

Prepolymers. Professional solutions for the industry.



Polyurethane adhesives

Polyurethane adhesives are prepolymers obtained through a reaction of polyol and MDI isocyanate. Compared to TDI-based adhesives, they are less harmful to health and the environment.

The adhesives form a strong bond after curing. Some of them increase their volume, tightly filling all the empty spaces. By adding suitable catalysts, it is possible to change the adhesive's setting time, properties, and target application. By selecting the appropriate parameters of the adhesive, it is possible to apply it manually or by machine even on demanding, porous surfaces.

Characteristics of bonds made using polyurethane adhesive:

- excellent adhesion,
- high adhesive force,
- good filling properties,
- elasticity,
- elongation ability,
- resistance to chemicals,
- high mechanical resistance and strength,
- vibration resistance,
- no organic solvents (from the LZO-VOC group).



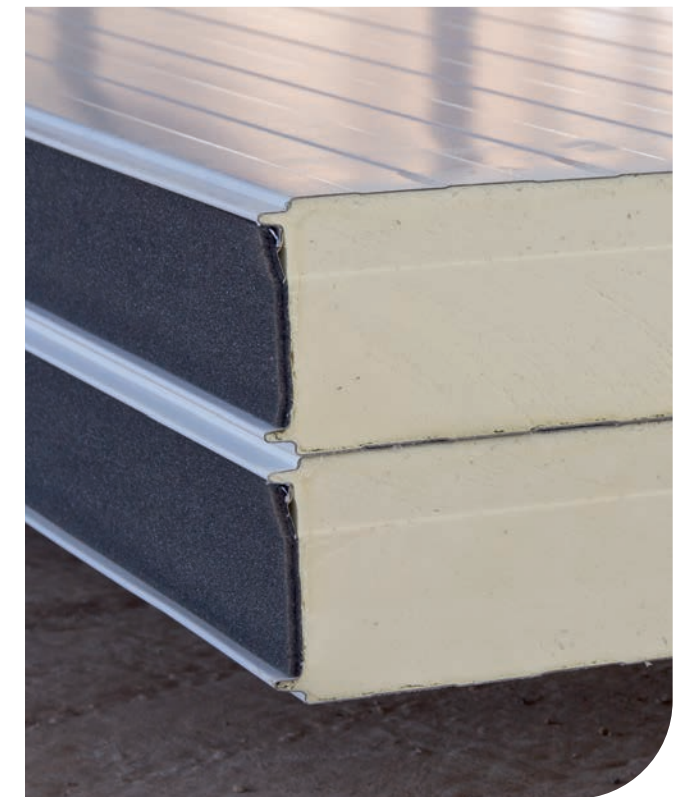
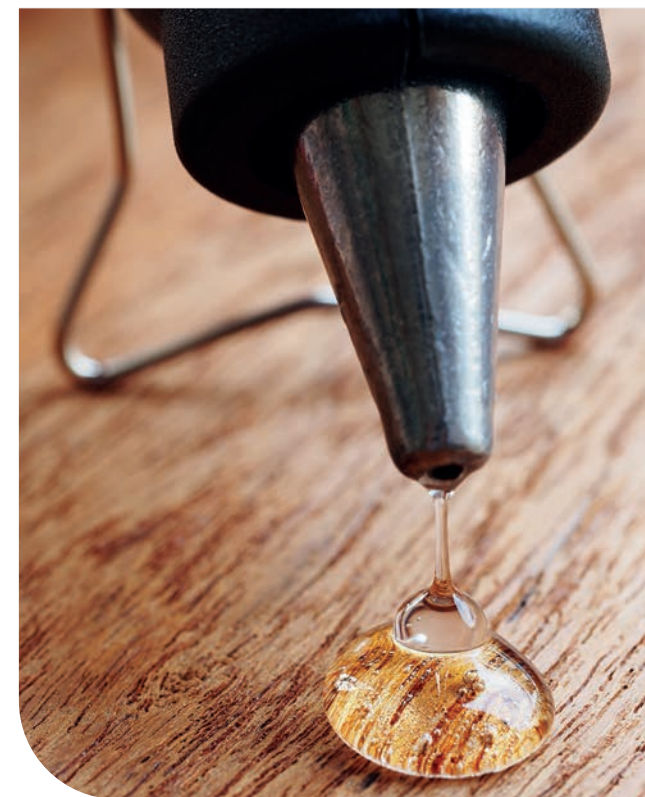
Use of polyurethane adhesives

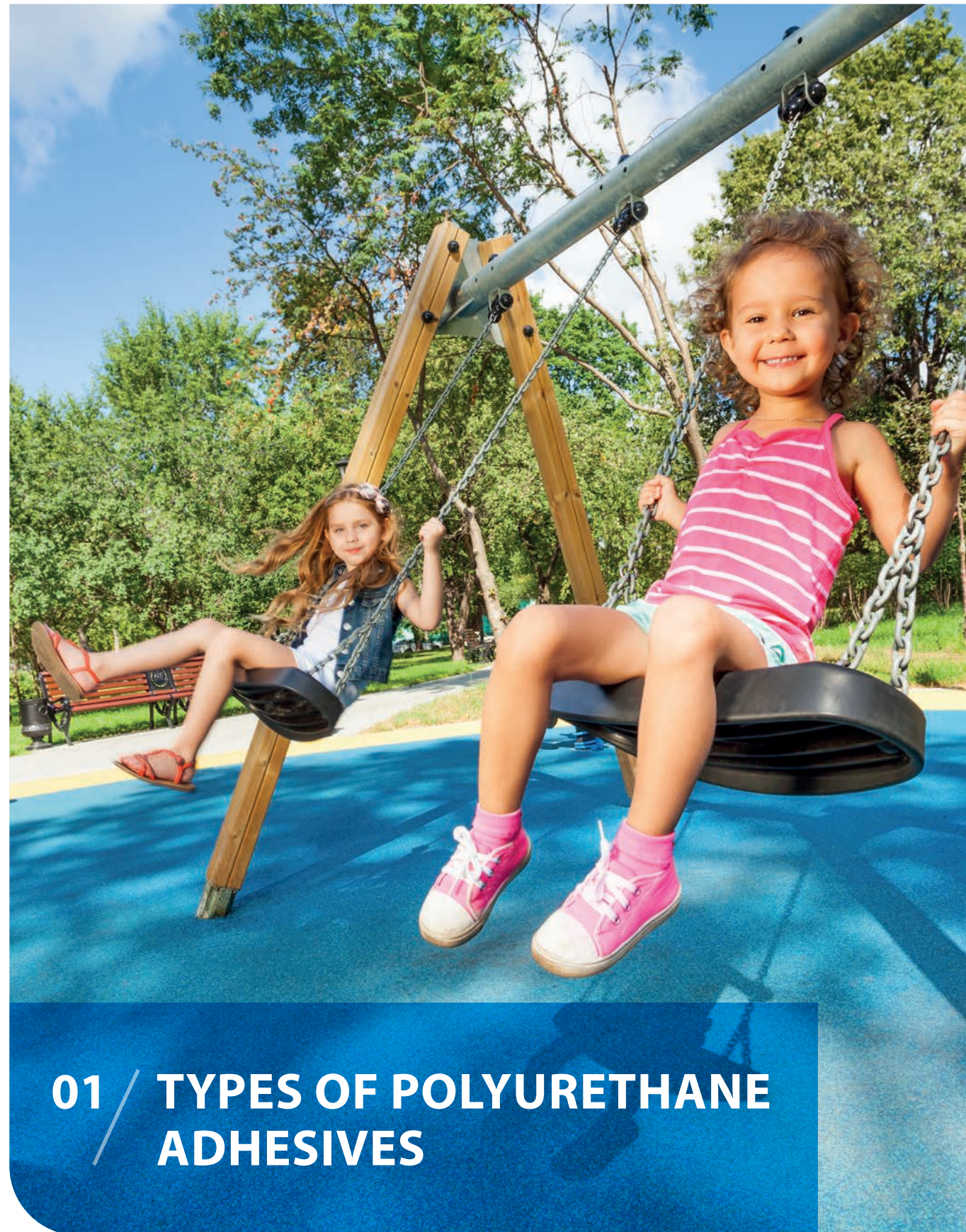
Thanks to their properties and excellent adhesion to most substrates, polyurethane adhesives have a very wide range of applications in manual and industrial applications.

When joining wood, they can act as structural adhesives. In addition, they are used as a binder for permanently bonding mineral wool, polystyrene, and polyurethane foam panels to aluminum sheet or to other sheets (sandwich panels). They are also widely used in the furniture, automotive, electronics, marine and aerospace industries. In woodworking, it is used as a binder to permanently join parquet, panels, plywood, veneer, as well as fiberboard. They are also used in the manufacture of rebond foam, in the production of laminates, in workshops, and in the assembly of materials such as glass, ceramics, stone and PVC. They are also used as a binder for SBR or EPDM rubber granules for the production of exterior and interior colored surface slabs for playgrounds, tennis courts, cycling bike paths, sports fields, fitness rooms, crossfit floors, cardio zones, gyms, kennel spaces, balconies, terraces, animal enclosures and more. The resulting surfaces are non-slip, damage-resistant, safe, noise-absorbing, sound-absorbing, and level the effects of a fall.



On 3 August 2020, the European Union Commission issued Regulation 2020/1149 according to which anyone who uses industrial polyurethane adhesives must undergo mandatory training.





01 / TYPES OF POLYURETHANE ADHESIVES

TYPES OF POLYURETHANE ADHESIVES

One-component polyurethane adhesives (1C PUR)

- are ready to use immediately after opening the package.

They consist of a prepolymer containing isocyanate that hardens when exposed to sufficiently high humidity (40% to 70%). The surfaces to be glued do not contain an adequate amount of water, so often various catalysts, including water, are applied to the adhesive layer before bonding the surfaces to be glued together. A reaction takes place, and as a result of that the adhesive hardens. It increases its volume and fills all the gaps in the glued material. Curing is done using a special press applying the load. It eliminates blister formation. The curing time can be significantly reduced by heating. After the adhesive dries, a durable, flexible, moisture- and vibration-resistant bond is formed. Adhesives of this type can be used outdoors, where the reaction takes place without supplying external heat sources.



Two-component polyurethane adhesives (2C PUR)

- consist of two components: A (polyol) and B (isocyanate).

They can be used only after mixing the base (component A) with component B in the specified proportions. The two components (A and B) must be used in the correct proportions and mixed. Under the influence of temperature, the two components mixed together start reacting with each other gaining adhesive properties. The setting time of the adhesive specified by the manufacturer can range from a minute to several hours. With a very short setting time only machine application is possible. During curing, the adhesive can form a more or less flexible bond, depending on application needs. Two-component adhesives form both flexible and hard-elastic joints, so they are often used for joining wood components, bonding aluminum and steel, and for creating better adhesion to metal cladding in the continuous production of PIR-type panels. Two-component flexible adhesives often have a flowing consistency and are also used as sealants.



Polyurethane adhesives for outdoor application applied hot for bonding SBR rubber granules

Active Play series adhesives - are specialized, single-component polyurethane adhesives, prepolymers based on diphenylmethane diisocyanate (MDI) designed for bonding SBR rubber granules, including those obtained from old car tires in the recycling process.

Active Play AS C II and Active Play AS N series adhesives contain color additives (red or green, for example) that change the color of the black granules to the color of the adhesive during hot application. On special request, it is possible to develop other colors of the adhesive. The adhesive, combined with SBR granules, forms a bond with very good elasticity.

What are SBR granules?

SBR granules - the product obtained by grinding used car tires into black granules with a grain size of 1 to 4 mm. It is highly resistant to abrasion and changing weather conditions. It is flexible and does not absorb water. It suppresses sounds extremely well.

Uses of SBR granules

The properties of SBR granules make them primarily used in sports and recreational construction, as an ideal material for the production of safe and environmentally friendly surfaces. It is used in the production of athletic treadmills, anti-slip mats for playgrounds, speed bumps and sports surfaces. The adhesive is selected for the granule fraction in terms of final properties and application.



Flame retardant

Active Play AS FR - a specialized additive to Active Play AS H 8014 adhesive that comes in the form of black paste. It is used to increase the fire resistance of the final product made of SBR granules.

Strict criteria for fire resistance are imposed on plastics. It is intended to reduce the risk of fire and increase the time allowing evacuation from a place of an incident. One way to reduce the flammability of plastics is to modify them by introducing special chemical additives - antipyrines, otherwise known as flame retardants.

The amount of flame retardant used affects the properties of the final product, which must be subjected to flammability tests (EN 11925-2, EN ISO 9239-1, PN 13501 PN EN Cfl s1). Flammability tests take into account the rate of flame spread, the amount of heat released, as well as the smokiness and toxicity of the resulting gases. When the appropriate amount of paste is added, the final product can come in a flame-retardant version.



Polyurethane adhesives for the manufacture of rebonded foams

Adhesives from the Rokanate M PE series - are specialized, single-component polyurethane adhesives, and prepolymers based on diphenylmethane diisocyanate (MDI) designed to produce rebond foams.

The formation of rebond foam (regenerated foam, rebonded foam, R-foam)

Flexible polyurethane foam from used mattresses is ground into 5-10 mm scraps in order to produce rebond foam. Recovered and cleaned foam scraps are sprayed with polyurethane glue and placed in a special mold. Depending on the solution, the foam thus cut is subjected to evaporation or left in the mold for a longer period of time. The curing time of the joint depends on the type and amount of adhesive used and the type of foam scraps. Depending on the type of adhesive used and the scraps of flexible foam, rebond foam of different hardness, final density and tensile strength is obtained. The obtained regenerated foam is produced in blocks and can be processed into smaller boards, profiles, and shapes.

Rebond foam properties

Rebond foam is a flexible, durable, and also economical material. It is air permeable, resistant to temperature fluctuations, maintains dimensional stability and shows minimal loss of rigidity during use. Rebond foam is a flexible, durable and also economical material. The resulting foam has weaker mechanical properties than the original foam and is used for less demanding applications.



Rebond foam applications

Rebond foam is most often used for upholstered furniture, insulation and soundproofing mats, rehabilitation mattresses, gymnastic mats, resilient suspended ceilings in sports halls, sleeping mats in truck cabs, sports pads, inserts for sports and rehabilitation equipment. It is also great as a cushioning pad in transporting, for example, glass, and as a carpet pad in households.



Polyurethane adhesives for wood

These are specialized, single-component adhesives characterized by high bond strength and weather resistance. They are very often used for gluing parts that are subjected to special loads (for example for gluing stairs). They do not contain volatile organic compounds and other dangerous compounds such as formaldehyde.

They are ideal for bonding wet surfaces and those coated with a protective impregnate. Excellent bonding of surfaces that exhibit reduced susceptibility to bonding. Before applying the adhesive, the surfaces to be glued should be thoroughly cleaned of all dirt, dust and residues of glue or paint. After applying the adhesive, press the glued surfaces together. The most common method of gluing wood is cold bonding in which the glue sets at 20°C. More advanced gluing methods allow warm bonding of wood parts, at temperatures from 20°C to 80°C or hot bonding (above 80°C).

A very important parameter that defines wood adhesives is the open time of the adhesive. It is measured from the application of glue to the surface to be glued until the adhesive bond is formed. It usually ranges from 10 seconds to 24 hours. The second important parameter is the bonding time of the adhesive, i.e. the time it takes to achieve a bond with maximum strength.

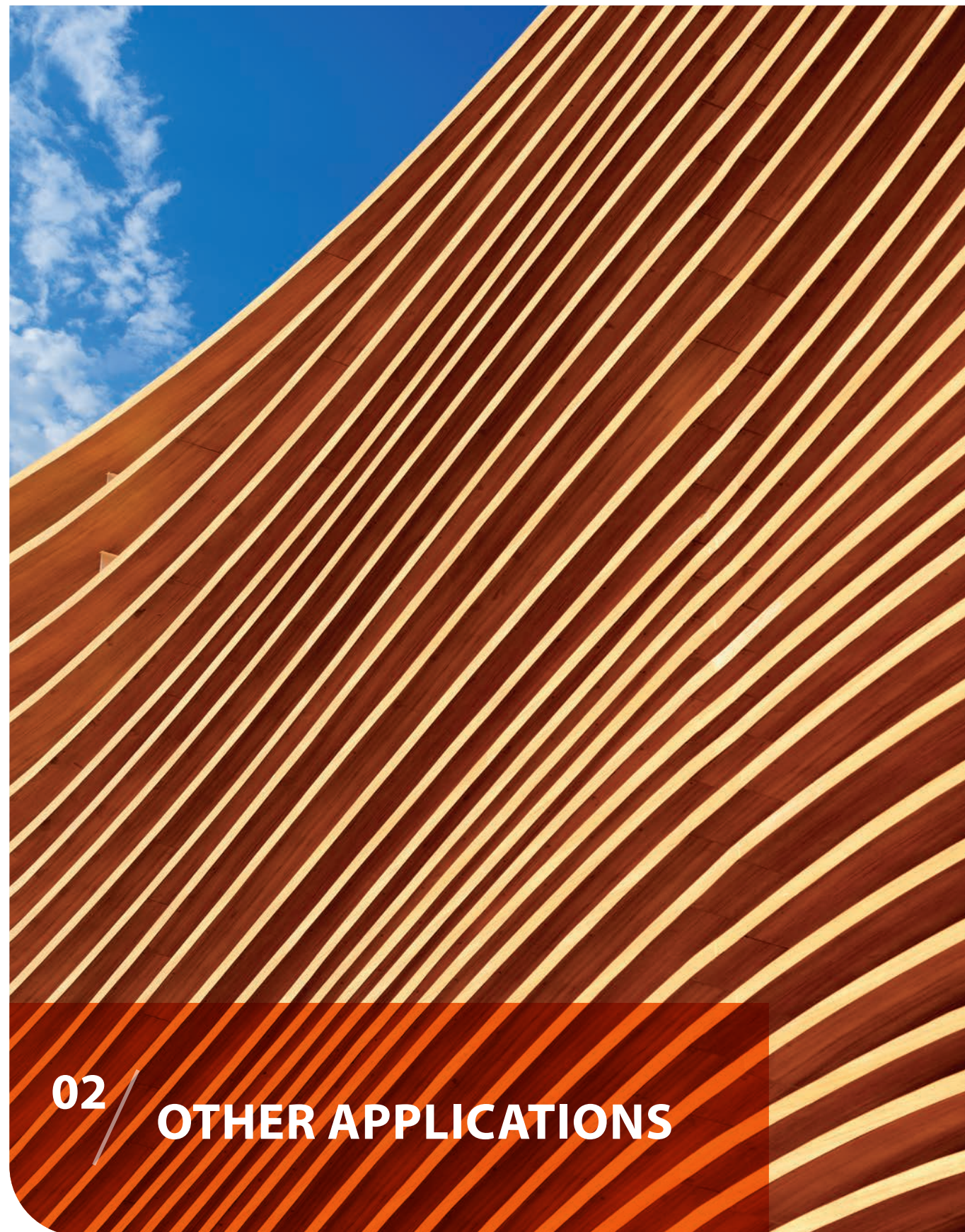


Wood adhesives increase their volume when exposed to moisture to form a flexible yet durable bond. They have different water resistance which is denoted by a class from D1 to D4, where D1 means that the adhesive is not waterproof at all and D4 denotes a fully waterproof adhesive. The adhesive labelled PN-EN 14257 (WATT' 91) forms a weather-resistant bond. To prolong this resistance the glued surface should be additionally protected with a suitable impregnate.

Polyurethane adhesives for wood are widely used in the construction industry for gluing, for example, load-bearing structures or window scantlings and door friezes. As a primer, they are used in the production of sandwich panels, the so-called obornicka plates. They promote adhesion for industrial lamination, especially when laminating PUR/PIR rigid foam.

In the furniture industry, they are used for gluing solid wood panels and woodwork, among other things. In the timber industry, they are used in the production of lightweight wood-based panels, known as LDF.





02 / OTHER APPLICATIONS

OTHER APPLICATIONS

Polyurea

Polyurea is a reaction product of isocyanate with polyamines. The polyurea production process takes place in two stages. Initially, it takes place at the manufacturer and involves the creation of a prepolymer that has reactive isocyanate groups. The second step occurs at the place of application and involves the reaction of the prepolymer with a mixture of polyamines, fillers, and auxiliary agents.

The polyurea layer is applied by spraying. During spraying, the prepolymer mixes with the polyamines and a very rapid gelation process begins, occurring as quickly as two seconds. The gelation process is very often deliberately slowed down to several seconds, in order to obtain a layer with a smoother surface. It is possible to spray the polyurea layer on damp or even wet surfaces. Then the polyurea will cure without foaming to give a tight coating.

Polyurea layers are very flexible and stretchable. With their stretchability, they show high tensile strength. They are used as protective coatings on various types of surfaces, which they provide with water resistance and increase resistance to mechanical damage and chemical contamination. Polyurea is used in the construction industry to protect steel and concrete structures from corrosion, moisture and mechanical damage. It is increasingly often used to insulate roofs in warehouse halls where systems with increased solar reflectivity are used. This protects the warehouses from heating. It is also used for corrosion protection of structures of bridges, pipes, ceilings, some elements of marine vessels and for waterproofing of foundations. It is also used in the automotive industry protecting entire coatings from corrosion. In the case of off-road cars, it protects against mechanical damage.

Performing polyurea spraying is a dangerous process that requires knowledge and experience. The use of protective clothing and other safety measures eliminates the dangers related to working with hazardous substances.

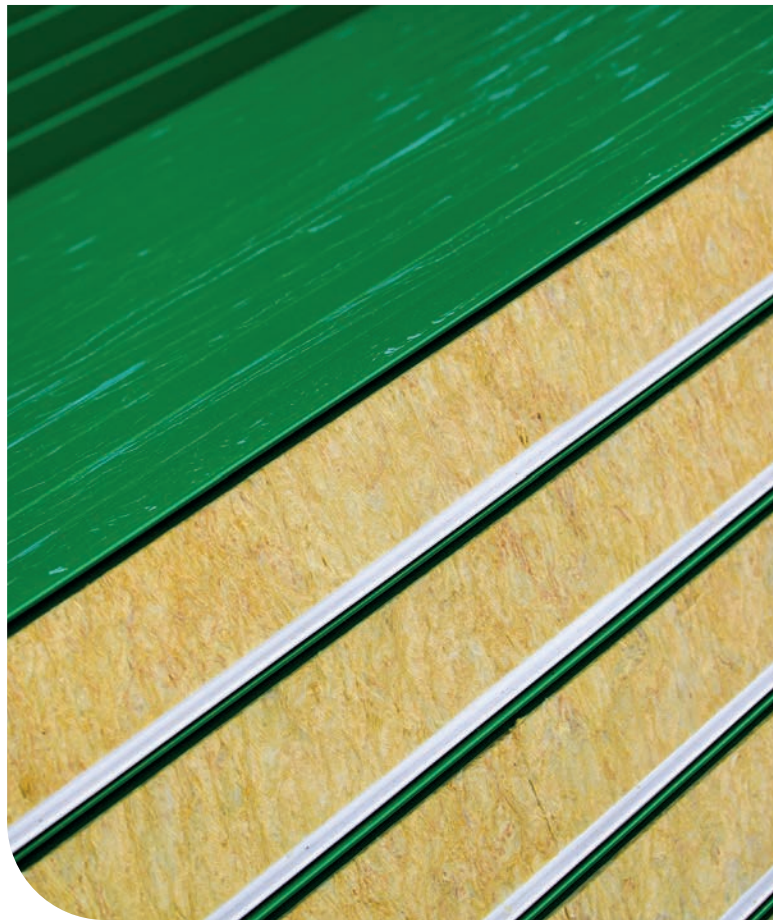
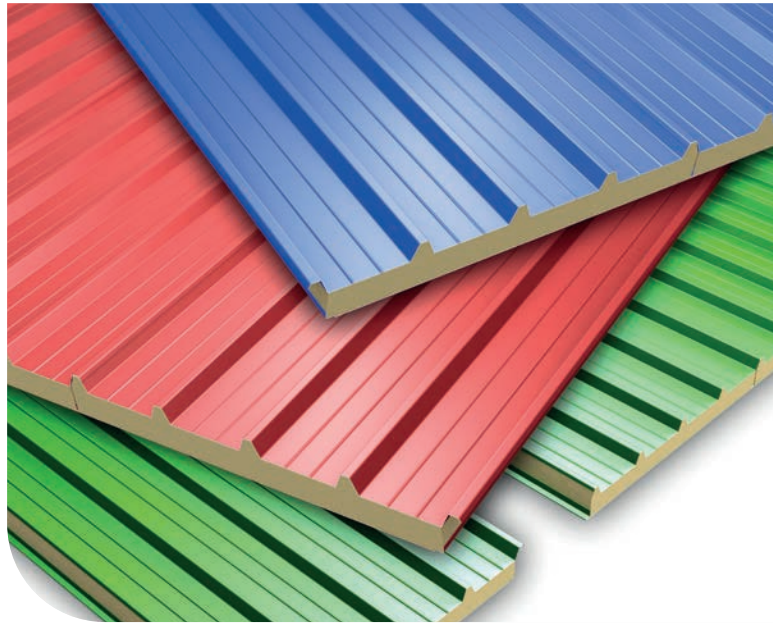


Primers

Primers are priming agents used on moist and absorbent substrates to increase adhesion of polyurethane adhesives, among other things. Moreover, primers clean surfaces from remains of dust and dirt.

Due to their structure, we distinguish between **1-component** and **2-component primers**.

Primers are intended for professional use only. They are used in the production of sandwich panels for joining PIR/PUR foam to sheet metal. They contain isocyanates in their composition. Therefore, when applying them, it is necessary to use appropriate self-protection and avoid contact with skin and eye.



List of products

| SEGMENT | PRODUCT NAME | DYNAMIC VISCOSITY AT 25°C [mPa*s] | NCO CONTENT % (m/m) | APPLICATION |
|--|---------------------------|---|------------------------|---|
| SINGLE-COMPONENT POLYURETHANE ADHESIVES HOT-APPLIED | Active Play AS H 8005 | 1500-3750 | 9.0-11.0 | An adhesive for making hot-and-cold molded parts from SBR or EPDM rubber granules. |
| | Active Play AS H 8009 | 2500-4500 | 10.0-12.0 | |
| | Active Play AS H 8013_1 | 2000-3000 | 14.0-15.0 | |
| | Active Play AS H 8014 | 2500-3500 | 9.0-10.0 | An adhesive for making hot-and-cold molded parts from SBR or EPDM rubber granules (weights among other things). |
| | Active Play AS H 8015 | 2750-4500 | 8.3-9.8 | An adhesive for making hot-and-cold molded parts from SBR or EPDM rubber granules (weights among other things). A faster-acting version of ACTIVE PLAY AS H 8014. |
| | Active Play AS H 8018 | 2000-4000 | 12.0-13.5 | An adhesive for making hot-and-cold molded parts from SBR or EPDM rubber granules (weights among other things). |
| | Active Play AS C II | 1000-4000 | 10.0-12.5 | An adhesive for making hot-and-cold molded parts from SBR or EPDM rubber granules and for colored SBR parts. |
| | Active Play AS C II GREEN | 3000-8000 | – | Pigment adhesive for the production of colored SBR rubber granule parts - hot and cold molded. It changes the color of the granules to green. |
| | Active Play AS C II RED | 4500-10000 | – | Pigment adhesive for the production of colored SBR rubber granule parts - hot and cold molded. It changes the color of the granules to red. |
| | Active Play AS C III | 1500-2500 | 9.5-11.0 | An adhesive for making hot-and-cold molded parts from SBR or EPDM rubber granules and for colored SBR parts. |
| FLAME RETARDANT | Active Play AS FR | Thixotropy | – | Product used to make a product manufactured from SBR granules not flammable. |
| SINGLE-COMPONENT POLYURETHANE ADHESIVES FOR OUTDOOR APPLICATIONS | Active Play AS H 8008 | 3000-4500 | 9.0-10.0 | Adhesives for bonding rubber granules (SBR or EPDM) for the production of surface slabs for playgrounds, fitness rooms, gyms, and the like. |
| | Active Play AS H 8008W | 2500-4000 | 9.0-10.0 | |
| | Active Play AS N GREEN | 2000-4000 | – | Prepolymer with color additive used as a pigmented surface applied by spraying on the surface of sports mats made of SBR or EPDM granules. |
| | Active Play AS N RED | 1000-3000 | – | |
| ONE-COMPONENT POLYURETHANE ADHESIVES FOR REBOND FOAMS | Ekopromer REB_02 | 200-800 | 19.0-21.0 | Adhesives for the production of regenerated foam blocks. |
| | Rokanate M PE 0601 | 450-900 | 5.0-6.5 | |
| | Rokanate M PE 0801 | 200-600 | 7.9-8.6 | |

| SEGMENT | PRODUCT NAME | DYNAMIC VISCOSITY AT 25°C [mPa*s] | NCO CONTENT % (m/m) | APPLICATION |
|---|----------------------|---|------------------------|--|
| ONE-COMPONENT POLYURETHANE ADHESIVES FOR WOOD | Rokanate M PE 2601 | 300-450 | 25.4-26.4 | Glue for the production of lightweight wood-based panels, so-called LDF, does not contain hazardous compounds, i.e. formaldehyde. |
| | Rokonate M PE 1601 | 3000-5000 | 15.5-17.0 | An adhesive designed for the woodworking industry, for gluing wooden and wood-based components with applications in construction, joinery, and furniture. After curing, the adhesive forms a bond with durability class D4 in accordance with PN-EN 204 and has heat resistance according to PN-EN 14257 WATT' 91. |
| | Rokanate M PE 1503 | 1500-3000 | 14.0-16.0 | Adhesive for bonding boards such as fiberboard, styrofoam, polyurethane, mineral wool to sheet metal, wood, gypsum cardboard, roofing paper. After curing, the adhesive forms a bond with durability class D3. |
| | Rokanate F2C 0002_03 | 4500-8500 | – | An adhesive used together with polymeric MDI designed for bonding, for example, aluminum and steel. A product for professionals only. |
| TWO-COMPONENT POLYURETHANE ADHESIVES | Rokapur PR2K_97 | 700-1000 | – | A 2-component primer based on recycled PET to create better adhesion to metal cladding in the continuous production of PIR type panels. |



PCC Group

We build value through sustainable innovation



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

Each project or venture with a long-term success story shares one common thing – it's based on in-depth market research and knowledge acquired through years of experience. It is knowledge and experience that enable 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 by taking advantage of innovative technologies 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're always striving to reach our strategic goals. Efficient and dynamic management helps our employees to fully develop their potential and, therefore, enhances the overall value of the PCC Group. 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 over 3300 people. We operate in 17 countries, in 39 different locations around the world. Sales of the PCC Group are generated in three areas: Chemicals, Logistics, and Holding & Projects. Our portfolio includes five segments: Polyols & Derivatives, Surfactants & Derivatives, Chlorine & Derivatives, Silicon & Derivatives, and Trade & Service.

Segments of the PCC Group

Chemicals 83%



Polyols & Derivatives

- Polyether polyols
- Polyester polyols
- Polyurethane systems
- Prepolymers
- Acryl phenols



Surfactants & Derivatives

- Anionic surfactants
- Non-ionic surfactants
- Amphoteric surfactants (betaines)
- Household and industrial cleaners, detergents, personal care products



Chlorine & Derivatives

- Chlorine
- Chlorine derivatives
- MCAA
- Phosphorus and naphthalene derivatives



Silicon & Derivatives

- Quartzite
- Metallic silicon



Trade & Service

- Trade
- Services

Logistics 12%



Logistics

- Intermodal transport
- Road transport
- Rail transport
- Container terminal in Kutno

Holding & projects 5%



Holding & Projects

- Investment management
- Projects
- Renewable energy
- Conventional energy



PCC Group
Sienkiewicza 4
56-120, Brzeg Dolny, Polska
products@pcc.eu

Please visit our capital group
business platform:
www.products.pcc.eu

February 2023



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 of our 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.

All copyright, trademark rights and other intellectual and industrial property rights and the resulting rights to use this publication and its contents have been transferred to PCC Rokita SA or PCC EXOL SA or its licensors. All rights reserved.

Users/readers are not entitled to reproduce this publication in whole or in part, nor are they entitled to reproduce it (excluding reproduction for personal use) or to transfer it to third parties.

Permission to reproduce it for personal use does not apply in respect to data used in other publications, in electronic information systems, or in other media publications. PCC Rokita SA and PCC EXOL SA shall not be responsible for data published by users.