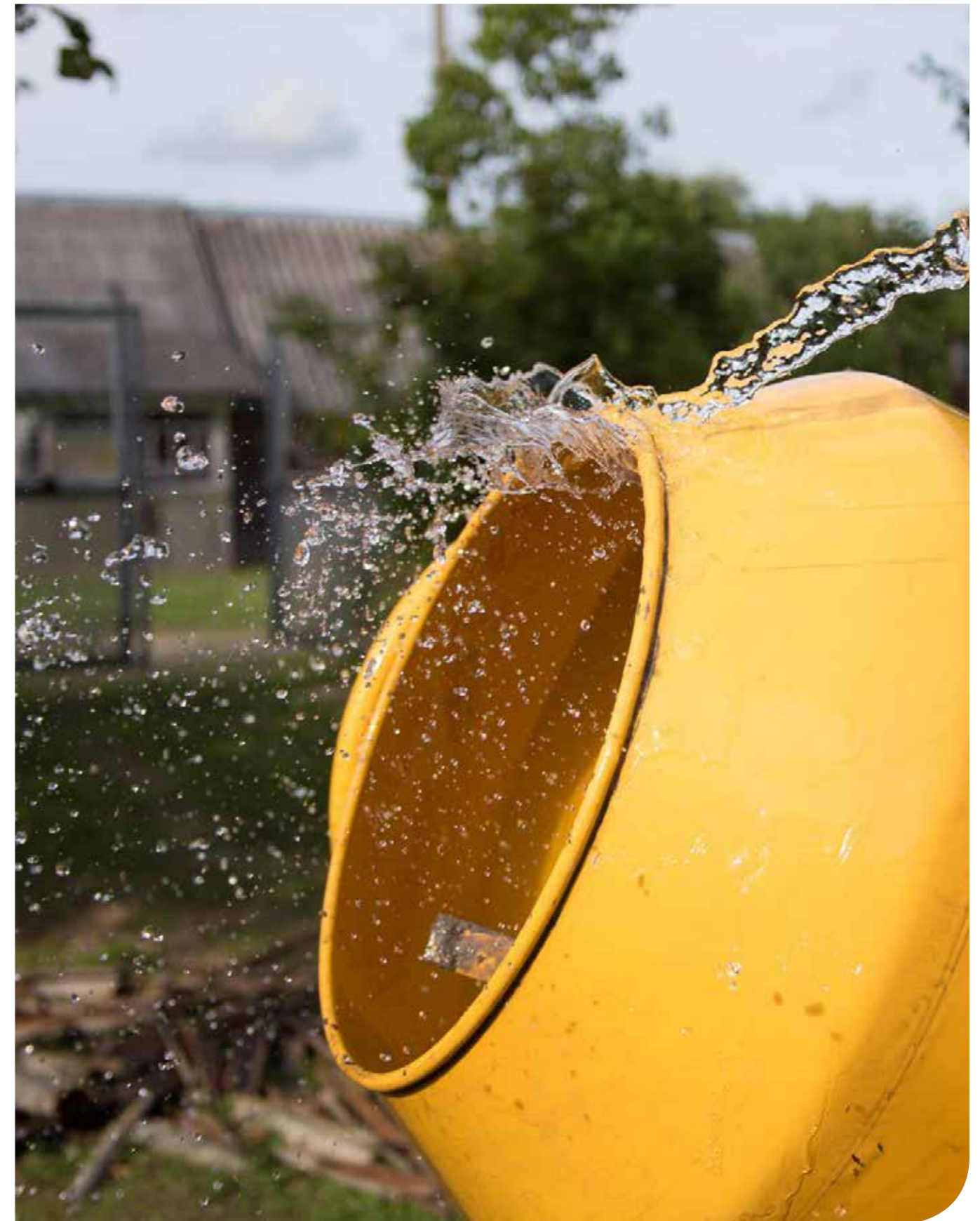
Concrete finish - concentrates

Cleaning formulations

PRODUCT NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
EXOc lean CR	Mixture	-	Liquid	~100	Specialist formulation for removing concrete residues. The agent is suitable for cleaning delicate metal tools and hard surfaces. Exoclean CR after application does not cause corrosion and does not emit smoke.
EXOc lean AL	Mixture	-	Liquid	~100	Concentrated alkaline cleaning mixture (pH> 13) for removing dirt from concrete surfaces and acid resistant steel.
EXOc lean MC	Mixture	-	Liquid	~100	Concentrate for cleaning and degreasing with the addition of a corrosion inhibitor (pH 8.5-10.5)



Products from the offer are raw materials for the production of concrete admixtures intended for companies, chemical formulators producing concrete admixtures. This fact means that this product is not certified as a construction product. The responsibility of certification rests in the hands of the company that processes our product, and in this case, all the obligations of marketing authorization rest with the company producing concrete admixtures. In accordance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011.





AGGREGATES

Quartzite aggregates are distinguished by excellent physicochemical parameters. They are hard, durable, resistant to weather conditions and ecologically clean. Due to their properties, they are used in metallurgy, in the refractory industry, in the construction industry, especially in road and railway construction.

PCC Silicium S.A. is a plant with many years of experience in the quartzite mining and processing industry.

The constantly modernized production process and continuous efforts to ensure high quality of products led us to the current strong and stable position of the company on the market.

Our advantages are our ability to adapt to the customer's needs in terms of the range of products offered, favorable geographical location, infrastructure enabling the collection of products by road and rail.

Due to the location in the vicinity of the Świętokrzyski National Park and the Natura 2000 area, the company's activities take into account environmental conditions.

PCC Silicium SA offers its customers high quality quartzite aggregate for use in the following areas

- road construction
- construction of rail and tramways
- production of concrete and concrete products
- production of asphalt concrete and asphalt mixtures
- hydrotechnical construction
- building elements of small architecture (rockeries, cascades, flower beds, rock gardens)



TRADE NAME OF AGGREGATE	GRANULATION	PRODUCT CONFORMITY	CE MARKING
Crushed sand	0/1 mm* 1/3 mm*	according to the manufacturer's declaration	
Quartzite fines	0/4 mm	according to the manufacturer's declaration	
Quartz grit	2/8 mm 8/16 mm	PN-EN 12620: PN-EN 13043 PN-EN 13242 PN-EN 12620: PN-EN 13043 PN-EN 13242	CE CE
Key-aggregate	4/31.5 mm*	PN-EN 12620: PN-EN 13043 PN-EN 13242	CE
Crushed stone	31.5/50 mm* 31.5/63 mm* 50/80 mm* 50/110 mm*	PN-EN 13450 PN-EN 13242 according to the manufacturer's declaration	CE CE
Quartzite mixture	0/31.5 mm 0/63 mm	PN-EN 13043: PN-EN 13242 PN-EN 13043: PN-EN 13242	CE CE
Quartzite waste	0/16 mm 0/30 mm 0/63 mm	according to the manufacturer's declaration	
Hydrotechnical stone	80/150 mm 100/250 mm 200/400 mm (or other)	according to the manufacturer's declaration	
Decorative stone for gardens	8/16 mm* 16/22 mm* 50/110 mm* 200/500 mm	according to the manufacturer's declaration	

* washed aggregates



Industrial quartzite

Industrial quartzite is produced from selected deposits of the best chemical parameters.

We offer industrial quartzite especially for:

- metallurgical industry (smelting of metallic silicon and ferro-silicon),
- refractory industry,
- the renewable energy sector,
- electronic industry.

Types of industrial quartzite according to the content of SiO₂

CHEMICAL COMPOSITION	KpSI 99	KpSI 98	KpSI 97
SiO ₂ % (min)	99	98	97
Al ₂ O ₃ % (max)	0.3	0.70	1.2
TiO ₂ % (max)	0.05	0.08	0.12
Fe ₂ O ₃ % (max)	0.16	0.23	0.45
MgO % (max)	0.04	0.07	0.1
Alkali % (max)	0.15	0.2	0.4
Loss on ignition % (max)	0.40	0.50	0.70
Granulation	40/100 mm-basic production		
Product conformity	BN-74 6761-08		
Chemical analysis	PN-86 H-04155/09		

The company guarantees repeatability of declared chemical parameters in terms of raw material quality and nearly 50 years of experience in the production and enrichment of quartzite by mechanical processing and rinsing technology.

Depending on the size of the order, we can produce other quartzite granules not included in the offer.



03 / GYPSUM

GYPSUM

Plasterboards are commonly used in finishing works. Thanks to surfactants and superplasticizers, less water and energy is consumed during their production. This allows a significant reduction in manufacturing costs, and helps to protect the environment.

Gypsum fluidizers

TRADE NAME	CHEMICAL NAME	CAS	FORM	pH	ACTIVE SUBSTANCE %	CHLORIDE % (m/m)	DESCRIPTION	FUNCTION
Superplastyfikator CP	a polymer of calcium salt naphthalenesulfonic acid with formaldehyde	37293-74-6	Powder	6.5-9.5	min. 85	max. 0.05	It is a compound acting as a dispersant in the base for liquefying and plasticizing admixtures in the construction industry and as a water reducer in the production of plaster board.	<ul style="list-style-type: none"> Liquefaction of a gypsum mixture Reduction of mixing water
Superplastyfikator CA 40 FF	a polymer of calcium salt naphthalenesulfonic acid with formaldehyde	37293-74-6	Liquid	6.5-8.5	39-41	max. 0.05	A liquefying substance for gypsum products, dry mortars and a superplasticizer in the production of cardboard-gypsum boards.	<ul style="list-style-type: none"> Improving the stability of the gypsum mixture

Foaming agents

TRADE NAME	CHEMICAL NAME	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
EXOcon GPD	Sodium decyl ether sulfate	Liquid	30-32	Specialist anionic surfactant intended for the production of gypsum plasterboards. It is produced in the form of clear liquid, with low content of non-sulphated substances and clearly defined viscosity.
Sulforokanol D232P	Sodium decyl ether sulfate	Liquid	31-33	The product is based on natural raw material. Product shows excellent foaming properties, creating high and stable foams, even in hard water.
Sulforokanol D232P MB	Sodium decyl ether sulfate	Liquid	31-33	Mass balance Grade
Rosulfan D	Sodium decyl sulfate	Liquid	35-37	Foams obtained from ROSULfan D are characterized by a high degree of hydration (called wet foam) and a small diameter of bubbles (fine foam).
EXOcon GPU50	Mixture	Liquid	49-51	Amonium salts mixture. Product shows good foaming properties and semi-stable foams. Dedicated for creating larger pores in plasterboards.

Cleaning formulations

TRADE NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
EXOclean CR	Mixture		Liquid		A special formulation for removing gypsum residue. The agent is suitable for cleaning delicate metal tools and hard surfaces. Exoclean CR after application does not cause corrosion and does not emit smoke.



04 / BITUMINOUS MASSES

BITUMINOUS MASSES

Bituminous masses belong to the group of sealing materials used mainly for damp insulation and in the construction and repair of roads of every class of traffic. Bitumen emulsions (or dispersions) are a mixture of water, bitumen and surface-active compounds.

Emulsifiers

TRADE NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
Rokanol DB7	Alcohol, C12-C15 + 7EO	68131-39-5	Liquid	~100	Non-ionic surfactant with excellent emulsifying properties of asphalt masses.
Rokafenol N8	Nonylphenol + 8 EO	127087-87-0	Liquid	~100	A universal non-ionic emulsifier used for the preparation of bitumen emulsions. The product is based on nonylphenol.
Rokamin KI 5	Cocamine + 15 EO	61791-14-8	Liquid	~100	Non-ionic emulsifier based on ethoxylated amines. The product has excellent resistance to high temperatures.
Rokamin SR22	Tallow amine + 22 EO	61791-26-2	Paste	~100	
EXOstab C100	Non-ionic surfactant		Liquid	~100	A powerful emulsifier based on modified oleochemicals.
Rokwinol 80	Sorbitan monooleate, ethoxylated	9005-65-6	Semi-liquid paste	~100	A universal emulsifier in the form of a paste, used for the preparation of bitumen emulsions.
Rokamin K15K	PEG-15 cocomonium methosulfate	68989-03-7	Liquid	~100	Cationic surfactant, emulsifier with strong acid and alkaline resistance

Defoaming agents

TRADE NAME	CHEMICAL NAME	CAS	FORM	ACTIVE SUBSTANCE %	DESCRIPTION
EXOantifoam S100	Mixture		Liquid		Specialist silicone emulsion providing effective and quick defoaming.
Rokamer 2600	PEG/PPG copolymer	9003-11-6	Liquid	~100	Non-invasive defoaming agent used in the preparation of bitumen emulsions. The product is safe to use.



05 / POLYURETHANE IN BUILDING INDUSTRY

Raw materials for PU systems

POLYURETHANE IN BUILDING INDUSTRY

Raw materials for PU systems

Polyurethanes (PUR) have been used in construction for many years. They are used both as a construction material and material for thermal and acoustic insulation. Currently, due to the fire requirements, polyisocyanurate (PIR) foams are increasingly used in the thermal insulation.

Therefore, the PCC Group offers raw materials for supplying the construction industry with the main components necessary for the production of rigid PUR and PIR insulation foam (for self-forming). No less important is the assistance, technical support in the development of new solutions for the customer, and support during the implementation of the above-mentioned solutions on the production line.

The raw materials offer includes:

- Polyols (polyether - Rokopol® and polyester - Rokester®),
- flame retardants (Roflam),
- emulsifying and compatibilizing agents for polyols with hydrocarbons (EXOstab).

Emulsifiers / Compatibilizers

TRADE NAME	CHEMICAL NAME	CAS	FORM	HYDROXYL NUMBER mgKOH/g	WATER CONTENT %	DESCRIPTION	N-PENTANE	CYCLOPENTANE	ISOPENTANE	WATER
EXOstab C100	Non-ionic surfactant		Liquid	80	max. 0.5	Non-ionic agent based on modified oleochemicals used in the production of PIR and PUR foams. The additive significantly improves the compatibility of the polyol and foaming agent.	•	•		•
EXOstab C200	Non-ionic surfactant		Paste	67	max. 0.5		•	•		•
EXOstab NO100	Non-ionic surfactant	68439-46-3	Liquid	125	from 4 to 6	The compatibilizer dedicated to spray foams of low density based on a modified synthetic alcohol.				•
EXOstab NP100	Nonylphenol + EO/PO	37251-69-7	Liquid	90	max. 1	The nonylphenol-based compatibilizer dedicated for PUR spray foams.	•			•

Emulsifiers / Compatibilizers

TRADE NAME	CHEMICAL NAME	CAS	FORM	HYDROXYL NUMBER mgKOH/g	WATER CONTENT %	DESCRIPTION	N-PENTANE	CYCLOPENTANE	ISOPENTANE	WATER
EXOstab NP200	Nonylphenol + EO/PO	37251-69-7	Liquid	56	max. 1	A popular emulsifier used in the production of sandwich panel foams and low-density spray foams. A product based on nonylphenol.	•			•
EXOstab NP300	Nonylphenol + EO/PO	37251-69-7	Liquid	80	max. 1	Non-ionic agent based on alkoxyated nonylphenol. The product is used in the production of PIR and PUR foams. The additive significantly improves the compatibility of the polyol and foaming agent.	•		•	•
EXOstab NP400	Nonylphenol + EO/PO	37251-69-7	Liquid	58	max. 1		•			•
EXOstab NP500	Nonylphenol + EO/PO	37251-69-7	Liquid	40	max. 1		•			•

Polyether polyols for rigid foam

TRADE NAME	HYDROXYL NUMBER mgKOH/g	VISCOSITY 25°C, mPa·s	MOLECULAR WEIGHT g/mol	APPLICATION	SECTOR
Rokopol® D1002	108-116	130-170	1000	It is an additive in the production of rigid, semi-rigid, two-component polyurethane foams and other polyurethane systems. Rokopol G1000 - the main polyol component for the production of one-component assembly foams.	
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	The main component for the production of: rigid polyurethane foams (e.g.: block, molded), sandwich panels, pipe insulation systems, other polyurethane systems.	Construction, insulation
Rokopol® RF55*	475-515	9200	550		
Rokopol® GS364*	340-380	2000-4000	700		
Rokopol® RF151	440-460	15000-30000	700		
Rokopol® RF151V	440-480	5000-12000	700	Component for the production of polyurethane foam systems.	

* Some polyols are produced only on special order, after prior consultation with the sales department.

Flame retardants

TRADE NAME	CHEMICAL NAME	DENSITY, 25°C, g/ml	VISCOSITY, 25°C, mPa·s	THE ACID VALUE, mgKOH/g	PHOSPHORUS CONTENT %	CHLORINE CONTENT %	TYPE OF FLAME RETARDANT	ADVANTAGES
Roflam P	Tris(2-chloro-1-methylethyl) phosphate	1.28	66	max 0.1	9.5	32.5	additive	High efficiency Reduction of viscosity
Roflam 6*	N,N-bis-(2-hydroxyethyl) aminomethane phosphonic acid diethyl ester	1.16	200	max 8.0	12.2	-	reactive	Halogen-free High phosphorus content
Roflam B7	Phenol, isobutylated, phosphate (3:1)	1.18	72	max 0.1	8.5	-	additive	Halogen-free
Roflam F5	Phenol isopropylated phosphate	1.17	53	max 0.1	8.3	-	additive	Halogen-free

* Product available on special order

Flame retardants of the Roflam series are liquid products based on phosphoric esters. They can be used in PIR and PUR polyurethane foams to obtain a balance between the product's fire retardancy and its good mechanical properties. In this way, it is possible to obtain materials of B2 fire class according to DIN 4102-1, used in the construction industry as insulation materials, e.g. thermal insulation of buildings and cold rooms or acoustic insulation of rooms.

Polyester polyols for rigid foam

TRADE NAME	HYDROXYL NUMBER mgKOH/g	ACID VALUE mgKOH/g	VISCOSITY mPa·s w 25°C	WATER CONTENT %	FUNCTIONALITY	THE FLAME-RETARDANT CONTENT	APPLICATION
Rokester® 1600.01	150-170	max.1.5	1000-3000	max. 0.15	2	-	Aromatic - aliphatic polyester polyol intended for use in foams with reduced smoke release and for the production of high index PIR sandwich panels.
Rokester® 1710	170-190	1-1.5	2500-4500	max. 0.5	2	-	Aromatic - aliphatic polyester polyol intended for use in single-component OCF foams.
Rokester® 1911	165-185	max. 1	max. 5500	max. 0.15	2	+	Polyol polyester with low hydroxyl value; for PIR sandwich panels with isopentane.
Rokester® 1952.01	190-210	2-3	max. 7000	max. 0.15	2	-	Low-hydroxyl polyester polyol for the production of PIR foams with a low λ value.
Rokester® 2416	225-245	1.9-2.3	max.4500	max. 0.15	2	+	Polyester polyol for the production of PIR sandwich panels with a low λ value.
Rokester® 2402	230-250	max. 1.5	max. 4500	max. 0.15	2	-	Polyester polyol for the production of PIR sandwich panels with a low λ value, a wider technological window.
Rokester® 2446.01	230-260	max. 1.5	4000-6500	max. 0.1	2	-	Polyester polyol for the production of PIR sandwich panels with improved flame retardancy and reduced smoke production.
Rokester® 2430	230-250	1.6-2	8000-12000	max. 0.15	2	-	Aromatic - aliphatic polyester polyol intended for use in PIR block foams.
Rokester® 3110	300-330	2-3	2000-3000	max. 0.15	2	-	Polyester polyol for the production of PIR and OCF sandwich panels characterized by high hydroxyl value and relatively low viscosity.
Rokester® 3164.01	280-315	1-2	1500-4500	max. 0.15	2.3	-	Polyester polyol, a component for the production of PIR and PUR sandwich panels with improved flame retardancy and reduced smoke production.

Polyurethane systems.

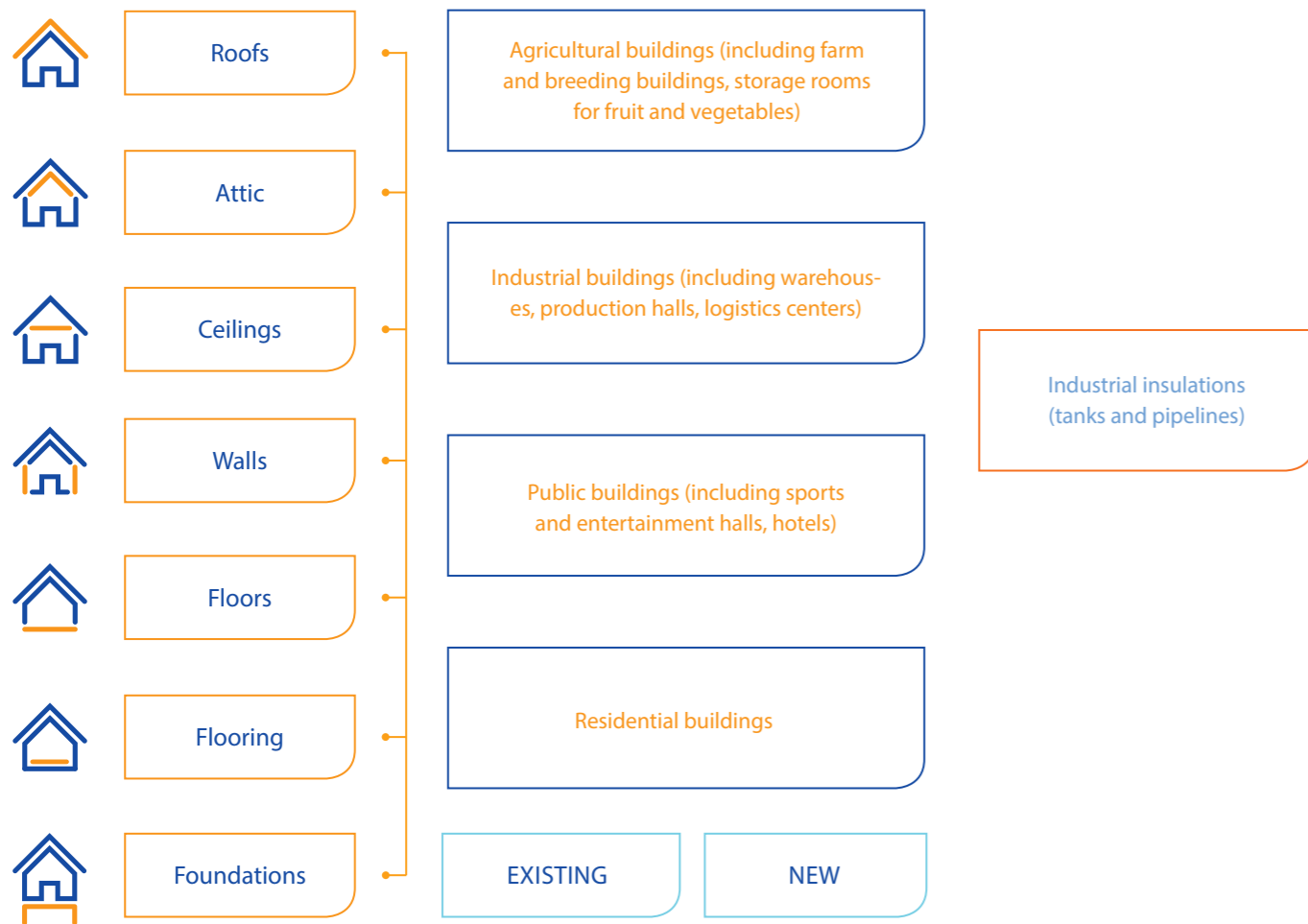
Spray polyurethane foam system.

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 mixing 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 do we use spray insulation?



Application

- roof insulation (including attics and ceilings), walls, floors and foundations in agricultural, industrial, utility and residential buildings, both new and existing (intended for renovation)
- insulation of industrial tanks and pipelines
- reinforcing surfaces by spraying layers of increased mechanical resistance

Advantages of insulation with polyurethane foam

- easy and quick application method, regardless of the complexity of the surface
- one of the lowest heat transfer coefficients ($\lambda < 0.020 \text{ W}/(\text{m}\cdot\text{K})$)
- no thermal bridges responsible for heat loss (seamless insulation)
- excellent adhesion to various materials and substrates
- high stability of parameters in time
- high efficiency (e.g. up to 1000 m² flat roof per day), which reduces additional work costs and does not significantly disturb the user of the facility
- light insulation and multifunctionality (thermal and acoustic insulation in one product)
- resistance to mold and fungi

TRADE NAME	DESCRIPTION	APPLICATION						FIRE CLASS	PARAMETERS
		EXTERNAL APPLICATION			INTERNAL APPLICATION				
		ROOF	ELEVATION	FOUNDATIONS	ATTIC	WALLS	FLOORS		
EKOPRODUR S0310	Semi-rigid, open-cell foam				•			F	Density: $\geq 7 \text{ kg}/\text{m}^3$ Efficiency: $0.10 \text{ kg}/\text{m}^2$ (thickness: 1 cm) application temp. $> 15^\circ\text{C}$
EKOPRODUR S0310E	Semi-rigid, open-cell foam				•			E	Density: $\geq 7 \text{ kg}/\text{m}^3$ Efficiency: $0.10 \text{ kg}/\text{m}^2$ (thickness: 1 cm) application temp. $> 15^\circ\text{C}$
EKOPRODUR S0329	Rigid, closed-cell foam				•	•	•	E	Density: $\geq 36 \text{ kg}/\text{m}^3$ Efficiency: $0.38 \text{ kg}/\text{m}^2$ (thickness: 1 cm)
EKOPRODUR S0540	Rigid, closed-cell foam	•	•	•			•	E	Density: $\geq 50 \text{ kg}/\text{m}^3$ Efficiency: $0.50 \text{ kg}/\text{m}^2$ (thickness: 1 cm)

Polyurethane adhesives

Polyurethane adhesives are widely used in many different sectors of construction. They occur in one or two-component forms. The unique properties of polyurethane adhesives result from the ability of their parameters to be modified, i.e. viscosity. This enables you to adapt the product to your specific application needs in a simple manner. The great advantage of PUR adhesives is the lack of volatile organic solvents (from the group of VOCs, Volatile Organic Compounds). Thus, these adhesives do not have adverse or harmful effects on the natural environment. They enable permanent bonding of materials

that are not resistant to chemical substances, i.e. expandable polystyrene (EPS) and materials with high humidity, among others wood.

An important group of polyurethane adhesives are products intended for the creation of sport surfaces, such as the Active Play series. By combining a rubber granulate with a suitable glue, you get a uniform, jointless surface that can be used on tennis courts, playgrounds, sports fields and in gyms and fitness clubs. Such surfaces have a high degree of flexibility and resilience, they cushion the falls thanks to the effective absorption of energy.



Application

- Sandwich panels: permanent bonding of mineral wool boards, EPS (as well as EPS with graphite and expanded polystyrene, XPS) or polyurethane or polyisocyanurate (PIR) foams with aluminum sheets or other metal sheets
- Permanent connection of demanding construction elements
- Construction: bonding of wood and wood-like products, i.e. parquet, panels, plywood, veneer, fiberboards, etc. with steel, aluminum and concrete
- Non-slip sports and playground surfaces, etc.: combining rubber granulates, among others SBR, EPDM or TPV (PP + EPDM) and rubber mixtures based on rubbers with the addition of dyes, chalk, oil and appropriate chemicals

Advantages of polyurethane adhesives

- Excellent adhesion to virtually all building materials characterized by high porosity
- The weld obtained in the bonding process, after hardening, is resistant to water and unfavorable weather conditions; thanks to which the surface is durable and the life of glued elements is extended
- The adhesive joint is flexible and resistant to possible cracks
- Environmentally friendly and safe for human health, does not emit harmful organic substances; also safe for allergy sufferers
- Polyurethane joint is chemically and mechanically resistant



Products

Polyurethane one-component adhesives are highly reactive isocyanate prepolymers with appropriately selected content of NCO groups and reactivity level, depending on the intended use. Products from this group are cured under the influence of moisture in the air. In extreme cases or in order to speed up the gluing process, they can be sprinkled with water:

- Active Play seria 8000
- EKOPRODUR RB2
- EKOPROMER DM
- EKOPROMER SP
- EKOPROMER GAB1
- EKOPROMER REB

Polyurethane two-component adhesives are composed of two components A and B and the curing process takes place as a result of mixing them together. Under the influence of

appropriate temperature conditions and the proportion recommended by the manufacturer, both components begin to react with each other, gaining adhesive properties. The moisture in the air acts catalytically on the speed of the reaction between the components and the curing process itself.

- EKOPRODUR 1331 B2
- EKOPRODUR KW-A2
- EKOPROMER AP
- other, depending on the client's needs

We are extending the current offer of polyurethane two-component adhesives with anti-static adhesives under the name PROMOSTAT. This group of adhesives has a special purpose. It is intended for sealing cracks in building construction elements, especially in places where there is a relatively high explosion risk.

Crossin® Insulations

Crossin® Insulations is one of the most innovative product lines in the PCC Group. It represents one of the most effective polyurethane insulation systems on the market for comprehensive and professional building insulation.

The modern line of Crossin® Insulations products is based on the highest quality and a reliability. The effectiveness of Crossin® products is the result of high qualifications of the crew and is based on over 38 years of experience and knowledge in the field of polyurethane insulation.

The Crossin® brand includes technologically advanced polyurethane insulation products and systems used in insulation of roofs, attics, walls,

floors and foundations, as well as in technical insulations.

Crossin® Insulations are ideal solutions for insulation of residential and office buildings, industrial and commercial facilities as well as utility rooms. Innovative Crossin® Insulations systems can be used for thermal insulation in both newly erected buildings and those subject to thermo-modernization.

Crossin® Insulations products are two types of technically advanced insulation:

- spray foam
- insulation boards



Foam insulation

These are spray polyurethane foam systems designed for quick and effective thermal and acoustic insulation of roofs, walls and foundations. These systems are used in residential, industrial and agricultural buildings as well as in public facilities. All Crossin® Insulations products based on spray foam insulation are particularly recommended for the insulation of large surfaces both outside and inside buildings.

In this modern insulation line, there are ready-made polyurethane systems that differ in their physico-mechanical properties. Crossin® Insulations based on sprayed polyurethane foam include systems for closed-cell rigid foam with different densities and a system for open-celled semi-rigid foam.

In addition to products of the highest quality, the Crossin® offer also includes a comprehensive service - the execution of building insulation.

Insulation boards

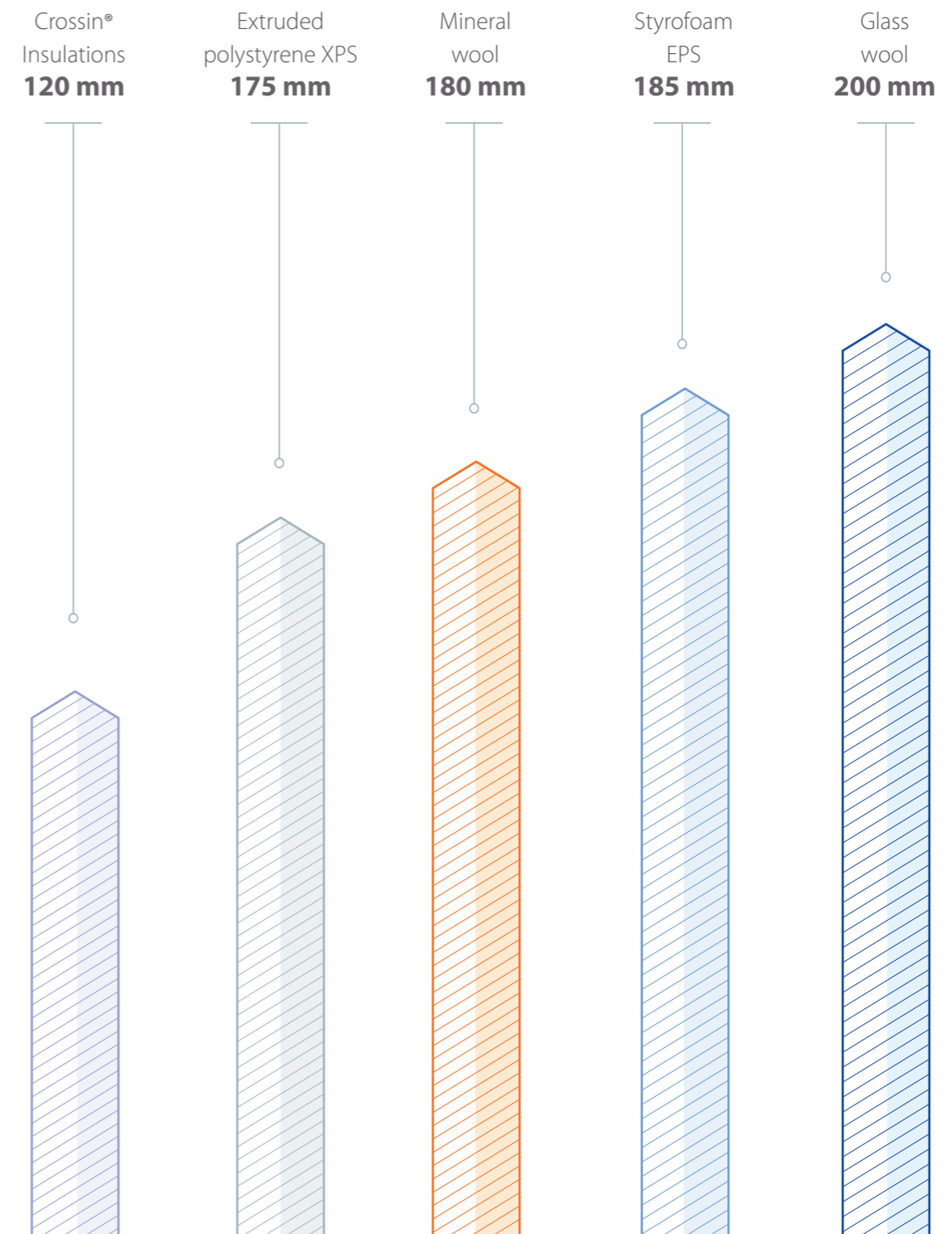
These are modern thermal insulation systems, which include hard, polyurethane insulation boards, high-quality adhesives, plasters, meshes and other elements adapted to the type and purpose of a given system.

Crossin® Insulations solutions are applicable throughout the entire property development process. They are perfect as technical insulations and insulation of double-layer walls in ETICS technology, in multi-layer systems, ventilated facades and insulation of floors and foundations. Crossin® Insulations systems based on rigid polyurethane boards are solutions tailored to the specific needs of users. These systems are characterized by lightness, ease of application and the lack of the need for specialized equipment.

Crossin® Insulations based on polyurethane boards (PUR) provide excellent insulation parameters that contribute to lowering costs by reducing energy losses in the heated buildings.



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



Application of Crossin® Insulations products

• Architecture

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 of industrial buildings such as ware-houses, production halls, logistics centers; in-sulation of tanks and pipelines.

• Agriculture

insulation of warehouses, fruit and vegetable storerooms and farm buildings such as, for example, pig farms, stables, cowsheds, hen houses.

• Public buildings

insulation for hotels, hospitals, schools, sports halls, offices, etc.

• Objects of special architectural significance

insulation for architectural monuments, historical buildings, tenement houses, castles, and modern architecture buildings.

PUR Spray foam - CLOSED-CELL

• 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

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.

PUR Spray foam - OPEN-CELL

• 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.

Rigid polyurethane boards CLOSED-CELL

• Crossin® Front System

resistant to dirt, water and moisture insulation system of external walls in the ETICS technology. A durable and effective system with exceptional insulation parameters.

The Crossin® Front System is appropriately designed in terms of parameters and quality of components. The system includes in its composition the following materials:

1. Adhesive mortar Crossin® Front ST04 based on Portland cement with polyurethane fillers, used to fasten boards to the substrate and embedding reinforcing mesh.
2. Insulation board Crossin® TPD PUR 30/40.
3. Reinforcing mesh VERTEX.
4. Mechanical connectors.
5. Crossin® Front A Grunt - primer.
6. Crossin® Front A plaster (thin-layer plaster).



The most important technical parameters of Crossin® TPD PUR 30/40 boards:

Heat conductivity coefficient	$\lambda_d=0,022 \text{ W/(m}\cdot\text{K)}$
Board dimensions	1000 x 600 mm
Board thickness	from 20 to 200 mm
Board density	32-35 kg/m ³
Long-term water absorption	3%
Compressive strength	150 kPa
Water vapor transmission coefficient	$\mu = 20$



Advantages of polyurethane insulation



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



one of the lowest 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



excellent sealing properties



stability of parameters over time



high resistance to water and moisture
(in closed-cell systems)



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



the jointless insulation ensures lack of thermal bridges responsible for heat loss



excellent adhesion to the substrate made of various building materials
(in spray insulations)

Benefits

Comprehensive savings

Crossin® Insulations can significantly reduce energy losses and reduce heating and electricity bills, which constitute the largest part of the building's operating costs. In addition, Crossin® Insulations systems provide the opportunity to reduce the consumption of building materials and significantly shorten the time and associated costs of investment.

Insulation durability

High durability and stability of Crossin® Insulations system parameters mean that insulation is characterized by lasting great performance. Crossin® systems do not shrink or degrade. It allows the building life cycle to be extended and a reduction in the costs of repairs and its 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.

Higher quality of life

Crossin® Insulations ensure that the same insulation parameters are obtained with a comparably thinner insulating layer. Using the Crossin® Insulations, we can minimize surface losses, resulting in a larger 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 supporting structure of the building.

Health and safety

Crossin® Insulations do not contain hazardous substances and foaming agents that deplete the ozone layer, in accordance with European Union regulations. This means that polyurethane insulation does not emit harmful gases, does not contain fibers that may irritate the respiratory tract, eyes or skin, and does not generate dust.



Notes for guidance concerning the functional parameters and notation used in the catalogue

HLB (Hydrophilic-Lipophilic Balance)

The hydrophilic-hydrophobic balance is a parameter that determines the ratio of the content of the hydrophilic group and that of the hydrophobic group in a particle. The validity scope of the HLB number for non-ionic surface-active compounds is included within the range of 0 to 20 and is the measure of the share of the hydrophilic group in the particle

$$HLB=20 \cdot \frac{\text{molecular mass of hydrophilic part}}{\text{molecular mass of compound}}$$

On the other hand, for aqueous solution of ionic surface active agents acquire additional transformations increasing their degree of hydrophilicity, the value of the HLB number goes up to 40.

HLB for ester type compounds (ethoxylated fatty acids):

$$HLB=20 \cdot \left(1 - \frac{LZ}{LK}\right)$$

where:

LZ saponification number of **ethoxylated** product, mgKOH/g

LK acid number of acids subjected to **ethoxylated**, mgKOH/g

On the basis of the HLB scale, the range of the utility fitness of surface-active agents can be determined.

HLB NUMBER	EO CONTENTS IN PRODUCT, %	PRODUCT APPLICATION
1-3	5-15	Anti-foaming agent
4-6	20-30	Emulsifier W/O
7-11	35-55	Wetting agent
8-18	40-90	Emulsifier O/W
10-15	50-75	Detergent
10-18	50-90	Solubilizer

Cloud point

Cloud point is an indicator determining the behaviour of water or other organic solutions of nonionic surfactants. Solutions of surfactants become cloudy during heating and revert to a clear solution at a certain temperature when cooled - this temperature is defined as 'cloud point'.

Depending on the temperature range at which the solution becomes cloudy, five determination methods are discriminated:

Method A – aqueous solution (10 - 90°C)

Method B – solution of NaCl 50g/l (>90°C)

Method C – solution of NaCl 100g/l (>90°C)

Method D – solution 45g of butyl diglycol/water (<10°C)

Method E – solution 25 g of butyl diglycol/water (<10°C)



PCC Group

We build value through sustainable innovation



Operating in 18 countries, in 41 different locations, PCC SE currently employs 3400 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 knowledge 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

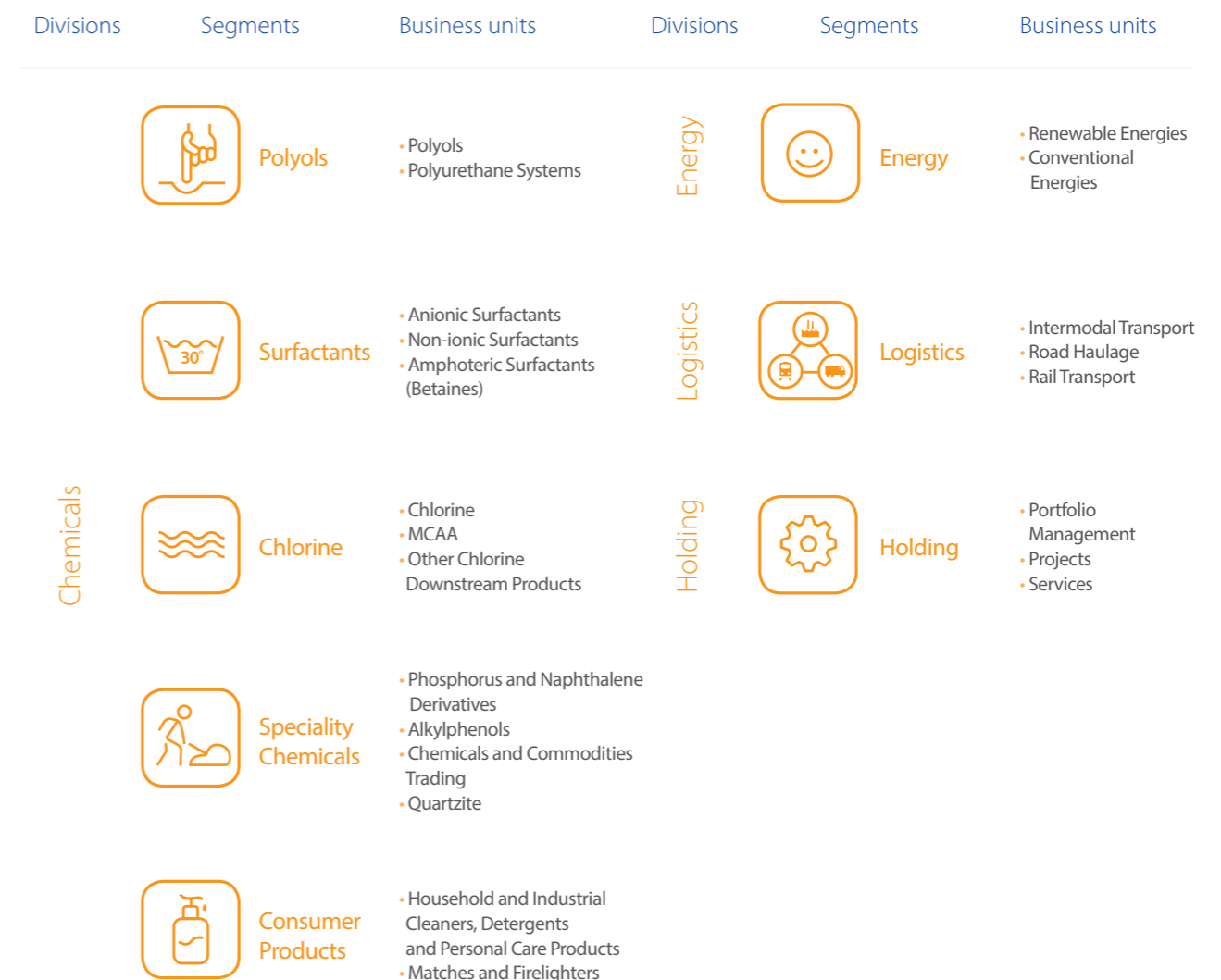
development of the PCC Group. The key element of our strategy is to ensure the development of each individual business unit through taking advantage of innovative technology and new market applications. We achieve our goals in a sustainable and responsible way - we care about the environment and the society within which we operate.

We are always ready to reach our strategic goals. 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 3400 people. We operate in 18 countries, in 41 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



PCC Group - Industrial Park in Brzeg Dolny, Poland

PCC Rokita SA

PCC Rokita Capital Group, 22 companies, including:

- PCC Rokita SA**
- PCC Prodex Sp. z o.o.
- PCC Prodex GmbH (Germany)
- PCC PU Sp. z o.o.
- IRPC PCC Co. Ltd. (Thailand)
- PCC Therm Sp. z o.o.

PCC EXOL SA

PCC EXOL Capital Group, 5 companies, including:

- PCC EXOL SA**
- PCC Chemax Inc. (the USA)
- PCC EXOL Kimya Sanayi Ve Ticaret Limited Sirketi (Turkey)

PCC CP Kosmet Sp. z o.o.

Capital Group PCC CP Kosmet, 3 companies, including:

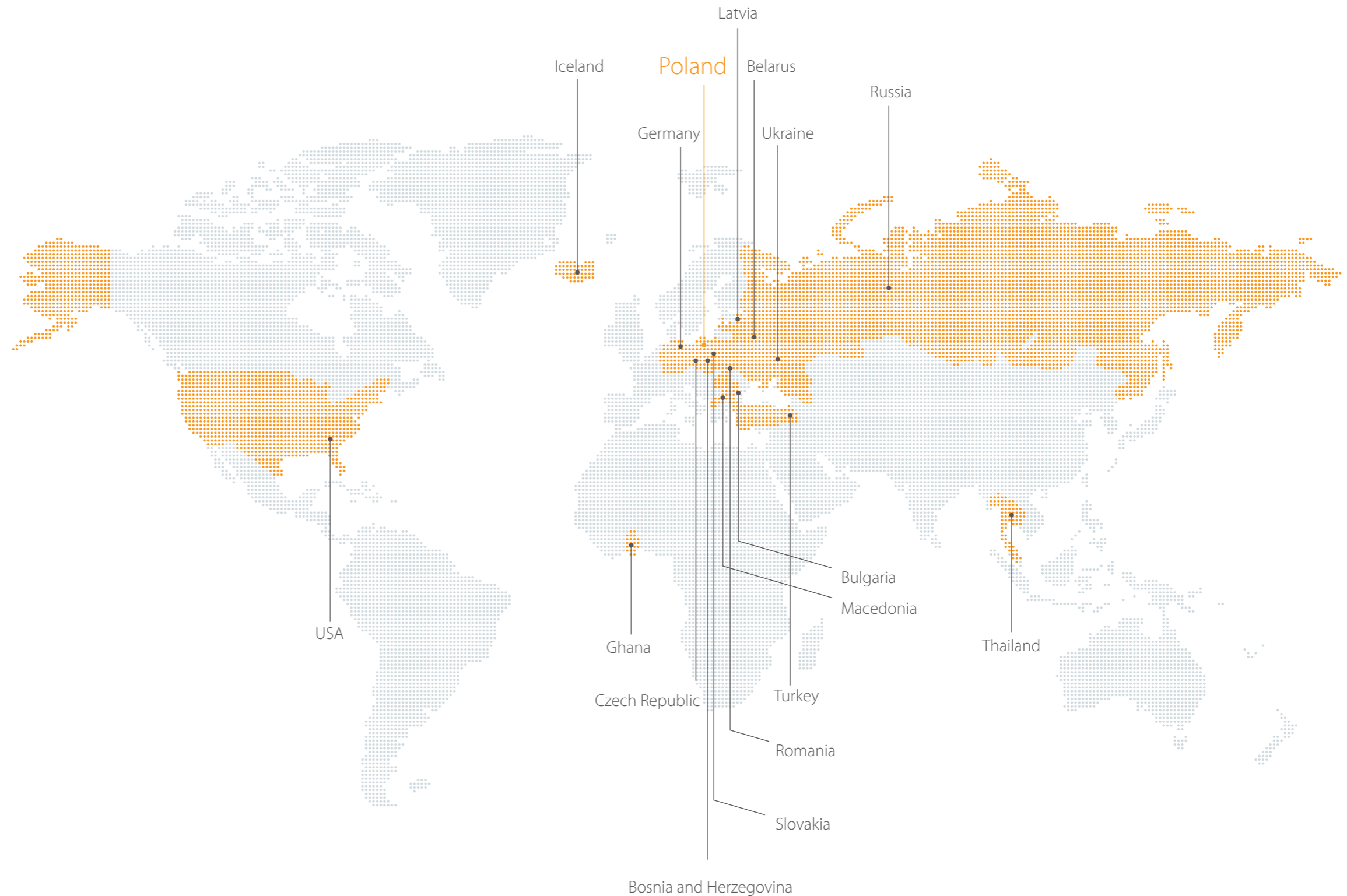
- PCC CP Kosmet Sp. z o.o.**
- OOO PCC Consumer Products Navigator (Belarus)
- OOO PCC Consumer Products (Russia)

PCC MCAA Sp. z o.o.

PCC Autochem Sp. z o.o.

PCC Intermodal SA

PCC Group in the world





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Please visit our capital group business platform:

www.products.pcc.eu

The information in the catalogue is believed to be accurate and to the best of our knowledge, but should be considered as introductory only. Detailed information about products is available in TDS and MSDS. Suggestions for product applications are based on our the best knowledge.

The responsibility for the use of products in conformity or otherwise with the suggested application and for determining product suitability for your own purposes rests with the user.

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*More than
Chemistry*