



# Construction Chemicals

## Sustainable Technologies

Local. Global. Integrated.

Operating in 17 countries, in 39 different locations, PCC SE currently employs over 3 300 people.















# About Us

The PCC Group is an international capital structure made up of dozens of companies operating in three major sectors of the economy. Chemicals, Energy and Logistics. The organisations within the PCC Group are both business units engaged in production activities and service companies operating simultaneously for the external market. The PCC Group is centrally managed by the German company PCC SE and comprises more than 74 companies at 39 locations in 17 countries around the world. One of the key elements of PCC SE's strategy is

the dynamic development of the chemicals business by exploiting the potential of new market segments and diversifying the portfolio of raw materials and chemical formulations in line with current trends in various industries. Every day, our specialists work on the stable growth and development of their organisations, making the PCC Group stronger and building a solid business platform for all contractors interested in reliable and long-term cooperation.

<b>PCC ROKITA SA</b> <b>PCC PCG</b> <b>OXYALKYLATES</b> <b>IRPC</b>	<b>PCC</b> <b>ROKITA SA</b>	<b>PCC</b> <b>ROKITA SA</b>	<b>PCC EXOL SA</b> <b>PCC CHEMAX INC</b> <b>PCC PCG OXYALKYLATES</b>	<b>PCC</b> <b>SYNTEZA</b>
<b>Polyols</b> 	<b>Chlorine</b> 	<b>Phosphorus</b> 	<b>Surfactants</b> 	<b>Alkylphenols</b> 
<ul style="list-style-type: none"> <li>• Polyether polyols</li> <li>• Polyester polyols</li> <li>• Prepolymers</li> <li>• Polyurethane Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Chlorine</li> <li>• MCAA</li> <li>• Other Chlorine Downstream Product</li> </ul>	<ul style="list-style-type: none"> <li>• Phosphorus derivatives</li> <li>• Naphthalene derivatives</li> <li>• Polycarboxyethers (PCE)</li> </ul>	<ul style="list-style-type: none"> <li>• Anionic surfactants</li> <li>• Cationic surfactants</li> <li>• Nonionic surfactants</li> <li>• Amphoteric surfactants (betaines)</li> <li>• Chemical formulation</li> </ul>	<ul style="list-style-type: none"> <li>• Nonylphenol</li> <li>• Dodecylphenol</li> <li>• Tristyrylphenol</li> </ul>
<b>PCC CONSUMER PRODUCTS SA</b>	<b>PCC</b> <b>ROKITA SA</b>	<b>PCC</b> <b>INTERMODAL SA</b>	<b>PCC</b> <b>BAKKISILICON HF.</b>	<b>PCC</b> <b>SE</b>
<b>Consumer Products</b> 	<b>Energy</b> 	<b>Logistics</b> 	<b>Silicon</b> 	<b>Holding &amp; Projects</b> 
<ul style="list-style-type: none"> <li>• Household &amp; industrial Cleaners, Detergents and Personal Care Products</li> </ul>	<ul style="list-style-type: none"> <li>• Renewable Energy</li> <li>• Conventional Energy</li> </ul>	<ul style="list-style-type: none"> <li>• Intermodal transport</li> <li>• Road Haulage</li> <li>• Rail Transport</li> </ul>	<ul style="list-style-type: none"> <li>• Microsilica</li> <li>• Silicon Metal</li> </ul>	<ul style="list-style-type: none"> <li>• Portfolio Management</li> <li>• Project Development</li> </ul>



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# 01 / Concrete

Superplasticizers are raw materials for chemical admixtures used in construction materials technology. Their application enables modification of fresh concrete parameters through: increasing fluidity, maintaining stable consistency over time, and

improving strength and durability parameters while maintaining a low water-cement ratio (w/c). The last one property contribute to the decreasing of cement and water content in the concrete.

## Raw materials for the production of concrete admixtures

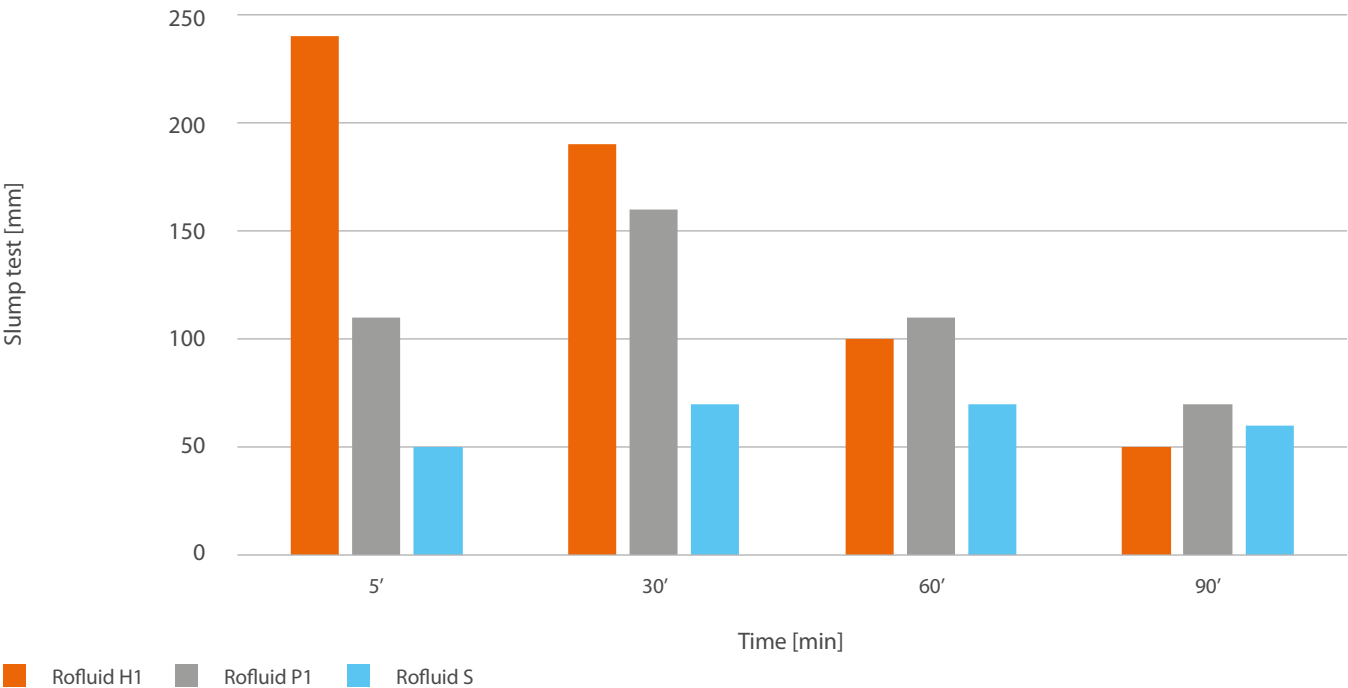
### Superplasticizers

Product name	Chemical name	CAS	Form	pH	Active substance %	Chloride % (m/m)	Sodium Sulphate (VI) %	Formaldehyde free	Function
Rofluid H1	Polycarboxylic copolymer	27599-56-0	liquid	2.8 - 4.8	50 ± 1	–	–	–	- high initial liquefaction of fresh concrete - good water reducing - improved workability
Rofluid P1	Polycarboxylic copolymer	27599-56-0	liquid	5.0 ÷ 7.0	50 ± 1	–	–	–	
Rofluid S	Polycarboxylic copolymer	27599-56-0	liquid	5.0 ÷ 7.0	50 ± 1	–	–	–	
Superplastyfikator BG40 FF	Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4	liquid	7.5-10.5	39-41	max. 0.02	max. 0.8	yes	- increase the liquidity of the concrete mix over time - improved workability and slump retention  - water reduction in concrete, - allows for less cement consumption, - liquefaction of the concrete mix, - delays the onset of the cement, - practically does not introduce air into the concrete mix - flexible dosage - increases the compression strength of concrete
Rocrete S	Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4	liquid	7.5-9.5	39-41	max. 0.05	max. 2	no	
Superplastyfikator BG97 40	Sodium naphthalene sulfonic acid polymer with formaldehyde	9084-06-4	liquid	7.5-10.5	39-41	max. 0.02	max. 0.8	no	
Rocrete SP	Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4	powder	7.0 - 10.0	min. 85	max. 0.1	max. 5	no	
Superplastyfikator BGP	Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	9084-06-4	powder	7.0 - 11.0	min. 87	max. 0.05	max. 2	no	
Rocem F1	mixture	–	powder	6.5-10.0	min. 85	–	max. 5	no	- additive for floor, cement and anhydrite underlays
Rocrete NAK	mixture	–	liquid	7.0-9.5	37-40	–	max. 2	no	

## Rofluid PCE series

The graph below shows the varied performance of the PCC Group Rofluid superplasticizers. Taking into account the dynamics of each trend, individual products are dedicated to the different application area.

The slump retention tests were performed on concrete with w/c ratio 0.45.








## Semi-finished products XPEG

Product name	Chemical name	CAS	Form	Active substance %	Description
MPEG 350	Methoxy polyethylene glycol	9004-74-4	solid	~100	A raw material used to obtain PCE superplasticizers.
MPEG 500	Methoxy polyethylene glycol	9004-74-4	solid	~100	
MPEG 750	Methoxy polyethylene glycol	9004-74-4	solid	~100	
MPEG 1000	Methoxy polyethylene glycol	9004-74-4	solid	~100	
MPEG 2000	Methoxy polyethylene glycol	9004-74-4	solid	~100	
MPEG 3000	Methoxy polyethylene glycol	9004-74-4	solid	~100	
MPEG 5000	Methoxy polyethylene glycol	9004-74-4	solid	~100	
HPEG 2400	Polyethylene glycol monomethyl ether	31497-33-3	solid	~100	



## Air entraining agents

Product name		Chemical name	CAS	Form	Active substance %	Description
Sulforokanol L225/1		Sodium laureth sulfate	68891-38-3	liquid	25-27	An anionic surfactant (SLES). The basic component of air entraining admixtures enables the introduction of fine and stable air bubbles into the concrete mass. Works synergistically with air bubble stabilizers.
Sulforokanol L227/1		Sodium laureth sulfate	68891-38-3	liquid	26.5-28	An anionic surfactant (SLES). The basic component of air entraining admixtures enables the introduction of fine and stable air bubbles into the concrete mass. Works synergistically with air bubble stabilizers.
Sulforokanol L270/1		Sodium laureth sulfate	68891-38-3	paste	68-72	Concentrated SLES. Ingredient of air entraining admixtures. Works synergistically with air bubble stabilizers.
Rosulfan L		Sodium lauryl sulfate	85586-07-8	liquid	27-30	An 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 LP		Sodium lauryl sulfate	85586-07-8	powder	min. 91	A powder air entraining admixture for cement mortars.
ABSNa 50		Sodium dodecylbenzenesulfonate	68411-30-3	paste	48-52	The active ingredient of concrete air entraining admixtures. The product enables the 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 K		mixture	–	liquid	min. 3	An aqueous solution of non-ionic and anionic compounds. An admixture with air entraining and plasticizing properties. It ensures proper consistency in the production of vibropressed 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 admixtures thanks to its excellent compatibility with other surfactants.



Concrete preparation:

- CEM 142.5R cement
- Tap water
- Rinsed river sand and pebble gravel
- $w/c=0.55$

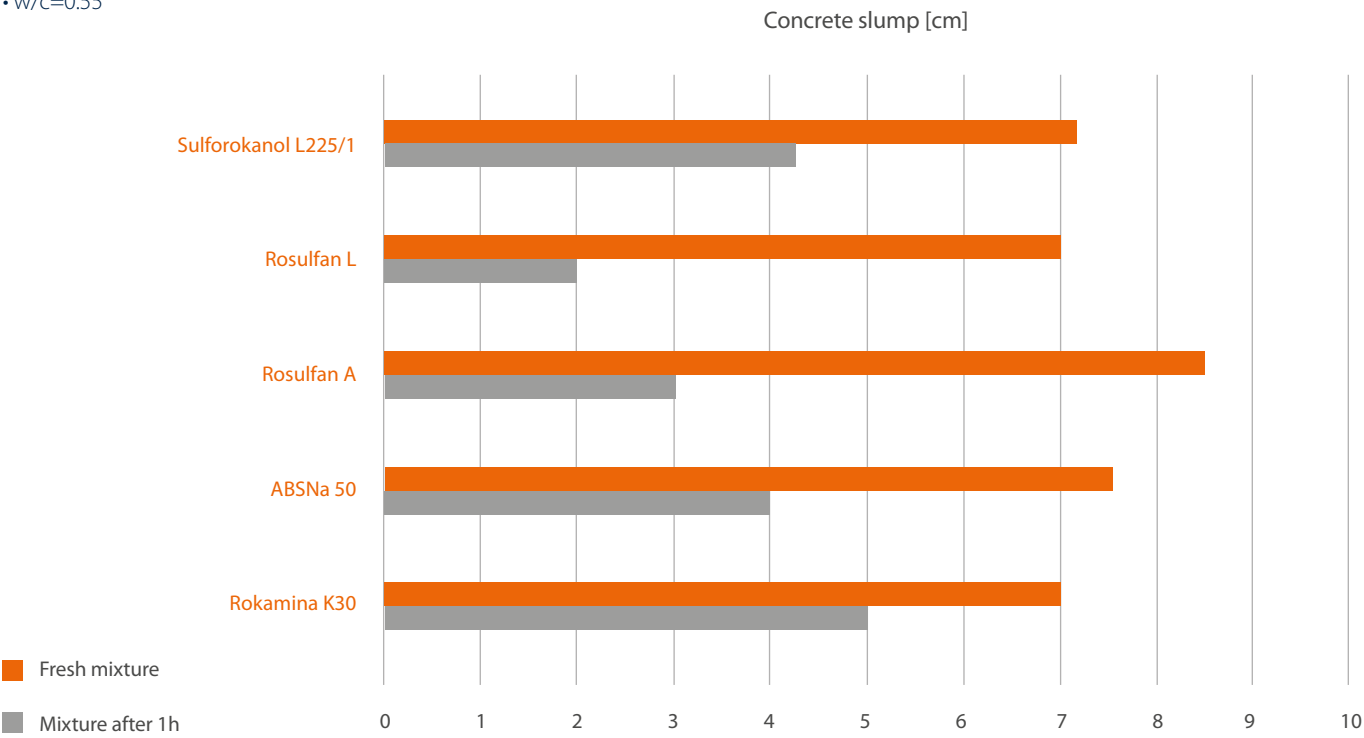


Figure 1. Measurement of consistency using the concrete slump test (air content -4.5%)

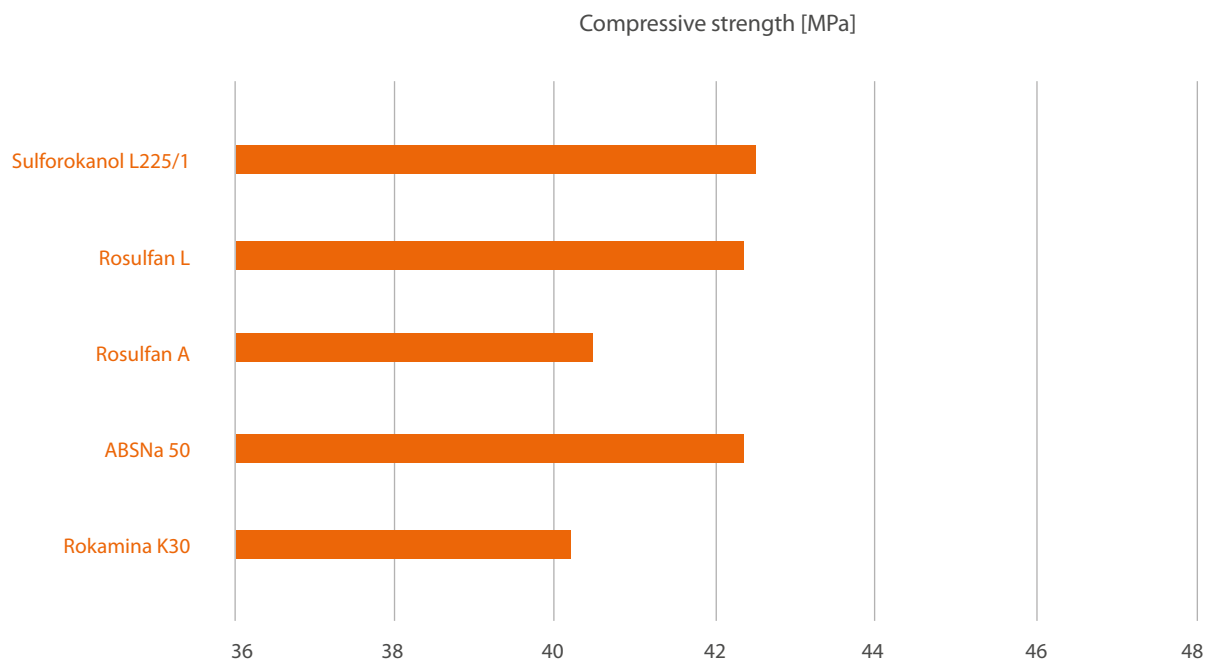


Figure 2. Compressive strength of aerated concrete blocks after 28 days of maturation (air content - 4.5%)

## Tunneling

Product name		Chemical name	CAS	Form	Active substance %	Description
Rokamina K40HC		Cocamidopropyl betaine	61789-40-0	liquid	37-42	An amphoteric surfactant. Works synergistically in combination with anionic surfactants, stabilizing and reducing the size of air bubbles in a fresh concrete mix.
Rokamid KAD		Cocamide DEA	68155-07-7	liquid	~100	
Rokamid RAD		Oleamide DEA	68603-38-3	liquid	~100	
Sulforokanol N232P		Sodium C9-C11 ether sulfate	160901-28-0	liquid	31-33	Highly stable foaming agents.
Rosulfan D		Sodium decyl sulfate	142-87-0	liquid	35-37	





## Lightweight concrete

Product name	Chemical name	CAS	Form	Active substance %	Description
EXOcon FC2	mixture	–	liquid	~11%	A mixture used in the production of Lightweight Foamed Concrete.
EXOcon FCA20	mixture	–	liquid	~ 20%	

## Defoamers/Deaerators

Product name	Chemical name	CAS	Form	Active substance %	Description
Deafomers for superplasticizers (PCE)					
EXOantifoam CPD3	mixture	–	liquid	~100	Specialized deaerating agent for superplasticizers
EXOantifoam S100	mixture	–	liquid		
Deafomers designed only for direct dosing into concrete (very efficient but insoluble in superplasticizers)					
Rokanol® LP2023	Alcohol, C16-C18+EO/PO	68002-96-0	liquid	~100	Agents with a strong deaerating effect, high effectiveness but low solubility in superplasticizers.
Rokamer PP2000	Alcohol, C16-C18+EO/PO	25322-69-4	liquid	~100	
Rokanol® RZ4P11	Alcohol, C16-C18+EO/PO	68002-96-0	liquid	~100	
Rokamer 2000	PEG/PPG copolymer	9003-11-6	liquid	~100	

## Accelerators

Product name	Chemical name	CAS	Form	Active substance %	Description
Diethanolamine W	Diethanolamine	111-42-2	liquid	89- 91	A concrete setting accelerator. The product has properties that inhibit metal corrosion.
Triethanolamine S	Triethanolamine	102-71-6	liquid	~100	
Triethanolamine W	Triethanolamine	102-71-6	liquid	~80	High-quality concrete setting accelerator that perfectly dissolves in all admixtures
EXOcem AZD-A1	mixture	–	liquid	~60	Significantly increases the early and late strength of concrete.

## Wetting agents

Product name	Chemical name	CAS	Form	Active substance %	Description
EXOwet N5	Alcohol+EO	78330-20-8	liquid	~100	A flagship high-performance wetting agent.
Rokanol® GA5	Alcohol, C10+EO	160875-66-1	liquid	~100	A wetting agent that additionally aids deaeration of concrete.
Rokanol® GA7W	Alcohol, C10+EO	160875-66-1	liquid	84-86	
Rokanol® GA8W	Alcohol, C10+EO	160875-66-1	liquid	84-86	
Rokanol® GT9	Alcohol, C9-C16+EO	97043-91-9	liquid	~100	
Rokanol® IT3	Alcohol, C13-Iso+3EO	69011-36-5	liquid	~100	A 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+6EO	68439-46-3	liquid	~100	
EXOwet OS	Di(2-ethylhexyl) sulfosuccinic acid, sodium salt	577-11-7	liquid	68-72	An excellent wetting product dedicated to ready-mixed concrete. Also acts as a wetting agent for dust suppressors.
Rokafenol N8LA	4-Nonylphenol, branched, ethoxylated	37251-69-7	liquid	~100	A universal compound with high efficiency of wetting of cement grains. The product is based on nonylphenol.

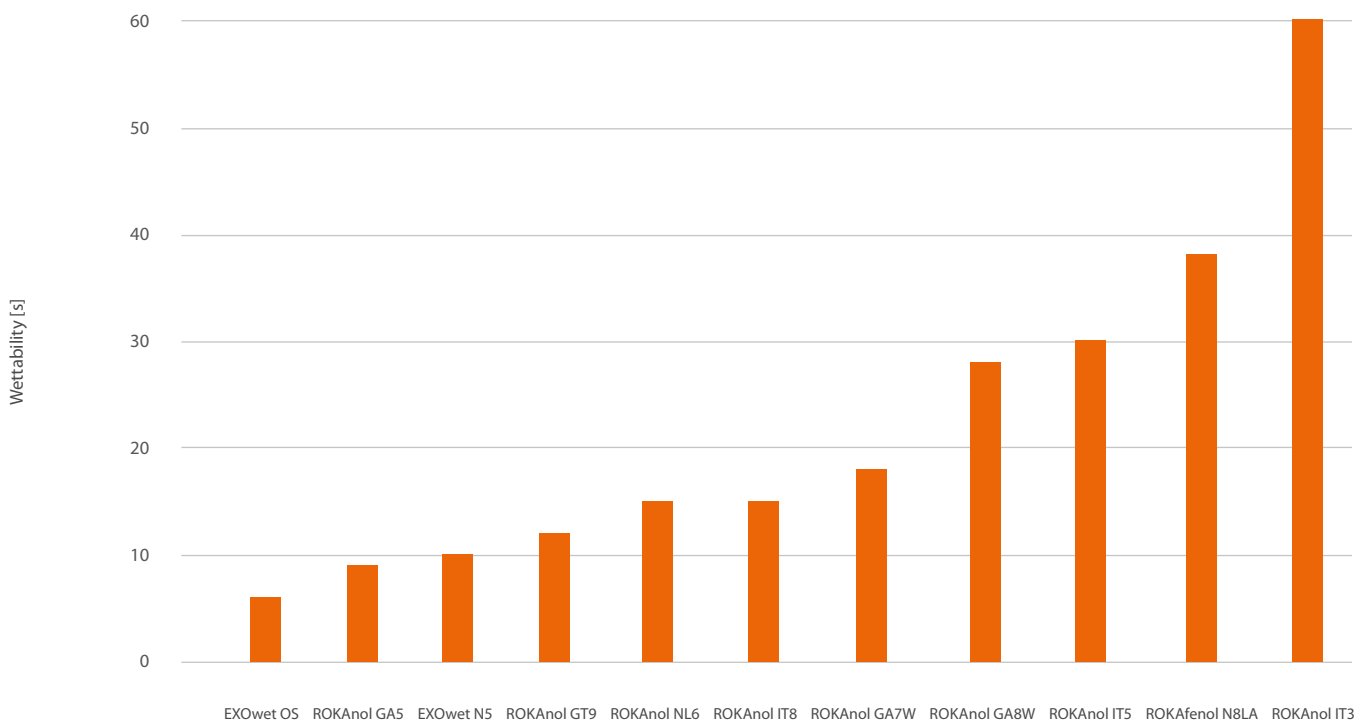




Figure 3: The shorter the wetting time, the better the agent performance

## Humectants

Product name	Chemical name	CAS	Form	Active substance %	Description
Poikol 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	
Polikol 1500	Polyoxyethylene glycol	25322-68-3	powder/flakes/bulk	~100	
Polikol 6000	Polyoxyethylene glycol	25322-68-3	powder/flakes/bulk	~100	

## Raw materials used in mold release agents

### Emulsifiers

Product name		Chemical name	CAS	Form	Active substance %	Description
EXOemul RO1		mixture	–	liquid	~100	Used in the emulsification of anti-adhesive liquids based on vegetable oils.
EXOemul OM3 LSP		mixture	–	liquid	~100	Used in the emulsifying process of anti-adhesive liquids containing mineral oil.
EXOemul SIN		mixture	–	liquid	~100	For emulsifying silanes and siloxanes

The PCC Group's offer includes products for use in anti-adhesive liquids as mold release agents for concrete. 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

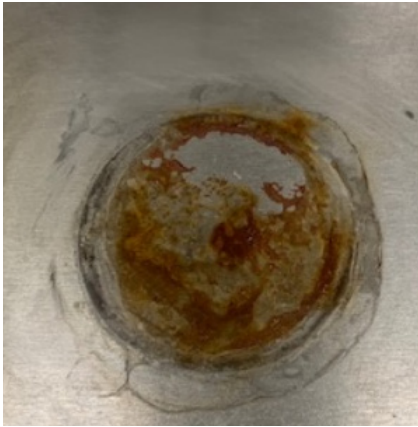
package for anti-adhesive fluids is EXOemul OM3 LSP, which works with mineral bases. This product also ensures stability of the emulsion over time.

## Corrosion inhibitors protecting steel

Product name	Chemical name	Active substance %	pH	Feature
EXOhib PC400	Aminoborate solution	~ 70%	9-11	Nitrite free
EXOhib PC500	Mixture of corrosion inhibiting compounds	48-52	9-11	Aminoborate and nitrite free



plate without inhibitor



EXOhib PC400



EXOhib PC500



## Raw materials for concrete injections, waterproofing and resin floor coating

### Polyether polyols

Product name	Hydroxyl number (mg KOH/g)	Dynamic viscosity at 25°C (mPa·s)	Molecular weight (g/mol)	Description	Sector
Rokopol D200	495-535	45-65	220		
Rokopol® D450*	230-270	60-80	450		
Rokopol® D1002	108-116	130-170	1 000		
Rokopol® C1520	150-165	2 000-3 300	–		
Rokopol® D2002	53 - 59	280 - 380	2 000		
Rokopol® DE2020	53-59	280-400	2 000		
Rokopol® DE4020	27-31	700-900	4 000		
Rokopol DE4030	26-30	700-1 200	4 000		
Rokopol® M5000	35-37	700-960	4 800		
Rokopol® M5020	33-38	700-1 000	4 800	A component for the production of coatings, adhesives, sealants and polyurethane elastomers based on one- and two-component systems.	Construction Industry. Polymers, coatings, adhesives, sealants and elastomers.
Rokopol® M6025	27-29	1 050-1 250	6 000		
Rokopol® M1170	31-36	1 250-1 550	5 000		
Rokopol® M6000	27-29	1 050-1 250	6 000		
Rokopol® M55240	20-23	3 500-7 000	4 800		
Rokopol® G400	370-400	250-400	400		
Rokopol® G441	330-360	250-310	440		
Rokopol® G500	290-310	240-340	560		
Rokopol® G700	225-250	220-270	700		
Rokopol® G1000	155-165	200-300	1 000		
Rokopol® F3600	45-50	540-620	3 600		


Rokopol® products are a perfect solution for polyurethane (PU) waterproofing and coatings, including sport flooring two- (2K) and one- (1K) component systems. This is due to their high hydrolytic stability and controlled reactivity with isocyanate. The range of different structures, molecular weights, and OH functionality allows

the creation of a product with desired properties covering indoor and outdoor applications. A composition of diols and triols with various hydrophobicity is usually recommended for 2K systems, whereas diols with higher MW with some content of high MW triols are normally recommended for 1K systems.



## Concrete finish - concentrates

### Cleaning formulations

Product name	Chemical name	CAS	Form	Active substance %	Description
EXOclean CR	 mixture	–	liquid	~100	A specialist formulation for removing concrete residues. The agent is suitable for cleaning delicate metal tools and hard surfaces. After application, Exoclean CR does not cause corrosion or emit smoke.
EXOclean OC	mixture	–	liquid	–	A product dedicated to cleaning oil stains from concrete surfaces.

The products in the offer are raw materials for the production of concrete admixtures intended for companies and chemical formulators producing concrete admixtures. This 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 marketing authorization obligations 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.









## 02 / Microsilica

Microsilica is produced by PCC BakkiSilicon hf. – the first silicon producer in its sector worldwide to receive certification of its greenhouse gas balance of silicon

metal in accordance with the new ISCC Carbon Footprint Certification (CFC) standard.



Sustainability is one of the core elements of PCC BakkiSilicons corporate strategy. We believe in sustainability and are highly committed to reducing our environmental footprint even further. We set ourselves goals and implement resulting measures.

### We offer two types of Microsilica:

- **Undensified**
- **Densified** with the CE certificate. 

Microsilica function an additive to cement, concrete, ceramics, and refractory materials.

Parameter	Standard ranges <sup>[1]</sup>	Typical <sup>[3]</sup>
Silicon dioxide (SiO <sub>2</sub> )(diff.), %	min. 94.0 <sup>[2]</sup>	95.0
Elemental silicon (Si), %	≤ 0.4	0.0
Total Carbon (C), %	≤ 4.0	1.5
Chloride (Cl-), %	≤ 0.3	0.03
Sulphate (SO <sub>3</sub> ), %	≤ 2.0	0.5
Alkalis (Na <sub>2</sub> O <sub>eq</sub> ), %	≤ 2.0	0.5
Free CaO (CaO <sub>free</sub> ), %	≤ 1.0	<0.01
Moisture (378 K, when packed), %	≤ 3.0	0.2
Loss on ignition (LOI), %:		
Undensified (1023 K)	≤ 6.0	2.5
Densified (1223 K)	≤ 4.0	2.0
pH	-	6
Specific Surface Area	15-35 m <sup>2</sup> /g	25.0 m <sup>2</sup> /g
Activity Index, %	≥ 100.0	110.0
Particle size, % (Primary particles >45 µm)	< 10 <sup>[4]</sup>	4.0 <sup>[4]</sup>
Bulk density (when packed) <sup>[5]</sup> :		
Undensified	280-450 kg/m <sup>3</sup>	320 kg/m <sup>3</sup>
Densified	500-700 kg/m <sup>3</sup>	600 kg/m <sup>3</sup>

[1] Standard ranges in accordance with the requirements of the EN 13263-1:2005 + A1:2009 standard method.

[2] The standard range in accordance with the requirements of the EN 13263-1:2005 + A1:2009 silicon dioxide content is min. 85.0%

[3] Typical values are for guidance only

[4] tested on ASTM sample, which is taken before densification silo

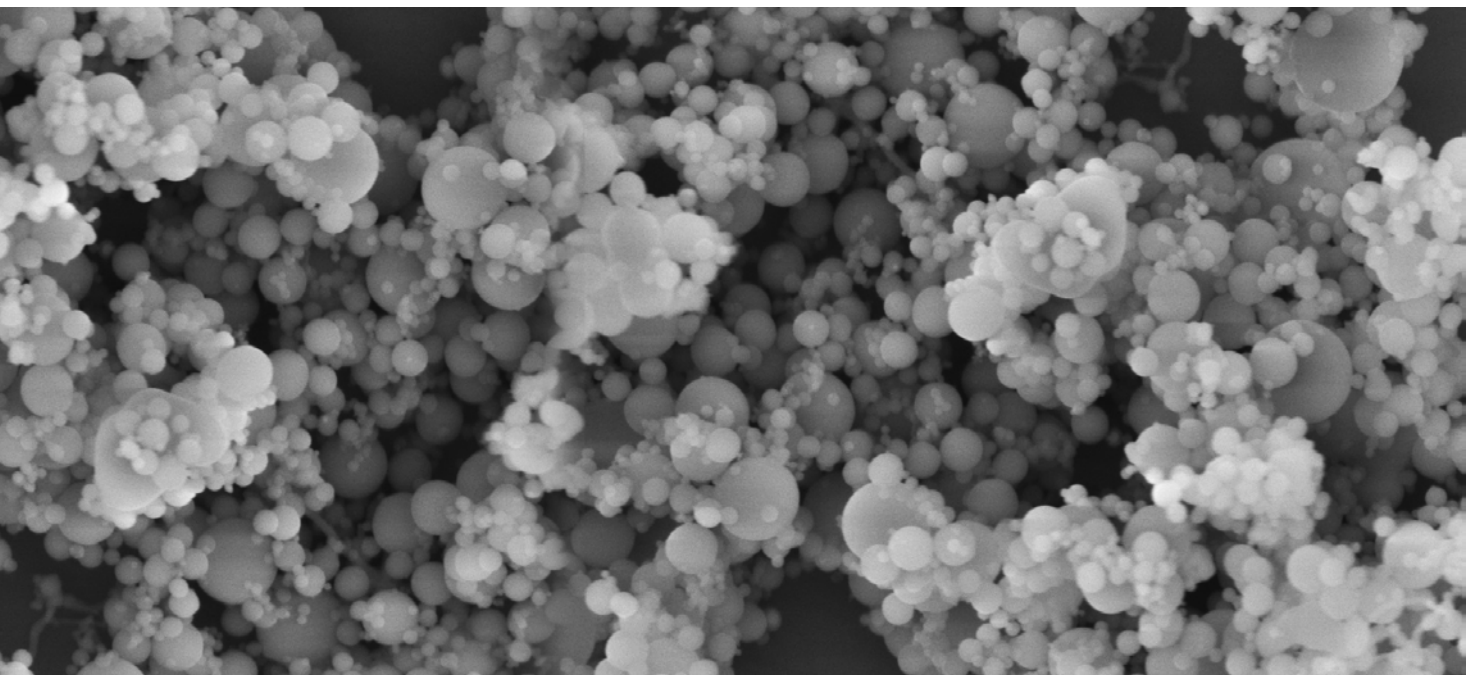
[5] the bulk density can be set individually

## EN 13263 norms standard via PCC Microsilica main parameters

EN 13263 norms standard	PCC Microsilica main parameters
level of SiO <sub>2</sub> for class 1 min. 85%	95%
the specific surface area in a range of 15 – 35 m <sup>2</sup> /g The high concentration of SiO <sub>2</sub> and the high specific surface area cause the material to be highly reactive in the environment of hardening cement paste (see pozzolanic reactions value).	25 m <sup>2</sup> /g
pozzolanic reactions min. 100% (PN-EN 13263-1 +A1)	110.0%
free carbon content in the product less than 4% The silica fume was added as a 5, 10 and 15% replacement for cement. The starting amount of cement was 350 kg and a water to cement ratio was equal 0.45.	1.5%

## Increase in strength with PCC Microsilica

Product name	Microsilica amount [%]	Compressive strength [MPa]	
		7 days	14 days
Microsilica Densified	0	28.8	43.2
	5	31.7	50.7
	10	34.3	58.4
	15	37.7	62.2











# 03 / Gypsum

Plasterboards are commonly used in finishing works. Thanks to the use of 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

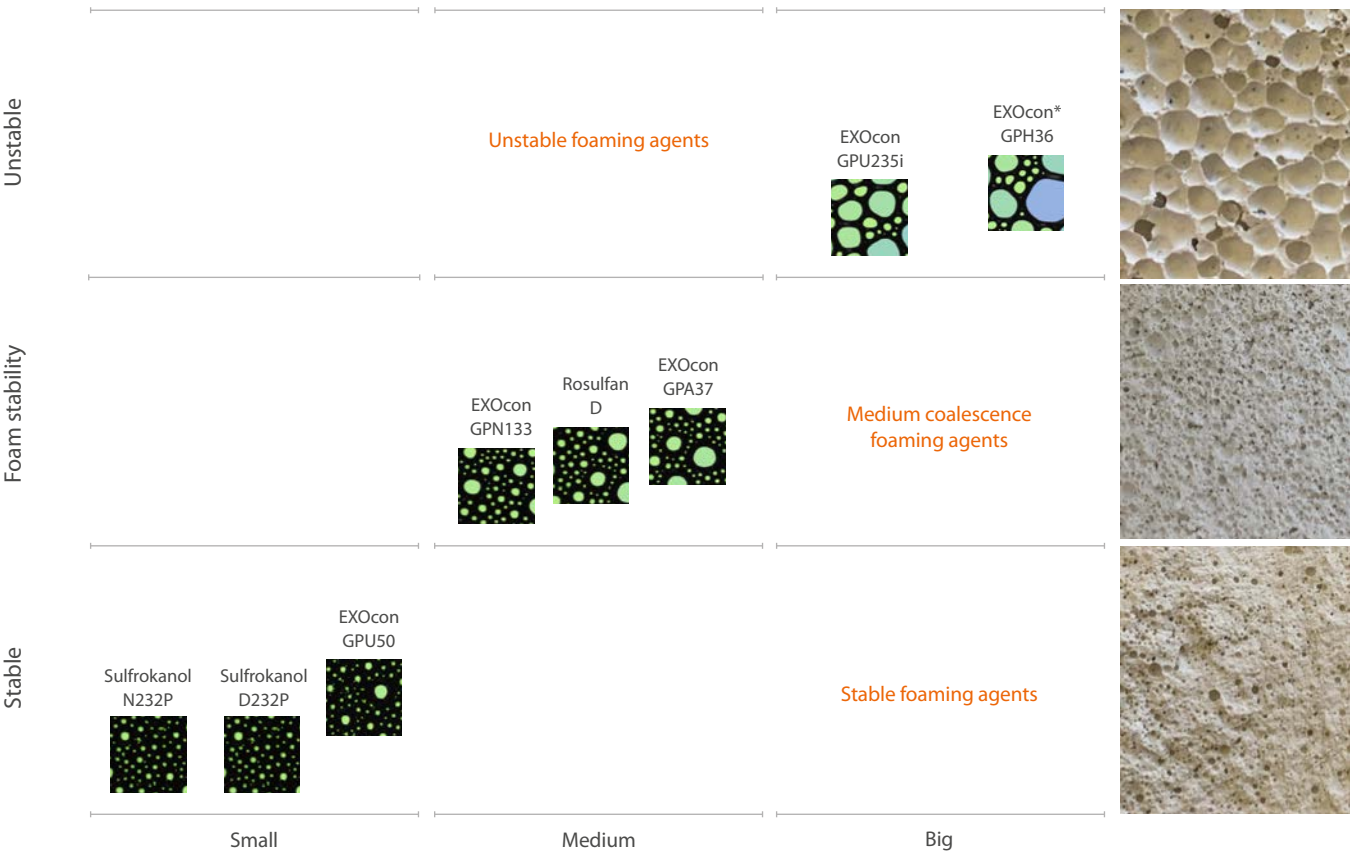
Product name	Chemical name	CAS	Form	pH	Active substance %	Chloride % (m/m)	Formaldehyde free	Function
Superplastyfikator CP	Naphthalenesulfonic acid, polymer with formaldehyde, calcium salt	37293-74-6	powder	6.0-9.0	min. 90	max. 0.05	no	- high initial liquefaction of fresh concrete - good water reducing - improved workability
Superplastyfikator CA40FF	Naphthalenesulfonic acid, polymer with formaldehyde, calcium salt	37293-74-6	liquid	6.5-8.5	39-41	max. 0.05	yes	

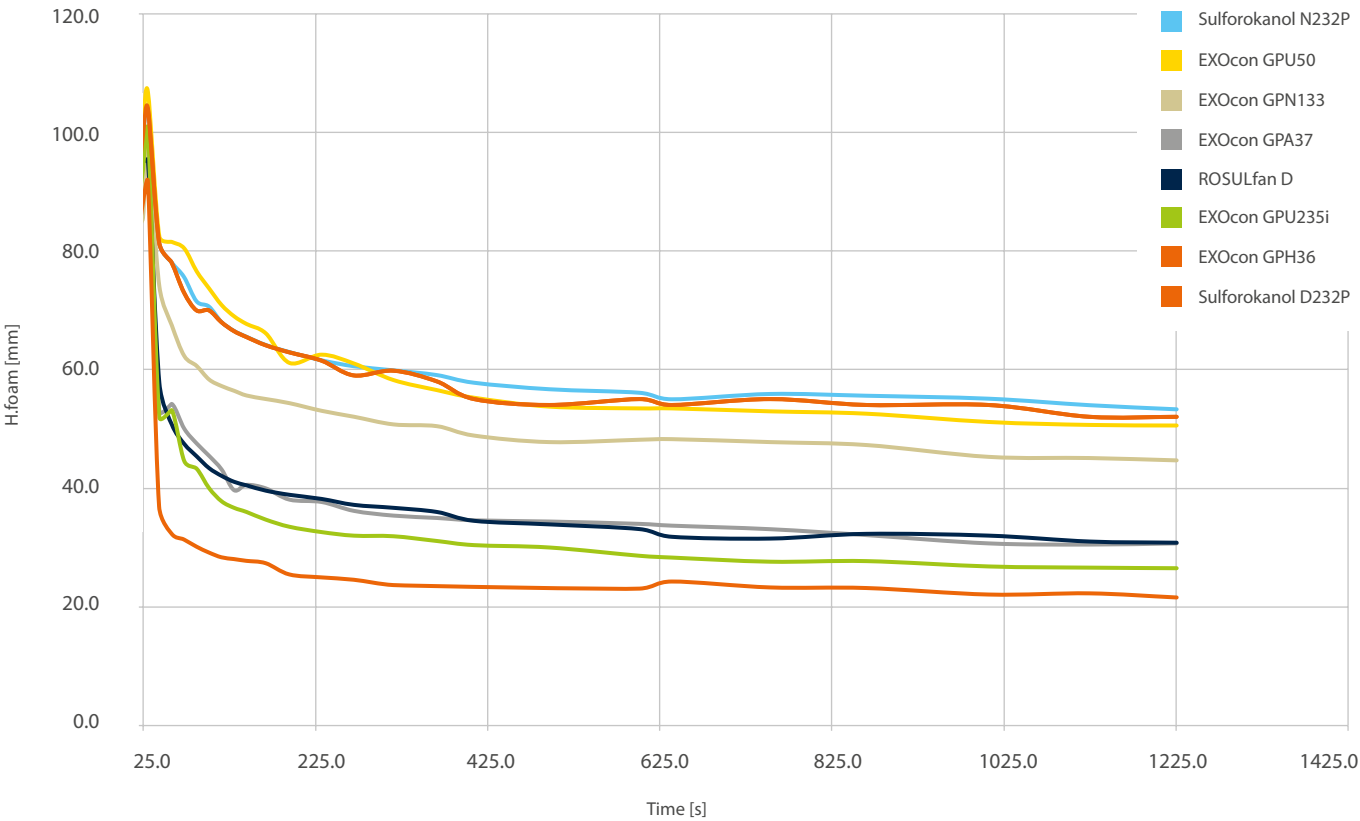





Foaming agents

Product name	Chemical name	Form	Active substance %	Description
EXOcon GPH36	mixture	liquid	36	Highly coalescent product only for professional use. Suggested to be dosed together with stable foam technology agent.
EXOcon GPU50	mixture	liquid	50	Stable foaming agent creating slightly enlarged pores. High active substance content.
EXOcon GPU235i	mixture	liquid	35	A coalescing foaming agent (unstable) for use in the production of lightweight gypsum plasterboard to achieve low-density boards.
EXOcon GPD	AES	liquid	35	An effective stable foaming agent for use in the production of gypsum plasterboard to achieve standard-density boards.
EXOcon GPA37	mixture	liquid	37	A medium-coalescing foaming agent (semistable) for use in the production of plasterboard with medium-sized pores.
EXOcon GPN133	 mixture	liquid	33	A medium coalescing foaming agent but forming quite stable and effective foam.
Rosulfan D	 AS	liquid	36	Semi-stable foaming agent for low and standard-density boards.
SULFOROKAnol D232P	 AES	liquid	32	A stable foaming agent for use in the production of gypsum plasterboard to achieve standard-density boards.
SULFOROKAnol D232P MB	 AES	liquid	32	This product is RSPO Mass Balance certified.
SULFOROKAnol N232P	AES	liquid	32	A stable foaming agent to achieve standard-density boards.



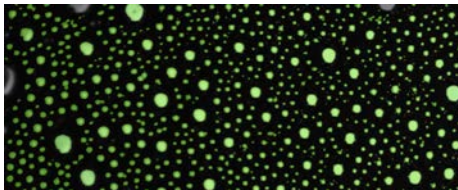


Cleaning formulations

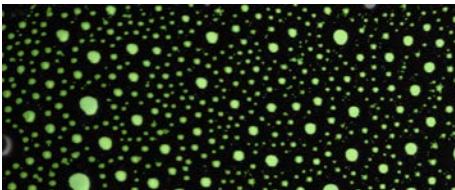
Product name	Chemical name	CAS	Form	Active substance %	Description
EXOc <span>lean</span> CR	 mixture	–	liquid	100	A special formulation for removing gypsum residue. The agent is suitable for cleaning delicate metal tools and hard surface. After application, Exoclean CR does not cause corrosion or emit smoke.

Foam analysis – differences in air bubbles

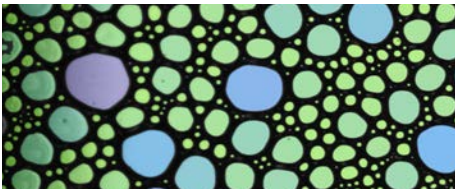
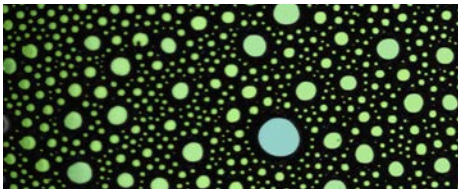
Standard foaming agent



Coalescing foaming agent



Immediately after foaming



5 minutes after foaming







# 04 / 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 traffic class.

Bitumen emulsions (or dispersions) are mixtures of water, bitumen and surface-active compounds.

## Emulsifiers

Product name	Chemical name	CAS	Form	Active substance %	Description
EXObit E-D7	Alcohol, C12-C15+7EO	68131-39-5	liquid	~100	A non-ionic surfactant with excellent asphalt mass emulsifying properties.
EXObit E-N8	Nonylophenol alkoxyated	37251-69-7	liquid	~100	A universal and well know non-ionic emulsifier used in the preparation of bitumen emulsions. A product based on nonylphenol but appropriately modified so can be offered in every market.
EXObit E-K15	Cocamine +15EO	61791-14-8	liquid	~100	A non-ionic emulsifier based on ethoxylated amines.
EXObit E-K40	 Cocamidopropyl Betaine	97862-59-4	liquid	~40	An amphoteric emulsifier strongly dependent on the pH of the formulation. Recommended pH above 10, the higher the better the emulsion stability.
EXObit E-T40	Alcohol C13+40EO	69011-36-5	liquid	~70	A high molecular weight non-ionic emulsifier.
EXOstab C100	 Non-ionic surfactant	–	liquid	~100	A powerful emulsifier based on modified oleochemicals.
EXObit E-SD7	mixture	–	liquid	~90	Modern emulsifier with universal use.
EXObit E-S9	Secondary alcohol ethoxylated	84133-50-6	liquid	~100	Very efficient emulsifier for advanced asphalt formulations, e.g. highly dilutable

## Defoaming agents

Product name	Chemical name	CAS	Form	Active substance %	Description
EXOantifoam S100	mixture	–	liquid	–	A specialist silicone emulsion providing effective and quick defoaming.
Rokamer 2600	PEG/PPG copolymer	9003-11-6	liquid	~100	A non-invasive defoaming agent used in the preparation of bitumen emulsions. The product is safe to use.





# 05 / Polyurethane in the construction industry

## Raw materials for polyurethane systems

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

This is why the PCC Group offers raw materials for supplying the construction industry with the main components needed for the production of rigid PUR and PIR insulation foam (for self-forming). Equally

important are assistance, technical support in the development of new solutions for customers, and support during the implementation of the above-mentioned solutions in production lines.

The raw material offer includes:

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

## Emulsifiers / Compatibilizers

Product name	Chemical name	CAS	Form	Hydroxyl number (mg KOH/g)	Water content %	Description	N-Pentane	Cyclopentane	Water
EXOstab C100	 Non-ionic surfactant	–	liquid	80	max. 0.5	A 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 NP100	Nonylphenol +EO/PO	37251-69-7	liquid	90	max. 1	A nonylphenol-based compatibilizer designed for PUR spray foams.	•		•
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 TSA	mixture	–	liquid	115	max. 5	An emulsifier dedicated for water blown, open cell PU foams. The product is ethoxylated nonylphenol free			•
EXOstab PE600	PAG	9003-11-6	liquid	185	max. 0.5	Polyalkylene glycol with PEG-600 properties in liquid, low viscosity form			



## Flame retardants

Product name	Chemical name	Density at 25°C, (g/ml)	Dynamic viscosity at 25°C (mPa·s)	Acid value (mgKOH/g)	Phosphorus content %	Chlorine content %	Type of flame retardant	Advantages
<b>Roflam P</b>	Tris(2-chloro-1-methylethyl) phosphate	1.28	66	max. 0.1	9.5	32.5	additive	High efficiency Reduction of viscosity
<b>Roflam 6*</b>	Diethyl-N,N-bis(2-hydroxyethyl)aminomethyl phosphonate	1.16	200	max. 8.0	12.2	–	reactive	Halogen free High phosphorus content
<b>Roflam B7</b>	<i>tert</i> -butylated triaryl phosphate	1.18	72	max. 0.1	8.5	–	additive	Halogen free
<b>Roflam F5</b>	isopropylated triaryl phosphate	1.17	53	max. 0.1	8.3	–	additive	Halogen free

\* Product available on special order

The Roflam series of products features liquid flame retardants based on phosphate esters. They can be successfully implemented in PIR and PUR polyurethane foams to provide a perfect balance of processability, flame retardancy and proper mechanical properties. The addition of Roflam flame retardants to polyurethane insulation

materials (e.g. for thermal insulation of buildings and cold storage chambers, or the acoustic insulation of rooms) satisfies the B2 class according to fire test criteria DIN 4102-1, which is a requirement in the building and construction industry.



## Polyether polyols for CASE

Product name	Hydroxyl number (mg KOH/g)	Dynamic viscosity at 25°C (mPa·s)	Molecular weight (g/mol)	Description
Rokopol® D200	495-535	45-65	220	Low viscosity PPG of molecular weight ca. 200 g/mol. Designed as chain extender for 1K prepolymers
Rokopol® D450*	230-270	60-80	450	Low viscosity PPG of molecular weight ca. 450 g/mol. Designed for 1K prepolymers and 2K systems.
Rokopol® D1002	108-116	130-170	1 000	Polyoxypropylene glycol of molecular weight ca. 1000 g/mol. It is designed as a component for prepolymer production. Not acidified.
Rokopol® D2002	53-59	280-380	2 000	Polyoxypropylene glycol of molecular weight ca. 2000 g/mol. It is designed as a main component for prepolymer production and 2K systems. Not acidified.
Rokopol® DE2020	53-59	280-400	2 000	Reactive polyoxyalkylated polyether polyol of molecular weight ca. 2000 g/mol. It is designed as an intermediate for the production of polyurethane prepolymers and 2K systems.
Rokopol® DE4020	27-31	700-900	4 000	High molecular weight reactive polyoxyalkylated polyether polyol of molecular weight ca. 4000 g/mol. It is designed as an intermediate for the production of polyurethane prepolymers.
Rokopol DE4030	26-30	700-1 200	4 000	High molecular weight reactive polyoxyalkylated polyether polyol of molecular weight ca. 4000 g/mol. It is designed as an intermediate for the production of polyurethane prepolymers.
Rokopol® M5000	35-37	700-960	4 800	High molecular weight reactive polyoxyalkylated polyether polyol of molecular weight ca. 4800 g/mol. It is designed as an intermediate for the production of polyurethane prepolymers, 1K and 2K adhesives.
Rokopol® M5020	33-38	700-1 000	4 800	High molecular weight reactive polyoxyalkylated polyether polyol of molecular weight ca. 4800 g/mol. It is designed as an intermediate for the production of polyurethane prepolymers, 1K and 2K adhesives. These products provide enhanced reactivity and polarity in comparison to Rokopol® M5000.
Rokopol® M6000	27-29	1 050-1 250	6 000	High performance 6000 MW polyol used for manufacturing HR, CMHR and moulded foam.
Rokopol M6025	27-29	1 050-1 250	6 000	High performance 6000 MW polyol used for manufacturing HR, CMHR and moulded foam.
Rokopol® MS5240	20-23	3 500-7 000	4 800	SAN type polyol with 40% solid content used for manufacturing HR slabstock foam.
Rokopol G400	370-400	250-400	400	High reactivity glycerine based triol of molecular weight ca. 400 g/mol. Due to its noticeable cross linking properties it can be used as an additive to improve mechanical properties.
Rokopol® G441	330-360	250-310	440	High reactivity glycerine based triol of molecular weight ca. 440 g/mol. Due to its noticeable cross linking properties it can be used as an additive to improve mechanical properties.
Rokopol® G500	290-310	240-340	560	Glycerine based propylene oxide triol of molecular weight ca. 500 g/mol. It is designed as a raw material for the production of polyurethane 2K elastomers, and 1K prepolymers.
Rokopol® G700	225-250	220-270	700	Glycerine based propylene oxide triol of molecular weight ca. 700 g/mol. It is designed as a raw material for the production of polyurethane 2K elastomers, and 1K prepolymers.
Rokopol® G1000	155-165	200-300	1 000	Glycerine based polyoxyalkylene triol of molecular weight ca. 1000 g/mol. It is designed as a raw material for the production of polyurethane 2K elastomers, and 1K prepolymers.
Rokopol® F3600	45-50	540-620	3 600	Glycerine based copolymer block-statistic on ethylene oxide and propylene oxide triol of molecular weight ca. 3600 g/mol. It is designed as a raw material for the production of polyurethane 2K elastomers, and 1K prepolymers.
Rokopol® RF170	500-520	300-500	330	Reactive aliphatic amine polyol for spray foams and 2k adhesive applications.
Rokopol® RF551	400-440	3 000-5 000	600	Sorbitol based polyether polyol, dedicated for PUR application. It gives good foam rise, dimensional stability and flowability.

## Reactive plasticizers for polyurethane CASE materials\*

Product name	Hydroxyl number [mg KOH/g]	Dynamic viscosity at 25°C [mPa·s]	Molecular weight [g/mol]	Description
Hydrophilic & reactive, EO/PO				
Rokopol® 50-B-32	75 – 85	50 – 100	700	Specially designed low MW product line, developed for various PU application as a reactive plasticizer. Products are characterized by high level of hydrophilicity, reduced processing times and allow to reduce surface stickiness.
Rokopol® 50-B-46	50 – 60	100 – 150	1 100	
Rokopol® 50-B-120	32 – 40	250 – 350	1 500	
Rokopol® 50-B-150	25 – 32	300 – 400	1 800	
Rokopol® 50-B-330	18 – 26	700 – 900	2 700	
Rokopol® 50-B-680	10 – 20	1 500 – 2 000	3 800	
Rokopol® 50-B-1000	7 – 15	2 000 – 2 800	5 500	
Hydrophobic, PO				
Rokopol® P-B-32	70 – 80	50 – 100	750	Specially designed low MW product line, developed for various PU application as a reactive plasticizer. Products are characterized by improved level of hydrophobicity, increased resistance to moisture and hydrolysis as well as good adhesive properties.
Rokopol® P-B-46	48 – 56	80 – 150	1 050	
Rokopol® P-B-68	42 – 52	120 – 200	1 200	
Rokopol® P-B-150	27 – 37	200 – 350	1 900	
Rokopol® P-B-220	20 – 30	350 – 550	2 500	
Rokopol® P-B-320	7 – 19	700 – 1 000	4 600	
High hydrophobic & low reactivity, PO/BO				
Rokopol® MOS 68	42 – 52	100 – 200	1 150	Specially designed medium MW product line, developed for various PU application as a low reactivity plasticizer. Products are characterized by high level of hydrophobicity, increased resistance to moisture and hydrolysis as well as good adhesive properties.
Rokopol® MOS 100	35 – 45	150 – 300	1 400	
Rokopol® MOS 220	15 – 30	400 – 600	2 450	
High hydrophobic & very low reactivity, BO				
Rokopol® MOS 460	13 – 30	800 – 1400	2 450	Specially designed high MW product line, developed for various PU application as a low reactivity plasticizer. Products are characterized by outstandingly high level of hydrophobicity, increased resistance to moisture and hydrolysis as well as good adhesive properties.
Rokopol® MOS 680	10 – 20	500 – 1 200	3 700	

## Polyether polyols for 2K polyurethane gels\*



Product name	Hydroxyl number [mg KOH/g]	Dynamic viscosity at 25°C [mPa·s]	Description
Rokopol® EP1465.01	38 – 47	300 – 900	Polyether polyols for manufacture of polyurethane gels with aromatic or aliphatic isocyanates (hot cure). These polyols in mixture allow controlling hardness of PU gel in minimum range of Sh00<5 up to Sh00=60. Pot life is controlled by catalyst content and curing temperature. Potential applications: shock absorbing materials, high comfort gel pillows and mattresses, gel bicycle seats, pieces with various hardness, non-slip phone pads, gaskets resistant to mineral oils, in general parts resistant to hydrophobic liquids.
Rokopol® EP1555.01	27 – 37	400 – 1 200	

\*on request

## Polyester polyols for rigid foam

Product name	Hydroxyl number [mg KOH/g]	Structure	Flame retardant	Description
Rigid faced lamination				
Rokester® DP NV 2416.01	225 – 245	2 500 – 4 500	●	Nonylphenol free. Aromatic polyester polyol designed for production of PUR/PIR foams.
Rokester® DP NV 2416.02	240 – 260	1 000 – 3 000	●	Nonylphenol free, halogen free. Aromatic polyester polyol designed for production of PUR/PIR foams.
Rokester® DP NV 2402.01	230 – 250	max. 5 000		Nonylphenol free, halogen free. Aromatic polyester polyol designed for production of PUR/PIR foams. Dedicated for cyclo-iso pentane mix.
Rokester® DP NV 4004.02	260 – 290	5 000 – 7 500		Nonylphenol free, halogen free, PA free, intumescent behaviour, reduced smoke emission. Aromatic polyester polyol designed for production of PUR/PIR foams.
Rokester® 3016	270 – 300	2 800 – 5 300	●	Hybrid polyester-polyether polyol for PUIR, with enhanced adhesion at low temperature.
Rokester® DP NV 7525.01GT	170 – 190	1 300 – 2 200	●	Nonylphenol free, formulated polyester polyol designed for the production of PUR/PIR. Wide processing window.
Rokester® DP NV 7526.01	170 – 190	max. 1 500	●	
Flexible faced lamination				
Rokester® DP 1952.14	185 – 215	max. 7 000	●	Aromatic polyester polyol designed for production of PUR/PIR foams with low lambda values.
Rokester® DP 1926.02	180 – 205	3 000 – 5 000	●	A specialty polyester polyol designed for production of PUR/PIR foams with high cyclopentane load.
Rokester® DP NV 2402.01	230 – 250	max. 5 000		Nonylphenol free, halogen free. Specialized polyester polyol designed for production of PUR/PIR foams. Dedicated for cyclo-iso pentane mix.
Rokester® DP NV 2416.01	225 – 245	2 500 – 5 000	●	Nonylphenol free. Aromatic polyester polyol designed for production of PUR/PIR foams.
Rokester® DP NV 2416.02	240 – 260	1 000 – 3 000	●	Nonylphenol free, halogen free. Aromatic polyester polyol designed for production of PUR/PIR foams.
Block Foam				
Rokester® 2500	225 – 250	2 000 – 5 000		Halogen free, nonylphenol free. A specialist hybrid polyester-polyether polyol designed for the production of PUR/PIR foams.
Rokester® 1711	185 – 195	2 500 – 3 500		Halogen free, nonylphenol free. Aliphatic-aromatic polyester polyol intended for production of one-component polyurethane foams (OCF) and PIR foams.
Rokester® 2430	230 – 250	8 000 – 12 000		Halogen free, nonylphenol free. Aromatic polyester polyol dedicated for the production of PIR block foam by the continuous or discontinuous method.

## Polyester polyols for CASE

Product name		Hydroxyl number [mg KOH/g]	Dynamic viscosity at 25°C [mPa·s]	Description
Rokester® C1520		150-165	2 000-3 300	A hydrophobic natural oil-based polyol for floor coatings.
Rokester® C1610		155-170	1 000-1 400	

Rokester® C1520 and Rokester® C1610 are branched polyols suitable for 2K coatings on concrete, asphalt floors and steel surfaces.



## Polyether polyols for rigid foam

Product name	Hydroxyl number [mg KOH/g]	Dynamic viscosity at 25°C [mPa·s]	Molecular weight [g/mol]	Description
Rokopol D200	495-535	45-65	220	Low viscosity PPG of molecular weight ca. 200 g/mol. Designed as chain extender for 1K prepolymers and 2K systems.
Rokopol® D450	230-270	60-80	450	A low-viscosity PPG of molecular weight ca. 450 g/mol with a high hydroxyl value. Designed as an additive for the production of specialized OCF foams. A general-purpose additive for rigid foams, and a viscosity depressant.
Rokopol® D1002	108-116	130-170	1000	A polyoxypropylene glycol of molecular weight ca. 1 000 g/mol often used as an additive in OCF systems. It can be used for improving cellular structure and skin texture. It reduces the friability of the foam.
Rokopol® D2002	53-59	280-380	2000	A polyoxypropylene glycol of molecular weight ca. 2 000 g/mol often used as an additive in OCF systems. It can be used for improving cellular structure and skin texture. It reduces the friability of the foam.
Rokopol G400	370-400	250-400	400	High reactivity glycerine based triol of molecular weight ca. 400 g/mol. Due to its noticeable cross linking properties it can be used as an additive to improve mechanical properties.
Rokopol® G441	330-360	250-310	500	High reactivity glycerine based triol of molecular weight ca. 440 g/mol. Due to its noticeable cross linking properties, it can be used as an additive to improve mechanical properties.
Rokopol® G500*	290-310	240-340	560	A glycerine-based propylene oxide triol of molecular weight ca. 560 g/mol. It can be used as a mechanical property-enhancing additive.
Rokopol® G700	225-250	220-270	700	A glycerine-based propylene oxide triol of molecular weight ca. 700 g/mol. It can be used as a dimensional stability and skin forming enhancing additive.
Rokopol® G1000	155-165	200-300	1 000	A glycerine-based triol of molecular weight ca. 1000 g/mol. A general-purpose additive for rigid foams. A skin forming enhancing additive.
Rokopol® GS364*	340-380	2 000-4 000	700	A general-purpose sucrose polyol for PUR rigid foams to be used, for example, in block foams, pipe insulation, and sandwich panel continuous and discontinuous lines.
Rokopol® GS 484*	465-505	6 500-10 000	–	A general-purpose sucrose polyol for PUR rigid foams to be used, for example, in block foams, pipe insulation, and sandwich panel continuous and discontinuous lines.
Rokopol® RF151	440-460	15 000-30 000	700	A reactive polyether polyol. A standard propoxylated Mannich base with high functionality and high viscosity. In PUR rigid foam formulations, it decreases flame retardant and catalyst content, and improves the reactivity and adhesion of spray foam.
Rokopol® RF151V	440-480	5 000-12 000	700	A reactive polyether polyol. A standard propoxylated Mannich base with high functionality. In PUR rigid foam formulations, it decreases flame retardant and catalyst content, and improves the reactivity and adhesion of spray foam.
Rokopol® RF152V	410-450	5 000-1 000	–	A reactive polyether polyol. A standard propoxylated Mannich base with high functionality. In PUR rigid foam formulations, it decreases flame retardant and catalyst content, and improves the reactivity and adhesion of spray foam.
Rokopol® RF170	500-520	300-500	330	A reactive aliphatic amine polyol for spray foams and 2K adhesive applications.
Rokopol® RF551	400-440	3 000-5 000	800	A sorbitol-based polyether polyol, designed for PUR application. It gives good foam rise, dimensional stability and flowability.

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

## Polyether polyols for One-Component Foams (OCF)

Product name	Hydroxyl number [mg KOH/g]	Molecular weight [g/mol]	Dynamic viscosity at 25°C [mPa·s]	Description
Rokopol G400	370-400	250-400	400	A glycerine-based triol. Can be used as a component that improves mechanical properties.
Rokopol® G441	330-360	500	250-310	A high-reactivity glycerine-based triol. Due to its noticeable crosslinking properties, it can be used as a component improving mechanical properties.
Rokopol® G500	290-310	560	240-340	A glycerine-based triol. Can be used as a component that improves mechanical properties.
Rokopol® G700	225-250	700	220-270	A glycerine-based triol often used as an additive to improve dimensional stability and mechanical strength.
Rokopol® G1000	155-165	1 000	200-300	A glycerine-based triol very often used as the main component in OCF systems. The low sodium and potassium content ensures a long shelf life.
Rokopol® D450	230-270	450	60-80	A low-viscosity diol with a higher hydroxyl value used as an additive in the production of specialized OCF foams.
Rokopol® D1002	108-116	1 000	130-170	A polyoxypropylene glycol often used as an additive in OCF systems. It improves cellular structure and skin texture, and reduces the friability of the foam.
Rokopol® D2002	53-59	2 000	280-380	A polyoxypropylene glycol used as one of the main components in OCF adhesive systems. It improves cellular structure and helps reduce the friability of the foam.

## Polyester polyols for One-Component Foams (OCF)

Product name	Hydroxyl number [mg KOH/g]	Dynamic viscosity at 25°C [mPa·s]	Description
Rokester® DP 1500.01	145-155	1 500-2 500	A specially designed aliphatic-aromatic polyester polyol. Provides high fire resistance and increased yield. Due to the low hydroxyl number, it is possible to increase its content in the formulation.
Rokester® 1600	150-170	1 000-3 000	A special aliphatic polyester polyol that helps reduce PMDI consumption. In some formulations, it improves the yield of the foam.
Rokester® 1711	185-195	2 500-3 500	A special aliphatic polyester polyol with very low reactivity. A very high loading level is possible.
Rokester® 2610	250-270	3 500-5 500	A modified aromatic polyester polyol for OCF with low reactivity. A high loading level is possible.
Rokester® 2600	250-270	2 500-4 500	An aromatic based polyester polyol with controlled reactivity for OCF based on PET.
Rokester® 2700	250-270	2 500-5 000	An aromatic polyester polyol for OCF.
Rokester® 3110	300-330	2 000-3 000	An aromatic polyester polyol for summer OCF foams with a high hydroxyl number.

## Specially designed polyols for One-Component Foams (OCF)

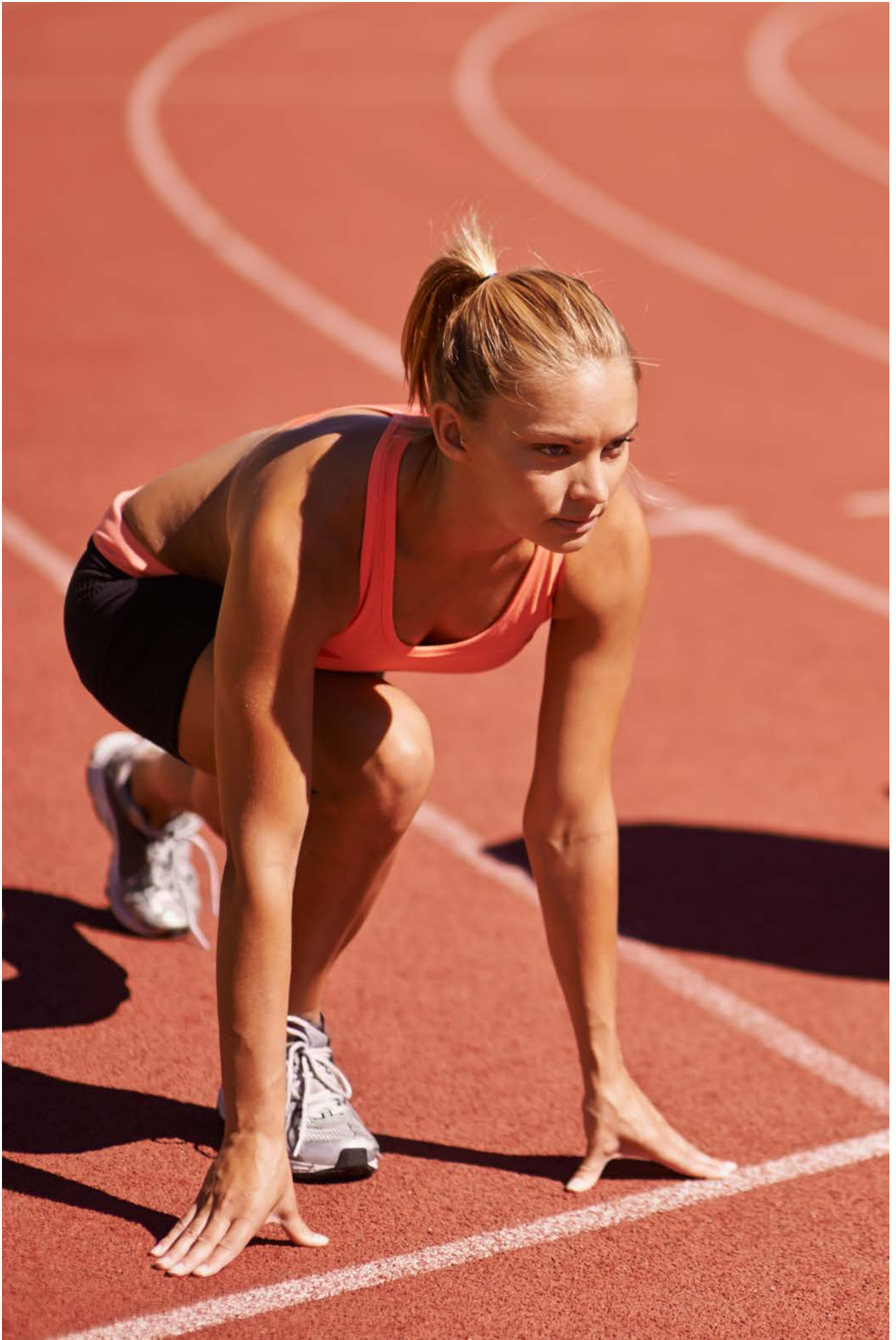
Product name	Hydroxyl number [mg KOH/g]	Molecular weight [g/mol]	Dynamic viscosity at 25°C [mPa·s]	Description
Rokopol® iCan 2432	145-160	900	150-250	A special polyether polyol for high performance OCF foams. Its main advantage is improved foam yield. In addition, the foam is characterized by a noticeably finer and regular cellular structure. This polyol is intended for use as a base polyol.
Rokopol® iCan 4100	150-165	1 000	200-350	A specially designed polyether polyol intended for winter OCF foams with improved yield. The foam based on this polyol has reduced friability, as well as tack-free and cutting times. It can be used as a base polyol.
Rokopol® iCan 2770	150-170	1 000	200-350	A special polyether polyol designed as an additive for winter OCF foams. It noticeably reduces the tack-free and cutting times. In selected formulations, the yield is increased. Its content in the polyol blend is up to 50 wt%.
Rokopol® iCan 2672	150-170	700	50-150	A special polyether polyol for the production of one-component foam with a high content of chlorinated paraffin.
Rokopol® iCan 2850	225-250	700	180-280	A special polyether polyol for the production of one-component foam with a high content of chlorinated paraffin. Reduces the tack-free and cutting times.
Rokopol® iCan 2812	105-115	1 500	200-550	A special polyether polyol for the production of one-component foam with increased elasticity. Its content in the polyol blend is up to 80 wt%.
Rokopol® iCan 2823	73-83	2 000	250-600	A special polyether polyol for the production of one-component foam with increased elasticity. Its content in the polyol blend is up to 50 wt%.











# 06 / Polyurethane systems

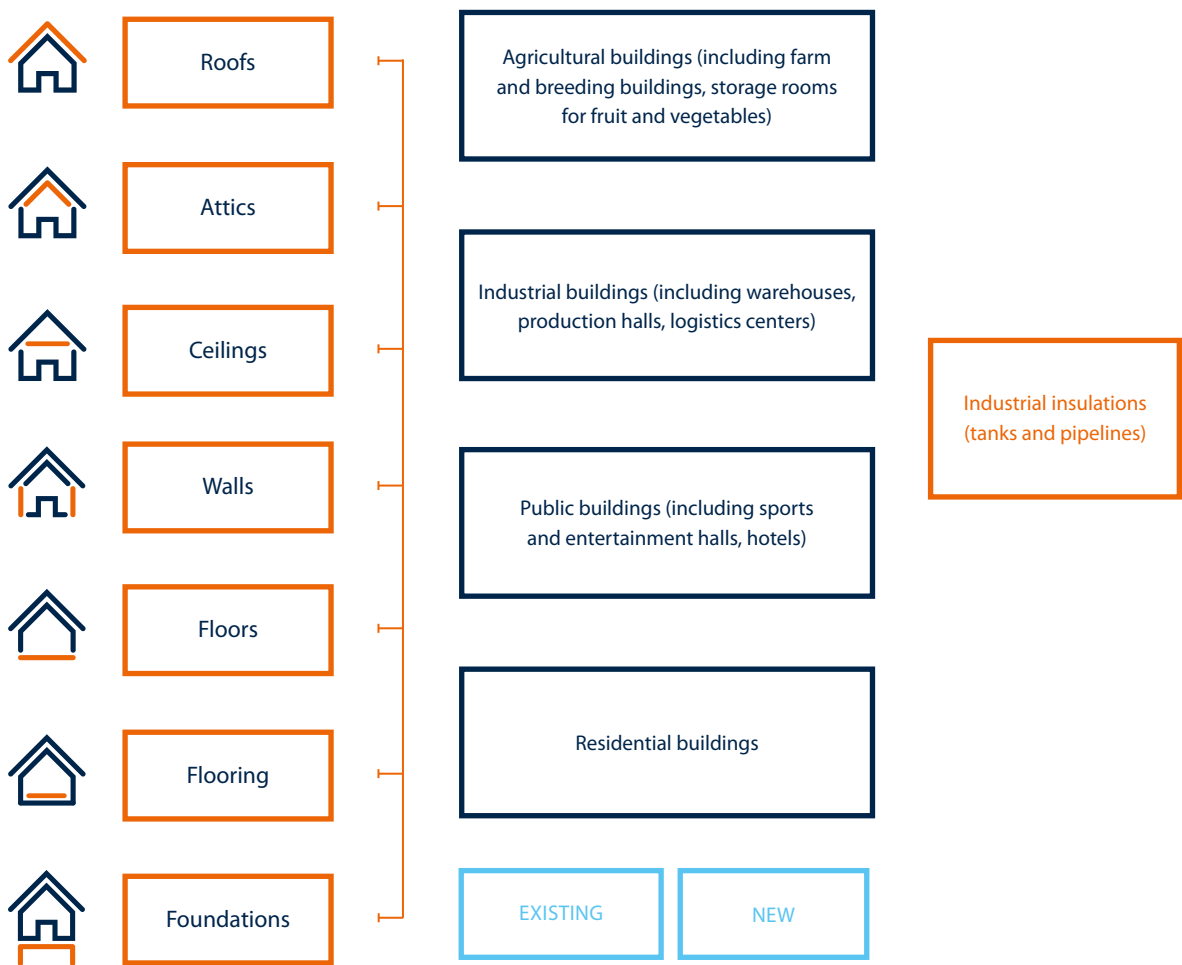
## Spray polyurethane foam system

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

equipment, which enables precise mixing of polyurethane products and accurate application of insulation layers. We have expanded our offer of spray polyurethane foam systems to include products for making pour and injection PU foams:

- Ekoprodur IP 3032 (slow)
- Ekoprodur IP 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, irrespective of the complexity of the surface
- one of the lowest heat transfer coefficients ( $\lambda < 0.023 \text{ W/(m·K)}$ )
- no thermal bridges responsible for heat loss (seamless insulation)
- excellent adhesion to various materials and substrates
- high stability of parameters over time
- high efficiency (e.g. up to 1000 m<sup>2</sup> flat roof per day), which reduces additional work costs and does not significantly disturb the users of the facility
- light insulation and multifunctionality (thermal and acoustic insulation in one product)
- resistance to mold and fungi

Product name	Description	Application							Fire resistance class	Parameters
		External application			Internal application					
		Roofs	Facades	Foundations	Attics	Walls	Flooring	Ceilings		
Ekoprodur S10-HP	Semi-rigid open-cell foam				●	●		●	F	Apparent core density Water vapor diffusion resistance factor Thermal conductivity coefficient Short-term water absorbability $d \geq 6.5 \text{ kg/m}^3$ $\mu = 6$ $\lambda_0 = 0.038 \text{ W/mK}$ $W_p = 1.5 \text{ kg/m}^2$
Ekoprodur S11E-MAX	Semi-rigid open-cell foam				●	●		●	E	Apparent core density Water vapor diffusion resistance factor Thermal conductivity coefficient Short-term water absorbability $d \geq 6.5 \text{ kg/m}^3$ $\mu = 6$ $\lambda_0 = 0.038 \text{ W/mK}$ $W_p \leq 2.85 \text{ kg/m}^2$
Ekoprodur S0310/E	Semi-rigid open-cell foam				●	●		●	E	Apparent core density Water vapor diffusion resistance factor Thermal conductivity coefficient Short-term water absorbability $d \geq 7 \text{ kg/m}^3$ $\mu = 3$ $\lambda_0 = 0.038 \text{ W/mK}$ $W_p \leq 0.85 \text{ kg/m}^2$
Ekoprodur S25-HD	Semi-rigid open-cell foam				●	●		●	F	Apparent core density Water vapor diffusion resistance factor Thermal conductivity coefficient Short-term water absorbability $d \geq 23 \text{ kg/m}^3$ $\lambda_0 = 0.034 \text{ W/mK}$ $W_p \leq 0.85 \text{ kg/m}^2$
Ekoprodur S0330	Rigid, closed-cell foam		●		●	●		●	E	Apparent core density Water vapor diffusion resistance factor Thermal conductivity coefficient Short-term water absorbability Compression resistance $d \geq 34 \text{ kg/m}^3$ $\mu \geq 60$ $\lambda_0 \geq 0.024 \text{ W/mK}$ $W_p \leq 0.10 \text{ kg/m}^2$ $\sigma_{10} \geq 200 \text{ kPa}$
Ekoprodur S0331FL	Rigid, closed-cell foam		●	●	●	●	●	●	E	Apparent core density Water vapor diffusion resistance factor Thermal conductivity coefficient Short-term water absorbability Compression resistance $d \geq 38 \text{ kg/m}^3$ $\mu \geq 60$ $\lambda_0 \geq 0.024 \text{ W/mK}$ $W_p \leq 0.10 \text{ kg/m}^2$ $\sigma_{10} \geq 250 \text{ kPa}$
Ekoprodur S0541	Rigid, closed-cell foam	●		●			●		E	Apparent core density Water vapor diffusion resistance factor Thermal conductivity coefficient Short-term water absorbability Compression resistance $d \geq 49 \text{ kg/m}^3$ $\mu \geq 70$ $\lambda_0 \geq 0.023 \text{ W/mK}$ $W_p \leq 0.10 \text{ kg/m}^2$ $\sigma_{10} \geq 300 \text{ kPa}$
Ekoprodur S0542	Rigid, closed-cell foam	●		●			●		E	Apparent core density Water vapor diffusion resistance factor Thermal conductivity coefficient Short-term water absorbability Compression resistance $d \geq 59 \text{ kg/m}^3$ $\mu \geq 70$ $\lambda_0 \geq 0.023 \text{ W/mK}$ $W_p \leq 0.10 \text{ kg/m}^2$ $\sigma_{10} \geq 300 \text{ kPa}$



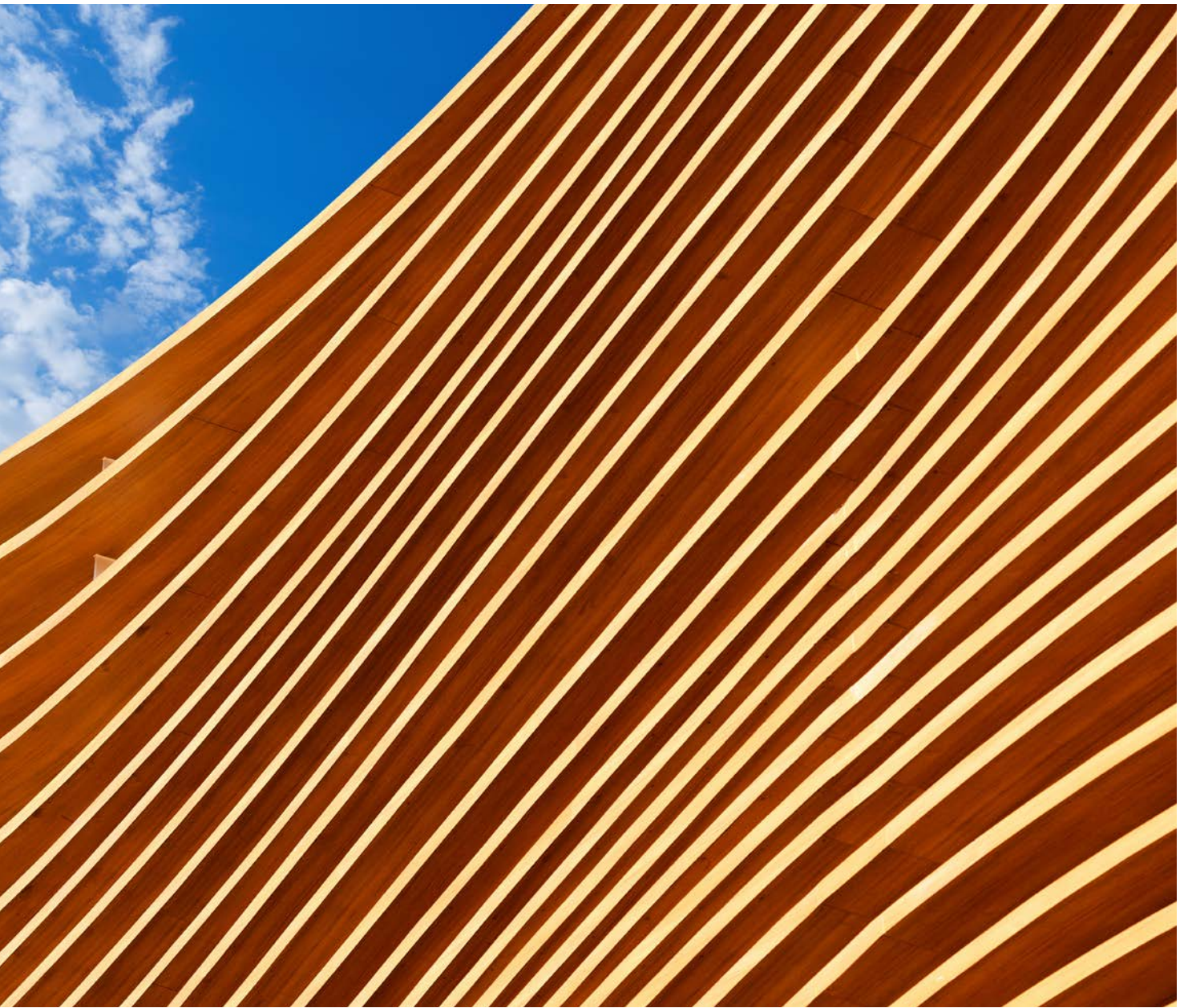
## Polyurethane adhesives

Polyurethane adhesives are widely used in many different sectors of construction. They're available 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 the user to adapt the product to their specific application needs in a simple manner. A great advantage of PUR adhesives is the lack of volatile organic solvents (from the group of VOCs - volatile organic compounds). This means that these adhesives don't 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 moisture content, including wood.

An important group of polyurethane adhesives is products intended for the creation of sport surfaces, such as the Active Play series. By combining a rubber granulate with a suitable glue, the result is a uniform, jointless surface that can be used for tennis courts, playgrounds, sports fields, gyms and fitness clubs. Such surfaces have a high degree of flexibility and resilience, and cushion falls thanks to their 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 endurance 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, including 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
- after hardening, the weld obtained in the bonding process is resistant to water and unfavorable weather conditions, thanks to which the surface is durable and the life of the 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
- the polyurethane joint is chemically and mechanically resistant



## Crossin® Insulations

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

The modern line of Crossin® Insulations products is based on the highest quality and reliability. The effectiveness of Crossin® products is the result of the high qualifications of the team, and is based on over 40 years of experience and knowledge in the field of polyurethane insulation.

The Crossin® brand includes technologically advanced polyurethane insulation products and systems used in the 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® Insulation systems can be used for thermal insulation in both newly erected buildings and those subject to thermo-modernization.







## Foam insulation

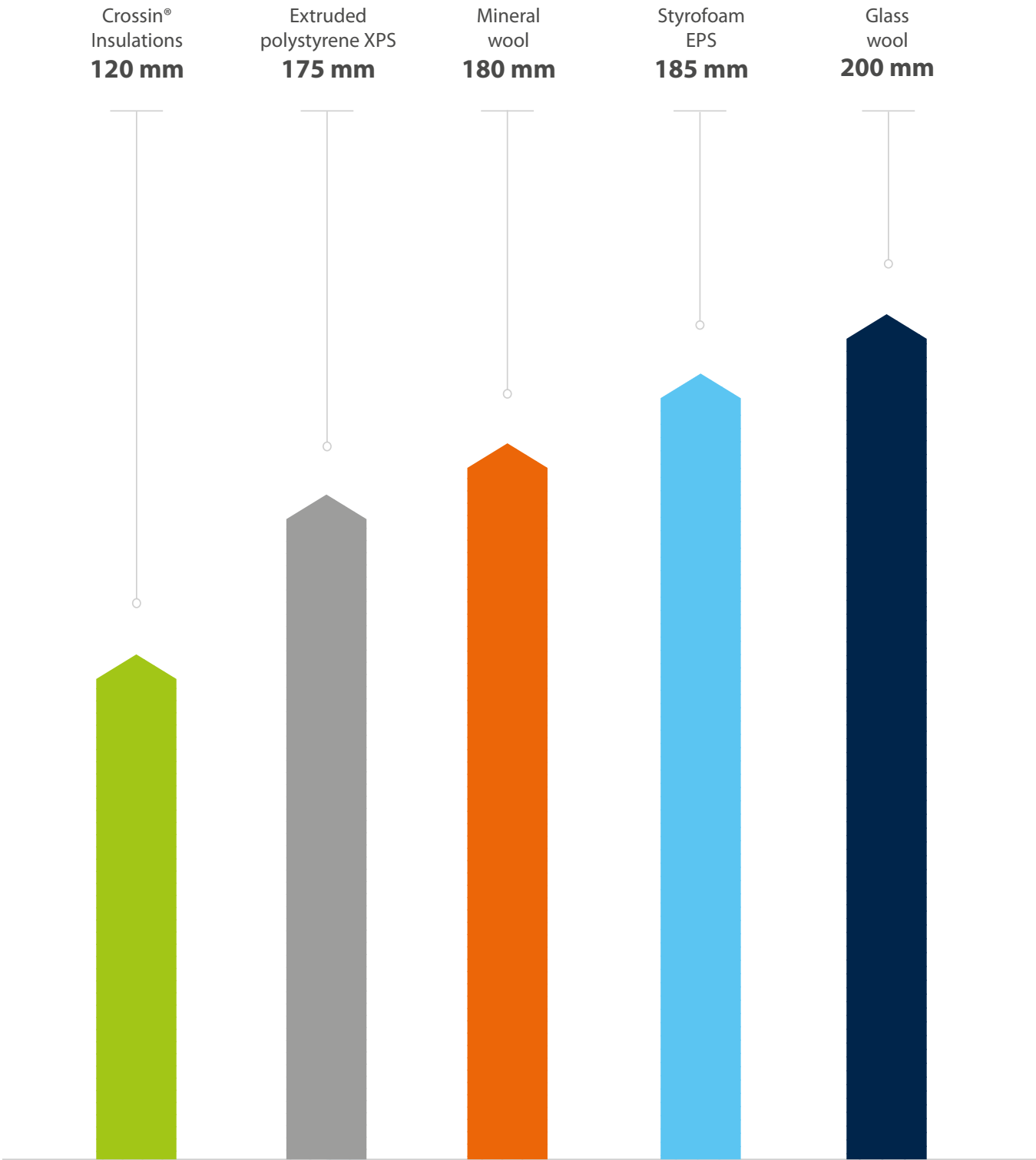
These are spray polyurethane foam systems designed for quick and effective thermal and acoustic insulation of roofs, walls and foundations. These systems are used in residential, industrial and agricultural buildings, as well as public facilities. All Crossin® Insulation products based on spray foam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

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

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

Moreover, in addition to top-quality products, the Crossin® offer also includes authorizations for contractors providing professional building insulation services.

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 warehouses, production halls, logistics centers; insulation of tanks and pipelines.

### • Agriculture

insulation of warehouses, fruit and vegetable storerooms and farm buildings such as pig farms, stables, cowsheds and 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® Hard 36

Internal insulation for ceilings, roofs and walls. Thermal and anti-condensation insulation for farm and storage buildings.

$\lambda D = 0.021 \text{ W/(m-K)}$

Water absorption  $W_p \leq 0.10 \text{ kg/m}^2$

### • Crossin® Hard 40

Foundation insulation, internal thermal insulation for floors.

$\lambda D = 0.021 \text{ W/(m-K)}$

Water absorption  $W_p \leq 0.10 \text{ kg/m}^2$

### • Crossin® Hard 50

External insulation for flat roofs

$\lambda D = 0.021 \text{ W/(m-K)}$

Water absorption  $W_p \leq 0.10 \text{ kg/m}^2$

## PUR Spray foam - OPEN-CELL

### • Crossin® Attic Soft

Effective lightweight insulation for attics, walls and ceilings inside buildings.

$\lambda D = 0.037 \text{ W/(m-K)}$

Water absorption  $W_p \leq 0.85 \text{ kg/m}^2$





## Benefits

### Comprehensive savings

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

### Insulation durability

The high durability and stability of Crossin® insulation system parameters mean that insulation is characterized by lasting great performance. Crossin® systems don't shrink or degrade. They allow the building life cycle to be extended, and reduce the cost of repairs and maintenance.

### Versatility

Crossin® Insulations allow the user to both 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 Crossin® insulations, we can minimize surface losses, resulting in a larger usable space.

### Ultra-lightweight

Crossin® Insulations are innovative insulation solutions that exhibit relatively low volume weight. This means that it is not excessively charged to the building structure. This allows for effective insulation of buildings without the need to increase the strength of the supporting structure of the building.

### Health and safety

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



## Prepolymers

Product name	Dynamic viscosity at 25°C [mPa·s]	NCO content [wt%]	Description
Wood adhesives			
Rokanate M PE 1602	3 000-5 000	15.5-17.0	Moderate reactivity, 1K polyurethane waterproof adhesive for wood with heat resistance according to PN-EN 14257 WATT' 91 and D4 classification.
Rokanate M PE 1602.25	3 000-5 000	15.5-17.0	Fast curing, open time 25 minutes, 1K polyurethane waterproof adhesive for wood with heat resistance according to PN-EN 14257 WATT' 91 and D4 classification.
Rokanate M PE 2601	300-450	25.4-26.4	1K polyurethane adhesive, high stiffness joint, dedicated for light wood-based boards (LDF).
Rokanate M PE 2602	250-400	25.5-27.0	1K polyurethane adhesive, high stiffness joint, dedicated for light wood-based boards (LDF).
Rubber (SBR, EPDM) adhesives			
Active Play AS H 8008	2 500-4 000	9.0-10.0	1K polyurethane adhesive dedicated for out door applicastiouns for the production of: - cold and hot cure SBR/EPDM molded elements, - general purpose sport flooring application, including colored EPDM. Active Play AS H 8008 is standard reactivity adhesive whereas active Play AS H 8008(w) has shorter curing time, dedicated mainly for winter use. Products dedicated mainly for cold cure applications.
Active Play AS H 8008(w)	2 000-4 000	9.0-10.0	
Active Play AS H 8009	2 000-3 500	10.0-12.0	1K polyurethane adhesive for the production of: - cold and hot cure SBR/EPDM molded elements, - general purpose sport flooring application, including colored EPDM. Active Play AS H 8009 standard reactivity adhesive whereas active Play AS H 8009-LR has longer curing time, dedicated for summer time. Product dedicated mainly for cold cure.
Active Play AS H 8009-LR	2 500-4 000	7.0-8.0	
Active Play AS H 8013_2	1 000-2 000	14.5-15.5	Medium viscosity, low elasticity 1K polyurethane adhesive for the production of hot cured molding SBR.
Active Play AS H 8014	2 500-3 500	9.0-10.0	Medium viscosity, elastic 1K polyurethane adhesive for the production of: - cold and hot cure SBR/EPDM moulded elements, - general purpose sport flooring application, including coloured EPDM. Active Play AS H 8014 can be used with Active Play AS FR to improve flame retardant of a product made from SBR granules. Product dedicated for hot cure moulded applications.
Active Play AS H 8027	2 000-3 500	7.0 – 8.0	Medium viscosity and moderate reactivity, elastic 1K polyurethane adhesive for the production of rubber granulate floor protection mats (cold cure).
Rubber (SBR, EPDM) pigmented adhesives			
Active Play AS C II Red	3 500-10 000	–	Active Play AS C II Red, Green and Grey 1K pigmented polyurethane adhesive for the production of sport flooring including coloured EPDM and for the production of cold and hot cure SBR/EPDM moulded elements. Product dedicated mainly for hot cure. Active Play AS C II Green-LV2 has lower viscosity than Active Play AS C II Green.
Active Play AS C II Green	3 000-8 000	–	
Active Play AS C II Grey-P	3 000-7 000	–	
Active Play AS C II Green-LV2	2 500 - 4 000	–	
Rubber (SBR, EPDM) pigmented adhesives (spray application)			
Active Play AS N Red	1 000-3 500	–	Low viscosity Active Play AS N Red and Active Play AS N Green polyurethane coating dedicated for out door applications for SBR surface applied by: - spraying technique. - mixed with rubber granules Active Play AS N Red-LV2 has lower viscosity than Active Play AS N Red.
Active Play AS N Red-LV2	1 500-2 700	–	
Active Play AS N Green	1 000-3 500	–	

## Prepolymers

Product name	Dynamic viscosity at 25°C [mPa·s]	NCO content [wt%]	Description
2K adhesives for mineral wool			
Rokanate F2C 0002_03	4 500-8 500	–	Rokanate F2C 0002_03 is fast curing, 2K polyurethane adhesive with filler intended for bonding mineral wool, steel and aluminum. Applied with mass ratio 100:30 with polymeric MDI. Rokanate F2C 0002_05 has longer open time, dedicated mainly for summer use.
Rokanate F2C 0002_05	4 500-8 500	–	
2K primer for sandwich panel			
RokaPur PR2K_100	800-1 200	–	RokaPur PR2K_100 is polyol component for 2K polyurethane primer for rigid faced sandwich panel production. Can be applied with low and high functionality polymeric MDI. Applied with mass ratio 100:150 with polymeric MDI. It is based on recycled component.
Rebounding adhesives			
Rokanate M PE 0804	100-500	7.9-8.6	Various viscosity and moderate reactivity, one component polyurethane adhesive applied in the production of rebounding foam blocks. High flexibility, cured with moisture. Rokanate M PE 0805 is lower reactivity adhesive, dedicated for higher temperature curing condition.
Rokanate M PE 0805	100-500	7.9-8.6	
Rokanate M PE 0601	450-900	5.0-6.5	1K polyurethane adhesive applied in the production of rebounding foam blocks, high flexibility, cured with moisture, low NCO content, moderate viscosity.
Rokanante M PE 1501.90	700-1 500	15.0-16.0	Rokanate M PE 1501.90 is an isocyanate component used as an ingredient in the manufacture of spray polyurea coating of sealants and adhesives. It is characterized by the stiffness of the bond while maintaining its flexibility
Flame retardant additive			
Active Play AS FR	–	–	Play AS FR General purpose black paste applied for improving flame retardancy of moulded elements. It can be applied with NCO prepolymers, i.e. Active Play AS H 8014 and Active Play AS H 8027.
Polyurea coating			
Rokanate M PE 1501	700-1 500	15.0-16.0	Isocyanate component for 2K polyurea spray coating.
All-purpose adhesives			
Rokanate M PE 1503.07	1 500-3 000	14.5-15.5	General purpose 1K polyurethane adhesive dedicated for various purposes including: light wood-based boards (LDF), wood bonding, mineral wool with metal facers, rubber granulates, polystyrene boards, drywall boards. Moderate viscosity and wide range of open time: from 7 up to 60 minutes.
Rokanate M PE 1503.15	1 500-3 000	14.5-15.5	
Rokanate M PE 1503.30	1 500-3 000	14.5-15.5	
Rokanate M PE 1503.60	1 500-3 000	14.5-15.5	
Ekopromer A008	2 500-3 500	8.0-8.9	Medium viscosity, elastic 1K polyurethane adhesive dedicated for various purposes in the polyurethane industry.
Waterproofing			
Rokanate M PE 0201	8 000-13 000	1.9-2.5	1K polyurethane resin for manufacture of waterproofing membrane applied to protect concrete screeds, foundations and walls against moisture. It is cured with moisture.





# 07 / EUROPIR® - unfaced PIR foam boards

## Introducing EUROPIR® ETICS– modern highly insulating product for thermal insulation of walls in ETICS technology.

EUROPIR® ETICS boards are elements of the latest generation of thermal insulation system for two layered external walls finished with thin-layer plaster. EUROPIR® insulation has many advantages, however the basic and the most important of

them is exceptional insulation. EUROPIR® ETICS unfaced boards with thermal conductivity coefficient ( $\lambda$ ) of 0.023-0.025W/m\*K are among the most efficient insulation materials.

### Other advantages of EUROPIR® insulation:

- can be combined with other materials
- low water absorption
- impact and compression resistant
- easy to work with and process
- doesn't lose insulating parameters during processing and assembly
- durable materials
- doesn't emit hazardous compounds (A+ class)

Mineral Wool

$\lambda_D = 0,040$  (20 cm)

Styrofoam EPS

$\lambda_D = 0,033$  (16,5 cm)

EUROPIR board

$\lambda_D = 0,023$  (12 cm)

Some of them directly translate into savings and better condition of your home or investment budget, however you may not notice all of the benefits immediately. First of all, the use of highly insulating unfaced PIR boards allows you to effectively reduce

energy used for heating and air conditioning. Well insulated walls not only save energy but also increase the comfort of both: living and working in such a building.

**EUROPIR® ETICS rigid unfaced PIR foam boards, with unique combination of insulation as well as high physical and mechanical parameters. Insulation of external walls finished with thin-layer plaster.**

- Proven thermal insulation for your home
- Lower heating and air conditioning costs
- Increased usable surface area and longevity of insulation

## Better insulation= space saving costs

Better thermal properties of the insulation allow less material to be used while maintaining the required insulation parameters of the building or partition. This gives you the opportunity to obtain a larger usable area.



## Saving costs of the remaining construction materials

Reduced thickness of the insulating materials= reduced thickness of the wall. This directly translates into savings related to the use of other construction materials used in external partitions (shorter mechanical connectors smaller window sills, jambs slats etc.)

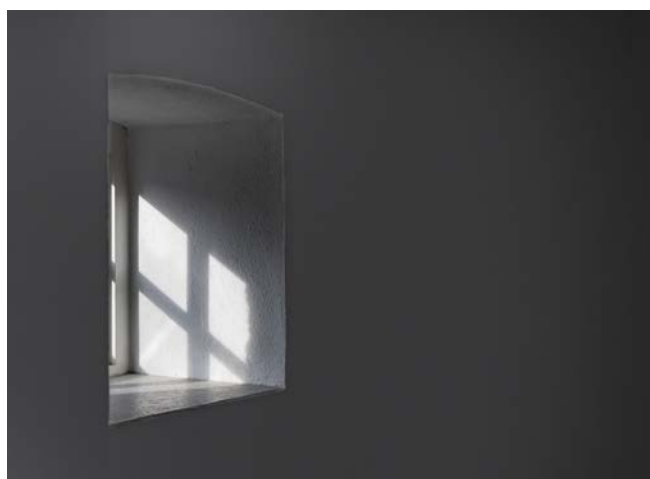
## Size of the building exterior elements

It is not obvious that when insulating the building from the outside the thickness of the insulation affects the size of all external elements of the building (balconies, terraces, stairs, etc.). Using a thinner layer of insulating material reduces this impact.

## Windows of insulated house and the daylight supply

Windows, especially in the old buildings are hidden in the structure of the external partition. The use of thicker material contributes to the fact that they resemble the old embrasure windows. They also cause limited daylight supply to the rooms. The use of EUROPIR®

ETICS boards minimizes this effect and increases the transmission of sunlight through the window without the need to increase their dimensions.



According to research we spend more and more time indoors (up to 90%), especially during autumn-winter period. This means that appropriate daylight supply of our homes and workplaces is becoming more important for our health.



By ensuring better daylight supply we provide ourselves and our loved ones with conditions necessary for the healthy functioning of our bodies and effective way to study and work. It is worth paying attention to this aspect especially when performing insulation work on schools, kindergartens, universities, or hospitals.





As many as **81%** of respondents agree with the statement that more daylight makes them think positively more often and they are in a better mood.

**79%** of respondents declared that more daylight increases psychological comfort.



## Clean air as necessary health factor

PIR boards also ensure healthy microclimate in insulated rooms and resistance to mould and microorganisms. In addition EUROPIR® ETICS insulation boards have been certified by Eurofin institute and obtained the highest (A+) for indoor air quality.

## Moisture - the nightmare of good insulation

The biggest enemy of all insulating materials is moisture which effectively and permanently reduces insulation properties. More importantly susceptibility of insulation material to moisture caused damage (e.g. rotting, mould formation) and permanent loss of insulating parameters. Nothing good about it!

EUROPIR® ETICS boards are characterised by low absorbability which means they create excellent, durable as well as mould and microorganisms resistant insulation of the building façade.

This feature of PIR foam boards has made it most popular insulating material in particular rainy regions of Norway, Sweden and Finland. Moreover polyurethanes are less susceptible to colonization by insects or rodents. By using ETICS insulation we protect the building against both- heat loss and unwanted tenants such as insects, mice, rats, or martens.

## Ease of processing and tightness of insulation

For experienced contractor it is of course an advantage that EUROPIR® insulation is easy to process due to its handy format and very light weight. EUROPIR® ETICS boards can be cut and sanded directly on the construction site adjusting the insulation to the individual structural elements of the building. This doesn't require any special equipment. Moreover the insulation doesn't lose its properties during such a treatment. For the homeowner this feature of EUROPIR® boards means durability and tightness of insulation layer.

Relative lightness and reduced thickness of EUROPIR® ETICS boards allow to avoid unnecessary load on walls and foundations. This aspect is particularly important when planning thermal modernization of existing buildings.

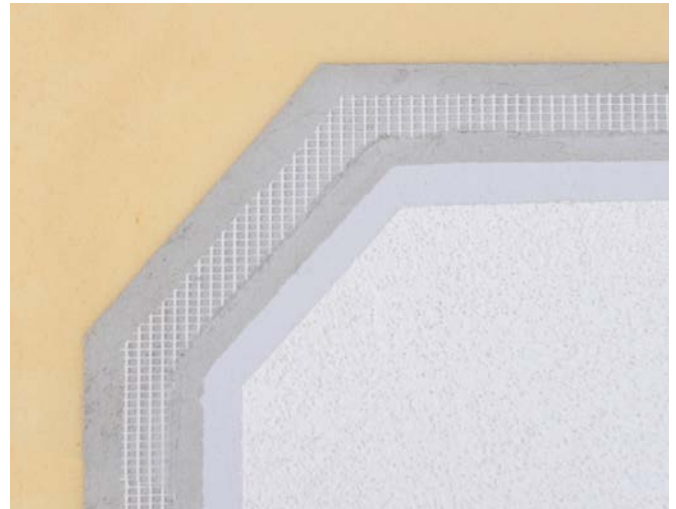


## Use

EUROPIR® ETICS – highly insulating unfaced PIR boards intended for insulation of two-layered wall finished with thin-layer plaster (ETICS).

Very low thermal conductivity coefficient - at a level  $\lambda_D = 0,023-0,025 \text{ W/(m}\cdot\text{K)}$  makes it an excellent solution, both for newly constructed buildings and those undergoing thermal modernization.

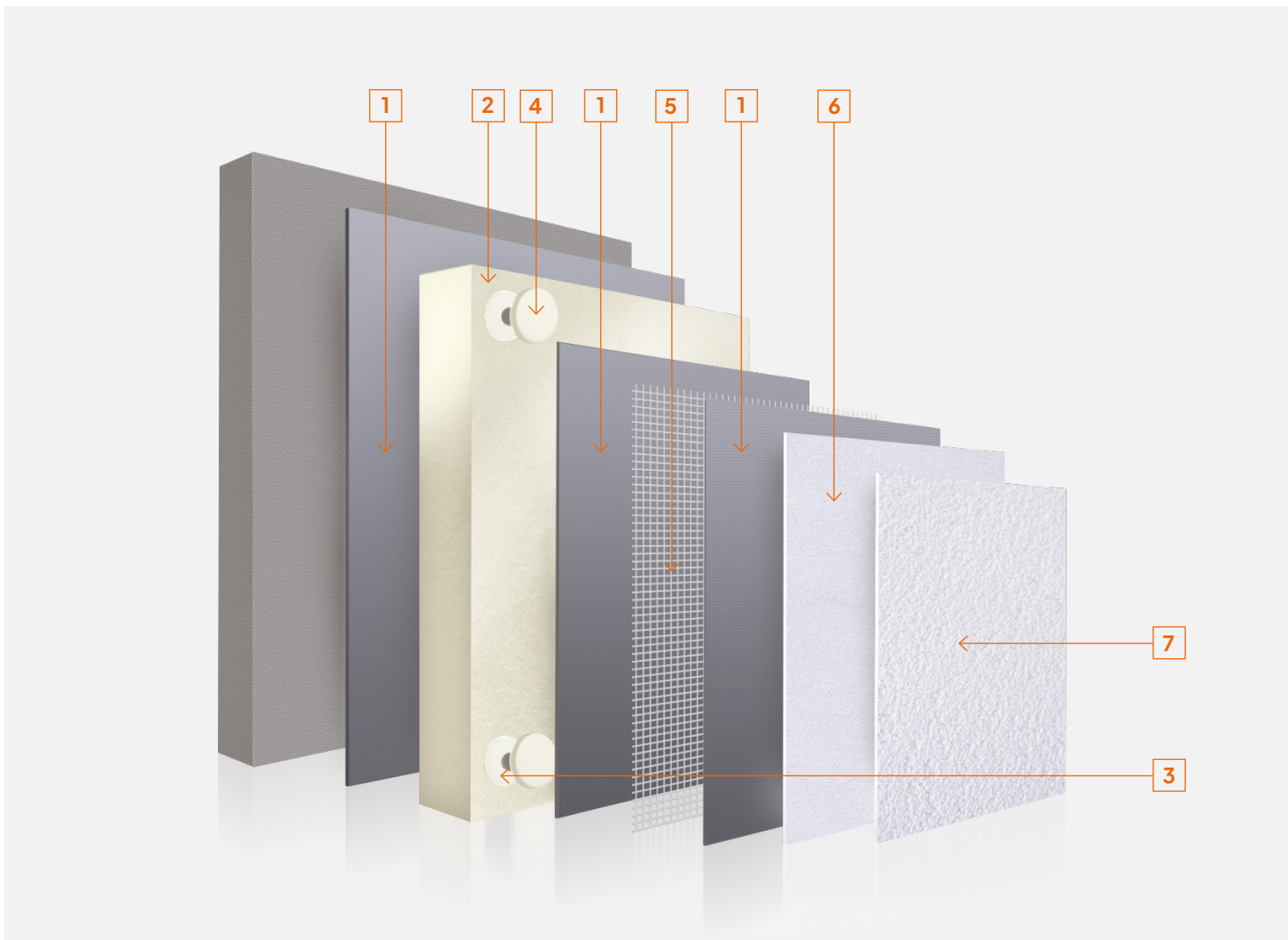
EUROPIR® ETICS board is recommended for use in thermal insulation and thermal modernization of residential buildings, public utility buildings, offices and service premises.



## The most important benefits of using boards based on EUROPIR® ETICS system

- Effective reduction of energy costs used for heating and air conditioning.
- Comfort related to easier maintenance of appropriate temperature during hot weather as well as autumn-winter period.
- EUROPIR® ETICS boards have increased resistance to mould and microorganisms, which contributes to healthy microclimate. In addition EUROPIR® ETICS boards obtained A+ class rating for indoor air quality.
- Better supply of natural light necessary for healthy functioning of our bodies and effective way to study and work, which is particularly important during autumn-winter season.
- No excessive load on walls and foundations and associated costs.
- Reliability and durability of insulation parameters.
- Quick installation due to the use of an easier-to-process insulating material such as board without facing.
- Approx. 30-40% reduced thickness of the thermal insulation layer necessary to achieve the same insulation effect.





## Façade layers

### 1. Adhesive and putty mortar

Mortar for bonding the insulation board to the substrate and embedding the fibreglass mesh.

### 2. EUROPIR® ETICS

Thermal insulating unfaced PIR boards, with thermal conductivity coefficient- 0,023-0,025 W/m·K.

### 3. Mechanical Connector

Mechanical connector in accordance with the approval.

### 4. EUROPIR® CAPS/ EUROPIR® TUBE

PIR foam end caps/tubes for insulation of mechanical connectors.

### 5. Fibreglass mesh

Mesh with density- 145 g/m<sup>2</sup>, mesh size - 4.0 x 4.5 mm (+/- 0,5 mm), or with density- 160 g/m<sup>2</sup>, mesh size- 3.5 x 3.8 mm (+/-0,5 mm).

### 6. Primer

Primer for preparing the substrate.

### 7. Thin layer plaster

Plaster mass intended for manual application of thin-layer plaster coatings on the exterior of the buildings and finishing layers in ETICS thermal insulation system, resistant to dirt, mould and fungi.



**Thermal insulating EUROPIR® ETICS board** is the basis of modern thermal insulation systems of exterior walls. Made of foamed rigid PIR foam, board with 20 to 200mm thickness and covering area of 1000x 600 mm. EUROPIR® ETICS insulation belongs to the group of the most efficient insulating materials with thermal conductivity coefficient at a level-  $\lambda_D = 0,023 - 0,025 \text{ W/(m}\cdot\text{K)}$ .

#### Use

EUROPIR® ETICS – rigid unfaced PIR boards with high insulation parameters, used in thermal insulation systems of two-layered walls with thin-layer plaster or façade paint finish.

Recommended for thermal insulation and thermal modernization of walls of houses, residential and office buildings as well as commercial and service facilities.

## EUROPIR® ETICS boards- technical properties:

### Boards characteristics:

Parameter	Unit	Value	Additional information
Length	mm	1000	Standard sizes. Other sizes available upon individual request.
Width	mm	600	
Thickness	mm	20-200	
Colour	–	light yellow	

### Technical specification

Parameter	Unit	Value	Euroclass
Reaction to fire	Euroclass	E	EN 13165
Compressive strength	kPa	$\geq 150$	EN 13165
Tensile strength	kPa	$\geq 120$	EN 13165
Short-term water absorption by partial immersion	kg/m <sup>2</sup>	<0,15	EN 13165
Long-term water absorption by partial immersion	kg/m <sup>2</sup>	<0.32	EN 13165
Long-term water absorption by full immersion	% (vol/vol)	<1.7	EN 13165
Closed cell content	%	>90	EN 13165
Dimensional stability (length, width,/thickness) 70o C/90% r.h.	%	$\leq 2 / \leq 6$	EN 13165
Dimensional stability (length, width,/thickness) -20o C	%	$\leq 0,5 / \leq 2$	EN 13165
<b>Thermal conductivity</b>			
Declared thermal conductivity coefficient d<80 mm	W/mK	$\lambda_D \leq 0.025$	EN 13165
Declared thermal conductivity coefficient $\leq d < 120 \text{ mm}$		$\lambda_D \leq 0.024$	
Declared thermal conductivity coefficient $\geq 120 \text{ mm}$		$\lambda_D \leq 0.023$	
Working temperature range	°C	-120 do +120	–

## Packaging and thermal resistance EUROPIR® ETICS boards

Boards are shrink wrapped in packages with dimensions of 1000 x 600 mm and height of approx. 500 mm.

Board thickness	mm	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
Thermal resistance (R)	m²K/W	0.80	1.20	1.60	2.00	2.40	2.80	3.30	3.75	4.15	4.55	5.20	5.65	6.05	6.50	6.95	7.35	7.80	8.25	8.65
Package weight	kg	8 kg - 12 kg (depending on the board thickness)																		
Pcs. Per pack	pcs	25	16	12	10	8	7	6	5	5	4	4	4	3	3	3	3	3	2	2
m² per pack	m²	15	9.6	7.2	6	4.8	4.2	3.6	3	3	2.4	2.4	2.4	1.8	1.8	1.8	1.8	1.8	1.2	1.2
Packs per pallet 1200x1000	pcs	8																		



**EUROPIR® CAPS- designed for thermal insulation of mechanical fastener plates**

**EUROPIR® CAPS**

– end caps made of rigid highly insulating PIR foam in the shape of discs, with diameter of 65, 67, 70mm and thickness of 15 mm. Designed for thermal insulation of mechanical fastener plate during the assembly of boards and façade based on PIR boards insulation system.



**EUROPIR® CAPS & EUROPIR® TUBE** are designed to increase tightness of the thermal insulation and reduce the risk of thermal bridges. End caps and tubes are made of PIR foam blocks with thermal conductivity coefficient - 0.023- 0.025 W/(m\*K). EUROPIR® CAPS are handy, ergonomic and easy to use. Special, slightly elliptical shape allows better insertion into the opening.

Product	Unit of measure	Pcs per pack
		pcs
EUROPIR® CAPS - 15 mm / fi 65/67/70 mm*	pcs	200.00

\* Minimum order- 1 pack.  
\* Other sizes available upon individual request.

**EUROPIR® TUBE**

– modern tubes made of rigid highly insulating PIR foam in the shape of tubes and 100 mm length, designed for thermal insulation of mechanical fastener plate during the assembly of boards and façade insulation system.



**EUROPIR® CAPS & EUROPIR® TUBE - recommended for:**

- insulation of mechanical fastener plates during wall insulation,
- external wall,
- external wall with ETICS technology façade.

Product	Unit of measure	Pcs per pack
		pcs
EUROPIR® TUBE - 1000 mm / fi 65/67/70 mm*	pcs	10.00

A building can lose up to 10% of its heat through thermal bridges. In order to ensure uniformed and tight insulation layer, professional installation companies always insulate mechanical connectors with which the thermal insulation boards are fixed to the wall.

A proper insulation of mechanical fastener plates with special plugs not only reduce the risk of thermal bridges. This simple procedure significantly reduces the risk of characteristic discoloration on the façade, commonly known as „the ladybug effect“. These are spots that appear over time as a result of condensation of water vapour in the places where the installed fasteners are not properly protected. The spots are also an excellent substrate for the reproduction of fungi on the façade.



## EUROPIR® STANDARD board designed for thermal insulation of attics, foundations and roofs.

EUROPIR® STANDARD unfaced boards are ideal for thermal insulation of floors, ceilings as well as attics and flat roofs. Unfaced rigid PIR foam boards are characterised by high compressive strength and very low water absorption. That ensures long-term consistency of thermal performance even in rooms with increased humidity (thermal insulation of bathroom floors, saunas, boiler rooms) and places particularly exposed to water (foundation, external wall, flat roof).

### Suitable for:

- Residential houses and apartment buildings
- Public utility buildings
- Commercial buildings
- Passive and energy-efficient buildings
- Listed/historical buildings
- Newly constructed buildings
- Thermal modernisation



Outstanding thermal conductivity among unfaced PIR boards translates into reduced material thickness while maintaining equivalent insulation, lower load on the ceiling and minimal impact on the rooms height.



Mechanical strength and resistance to biological factors significantly contributes to long term consistency of thermal performance as well as resistance to mould, fungi and other microorganisms.



Unfaced thermal insulation PIR boards are simple to handle and adjust, light weight and easy to install- no special equipment required.



A+ classification for indoor air quality and increased safety for people and animals.

Technical Specifications:		
Parameter	Unit	Value
Reaction to fire	Euroclass	E
Fire reaction durability	Remains unchanged over time	Remains unchanged over time
Dimensional accuracy (thickness)	Class	T2
Thermal conductivity	dN ≥ 120 mm	λD=0,023 W/(mK)
	80 ≤ dN < 120 mm	λD=0,024 W/(mK)
	dN < 80 mm	λD=0,025 W/(mK)
Bulk density	kg/m³	39±2
Short-term water absorption by partial immersion	kg/m²	dN < 0,15
Long-term water absorption by partial immersion	kg/m²	dN < 0,32
Long-term water absorption under full immersion	%	dN < 1,7
Dimensional stability	—	DS(-20,-)2
	—	DS(70,90)3



This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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The information in the catalogue is believed to be accurate and compiled to the best of our knowledge; however, it should be considered as introductory only. Detailed information about our products is available in TDS and MSDS.

The suggestions for product applications are based on our best knowledge.

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

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