

Think pure.

● purenit®

Performance prevails.

purenit  
functional material.



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### purenit – what's it all about?

The answer is quite simple: purenit is a high-density smart material combining an incredulous multitude of outstanding properties. purenit performance data can be termed brilliant without any qualification. purenit is a polyurethane product on a (PU) rigid foam basis providing a high thermal insulation value. Its bulk density ranges around 550 kg/m<sup>3</sup> – and this makes purenit a genuine lightweight – despite all its rigidity, stability and high thermal insulation value.

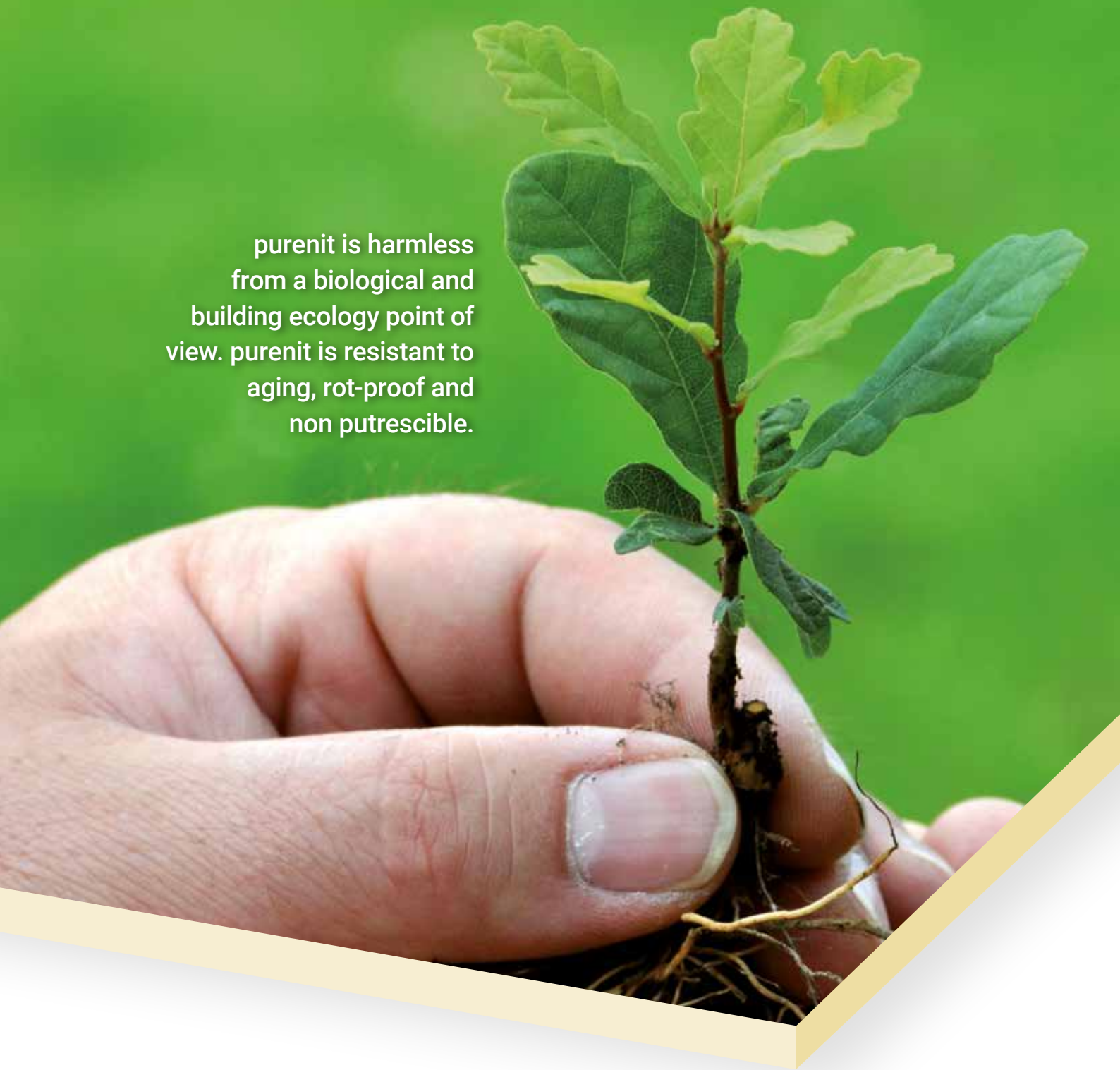
#### purenit's tough properties

Reaction to fire	<b>E and D-s3,d0</b> , EN 13501-1, non-smouldering, non-melting, non-dripping. <b>C-s2,d0</b> on demand, EN 13501-1, flame retardant.
Thermal conductivity	<b>0,083 - 0,085 W/(m·k)*</b> , rated value $\lambda_b = 0,086 - 0,088$ W/(m·k) purenit C: <b>0,096 W/(m·k)*</b> , applicable temperatures -50°C to +100°C short term up to +250°C
Bulk density	<b>550 kg/m<sup>3</sup></b> (+/- 40 kg), EN 1602
Compressive strength	<b>≥ 7,1 MPa</b> , EN 826
Resistance to aging	non-rotting, mould- and mildew-resistant
Resistance to chemicals	mineral oils, solvents, dilute solutions and acids

\* Laboratory value



purenit is harmless  
from a biological and  
building ecology point of  
view. purenit is resistant to  
aging, rot-proof and  
non putrescible.



purenit  
Performance prevails.



**purenit – the incredible functional material.**

If you intend to point the way by means of performance, you need a reliable basis to safely realize your own ideas and developments. New ways frequently require also new materials and their combination. However, what do you do, if traditional materials have reached their limits? If wood, metal, plastics or any other composite material do not meet your very special requirements? This is the point where purenit comes in – the innovative functional material that simply offers more possibilities!

**Brand quality from one source.**

purenit is a brand product. Reminders from the polyurethane manufacture of puren's are integrated into purenit – however, and this makes for the difference, no waste materials are being used for its production. Homogenous only and free of foreign substances is the motto. Therefore, all substances used in production are being strictly tested. purenit's very special properties are based on highly developed recipes of puren. And for this very reason, all substances and materials from basic raw materials up to finished purenit are directly processed by puren.

**purenit – sustainability in perfection.**

To assess how sustainable and ecological a material really is, the complete life cycle of a product from manufacture via usage up to disposal or reuse must be considered. purenit it is a product setting the pace in this direction, being an excellent example for the objective target of sustainability set by puren gmbh.



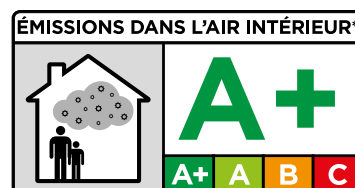
The EPD (Environmental Product Declaration) for polyurethane insulating panels explicitly refers to the manufacture of high-grade materials on polyurethane basis.



purenit complies with strict requirements – as numerous national and international independent test certificates prove (e.g. DGNB, LEED, DIBT, FIW, BAM).



NACH DEN KRITERIEN DES AUSSCHUSSES ZUR GESUNDHEITLICHEN BEWERTUNG VON BAUPRODUKTEN



purenit – more qualifications,  
higher performance, better advantages.

**Highest demands?  
Then you're exactly right  
with purenit.**

Sophisticated new solutions not only require innovative ideas but also materials providing a reliable basis for new approaches to solutions where product performance is concerned. purenit as high-performance smart material is a material whose range of application basically expands every day. Many processors of purenit ask themselves: "Whatever did we do before purenit was available?" purenit's unique performance is no accident.

**Takes a lot,  
has a thick skins and  
lasts and lasts and lasts...**

Extensive tests attest excellent mechanical properties to purenit. The material is extremely resistant to pressure as the value of 7.1 MPa (EN 826) confirms. purenit is therefore highly suitable for building components or as core material of sandwich constructions. Being so resistant to pressure, it is also suitable for safe connections and applications in the installation sector.

purenit is extremely resistant to pressure as its technical properties confirm. purenit is highly suitable for building components or as core material of sandwich constructions.



**NEW**

**Hot, cold, wet or moist?  
purenit is a genuine  
wonder material.**

Being a diffusion-open smart material, purenit excels with outstanding climatic properties. Under strain from moisture, purenit shows its extraordinary performance and distinguishes itself clearly from wooden materials. Even extreme moisture will not result in a change of shape – not even under long-term strain. Its rather low  $\mu$ -value of 8 positively supports water vapor permeability. Water absorbed is being harmlessly released. Another advantage: purenit is non-rotting, mold- and mildew-resistant and even resistant against termites – i.e. absolutely predestined for the manufacture of building components and installation work.

**purenit resists acids,  
solutions, solvents and  
other substances.**

purenit's expansive resistance to most chemicals and solvents, dilute solutions and acids opens an enormous range of applications. Today, trend-setting composite materials are mostly laminated or bonded. Like hardly any other material, purenit works well with adhesives and laminate materials. Even without lamination, purenit proves its longevity in critical and difficult application areas such as in agriculture, in particular for animal husbandry. Here, too, purenit sets standards and meets the highest requirements.

**Now also flame-retardant:  
purenit C.**

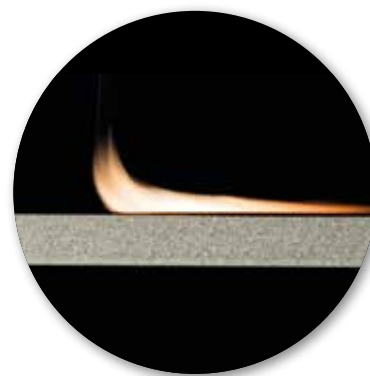
When stability, insulation properties and increased fire protection are required at the same time, purenit C is the solution and consistent further development of this multi-purpose smart material. Adding another innovative variant to the product family. These characteristics are particularly effective for facades. At the same time, temporary moisture loads have no fundamental influence on the material. But the new product variant now also offers possibilities in other fields of application. Just get in touch with us. (A US patent was granted for purenit C: US Patent 10844189)



Moisture has an extreme impact on many materials. purenit retains its shape even in boiling water.



Solutions, solvents, agents – purenit resists a multitude of popular chemicals.



Increased fire protection requirements: purenit C opens up new fields of application for the smart material.





Just do whatever you want –  
but best do it with purenit.





**Simple and cost-efficient processing.**

That purenit as smart material can take a lot is one fact, its nearly limitless variety of applications another. Here, one hears "Incredible" again and again. purenit can be processed easily on any current wood working machinery and tools – just as you're used to from working with chipboards. Carbide tools will help. Reminders from processing may be given over to regular thermal recycling. For screw connections, we recommend predrilling and leaving sufficient distance at the edges. During processing, purenit is impressive in every aspect.

**Bonding and laminating safely.**

Ever frequently, glued connections are used to interconnect parts and components. purenit allows for nearly any known process. To achieve perfect bonding with purenit, we recommend determining the details with the manufacturer of the adhesive. purenit works extremely well with widely-used 1K- or 2K-PU adhesives, hotmelt or water-based adhesive systems. No problems with paints or painting with popular products or systems that are solvent-based themselves. As with other materials, paint a test surface to achieve optimum results.

**Facts for processing**

<b>Milling</b>	exact and without effort, on any commercial wood processing machinery.
<b>Drilling</b>	an HSS drill bit suffices for drilling screw connections.
<b>Sawing</b>	saws easily and precisely. Water-jet cutting also possible. For a longer stability, we recommend carbide tools.
<b>Laminating</b>	Practically no restrictions when joined and laminated with other materials. Ideal support for laminating materials.
<b>Bonding</b>	Suitable to process with any commercial adhesive/ bonding system.
<b>Painting</b>	purenit even withstands solvent-based paints and varnishes.



One of the greatest strong points of purenit: Building elements must meet enormous strains such as temperature gradients inside and out, moisture, heat and mechanical strain. Wherever purenit is used – this extraordinary material fulfills its claims. Whether in the vehicle, furniture or building components industry – purenit sets standards.

High-grade interior design of spa areas and sanitary rooms – purenit give plenty of creative margins for planners and designers and convinces assemblers through easy handling.

Whether sport boat, sail boat, private yacht or furniture inside cruise ships – for shipbuilders, purenit is always a wise choice.



# purenit – a brilliant funktional material, offering a thousand possibilities.

## **The first all-rounder surpassing everything.**

Famous companies rely on the smart material purenit and appreciate the many advantages of this special construction material.

To manufacturers of building elements, its resistance to moisture makes all the difference. In vehicle construction, its excellent behaviour towards adhesives and the resulting multitude of surface laminates are extremely appreciated. For manufacturers of composite elements, pressure resistance and the possibility to use wood working machinery for processing are predominant.

For manufacturers of agricultural products, the principal characteristic is its resistance to chemicals.

## **Wooden materials we had yesterday, today, it's purenit.**

purenit performs better than other materials and all its properties hardly know any rivals. Its bulk density of 550 kg/m<sup>3</sup> makes purenit a lightweight among smart construction materials and thus contributes to reduce weight for the vehicle industry, i.e. a substantial advantage for commercial vehicles and campers. The homogenous material structure of purenit furthermore provides excellent thermal insulation – it can hardly get any better.

## **For some it's witchcraft – for us it's purenit.**

An impartial comparison to wooden materials pays off. Because of its unique characteristics, purenit never disappoint. Engineers, building and installation experts as well as product developers from various industries and sectors confirm this time and again: purenit convinces not only on a technical basis but greatly inspires to develop new ideas. Thus, purenit creates room for genuine innovation.

100 % waterproof flooring –  
below its high-grade cover layer,  
purenit convinces as  
support material.







Unique world-wide:  
The purenit manufacturing cycle.

**Protect resources, save disposal and transport costs.**

Further processing instead of disposal! Do you use rigid polyurethane foam in your production? Do you produce by-products from rigid polyurethane foam in your production process? Your transport and disposal costs for rigid polyurethane foam by-products are high because the product is bulky? There are other ways.

As one of the pioneers in the field of rigid polyurethane foam technology, puren has been involved in the recycling and further processing of by-products for decades. What initially developed from "own requirements" was later extended to other producers in the PU rigid foam industry and their customers throughout Europe. With the **NEXT STEP PU** system also these high-quality by-products can be supplied to a new product life cycle.

**Improve your life cycle assessment permanently.**

Commit yourself sustainably to the environment and the protection of resources. The by-products of polyurethane rigid foam that are produced in your production process can be used to manufacture new products tomorrow.

**Get certified for sustainability.**

Show that your company is committed to sustainability and environmental protection. Companies that participate in the **NEXT STEP PU** system receive a certificate for their participation and can use this positively for their advertising activities.

**Save on disposal and transport costs.**

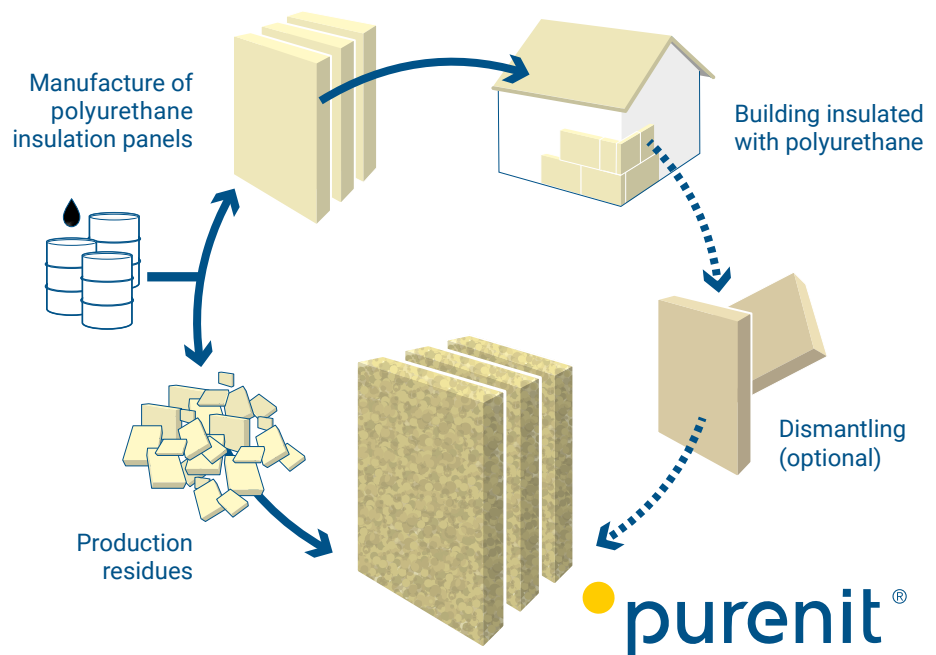
Return the rigid polyurethane foam by-products from your production process to the production cycle and thus save disposal and transport costs.

**Contractually regulated.**

Have we stirred your interest? Participation in the **NEXT STEP PU** system is of course contractually agreed. Please use the special application form, which we will gladly send you together with further detailed information.

**Unique world-wide:**

purenit is manufactured at puren in a closed production cycle and impresses with its sustainability. purenit is part of an exemplary product life cycle.



# purenit - quality is not a coincidence.



In the idyllic valley of the Danube, a state-of-the-art plant is manufacturing our multi-purpose purenit material.

## **State-of-the-art manufacturing technology offers unique possibilities.**

The requirements of the processing industry for a smart material such as purenit are enormously high. Compliance with applicable and important standards necessitates constant product quality. As a successful branded product, purenit is subject to strict and complete internal and external monitoring during production. The versatility of the purenit construction material while maintaining its outstanding material quality is only guaranteed, if all steps interlink perfectly during the production process. Without that level of reliability in the processes, no such high-performance product can ever be manufactured. All purenit products are being centrally manufactured in one of the most modern production plants in Europe.

## **purenit – 100% puren gmbh.**

puren gmbh is currently the only known company worldwide that produces a smart material such as purenit in a sustainable system from raw material preparation to the finished functional material. For more than 50 years, puren has been setting standards for the industrial manufacture of polyurethane rigid foam products. PUR/PIR insulating building materials shaped as insulating panels, foam slab stock and purenit are being manufactured in a basically endless recycling cycle.

Manufacturing purenit – the reliable industrial production must fear no comparison.





# Processing recommendations I: Paints.

purenit and purenit C are particularly suitable for structural applications with a thermally separating function, even in areas exposed to moisture. Since the multitude of possible processing methods, applications and installation situations cannot be comprehensively assessed and dealt with, we limit our recommendations to the basic handling of the material and its specific properties. These processing instructions do not exonerate the user from independent and self-responsible handling of material and construction taking in the diffusion behaviour and the laws of building physics. In particular, consideration of and compliance with the applicable recognised rules of technology is a prerequisite for a successful result.

## Paints

purenit is a functional material with good adhesion properties and is compatible with most commercially available coating materials. Due to the large number of possible applications and coating materials, a preliminary test on a material sample is always recommended.

purenit functional material is largely solvent-resistant and does not restrict the selection of the suitable coating system. If heavily solvent-containing coatings and undercoats are used, their compatibility should be checked prior to application if necessary.

purenit functional material structure is open-cell and consists of particles of different sizes and materials. The resulting different absorption behaviour usually requires levelling by means of an appropriate primer and, if necessary, a pore filler.

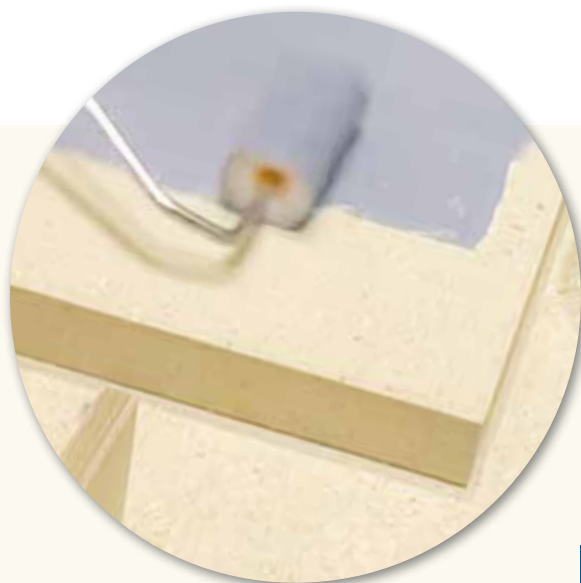
Due to the inhomogeneous structure, a furniture surface (varnishing, especially high-gloss varnishing) can only be achieved to a limited extent or requires additional measures (e.g. priming foil).

Light colours are recommended for outdoor areas with a risk of thermal charging. Particularly with dark colours and high surface temperatures, there is a risk of small bubbles or "orange peel".

purenit functional material can withstand temperatures of up to 100 °C permanently. Baking enamels or powder coatings are not recommended due to the processing temperatures.

## purenit range of application

purenit functional material is basically intended for use in weather- and UV-protected areas. If the weather and UV protection is not specified by the application, appropriate coatings are available, e.g. in the form of laminated cover layers (HPL, PVC, etc.). Liquid (paint) coatings of various types can also be applied.



# Processing recommendations II: Adhesive joints.

## Adhesive joints

When using the functional material purenit as core material for composite elements or for fastening, adhesive joints are commonly used. As a rule, all kinds of adhesive systems adhere very well to purenit functional materials. The selection or suitability of the adhesive therefore does not usually depend on the bond to the purenit functional material, but essentially on the material side to be bonded (PVC, HPL, metal, GRP, wood/vener, mineral substrate, etc.). The test of the adhesive bond should result in a cohesion fracture. Due to the large number of possible adhesives, cover layers and constructions, only one orientation can be given here. As a rule, tests are advisable in consultation with the adhesive manufacturer and according to the chosen bonding method.

■ The material basis of purenit functional material is polyurethane. Bondings within the material group, with 1- or 2-component PU adhesive systems are generally to be preferred.

■ purenit functional material can be subjected to temperatures of up to 250 °C for short periods. This makes the use of hot melt adhesives possible without further ado.

■ The compatibility of solvent-based adhesives and primers with the purenit functional material must be checked in advance. The application should be as economical as possible and should be carried out in compliance with any required flash-off times. Excess quantities (e.g. puddle formation) should be avoided or absorbed before bonding.

■ When using water-based or unfilled adhesive systems, the absorbency behaviour of the purenit functional material must be taken into account, especially in processes that require a longer open time (e.g. stack pressing).

■ In principle, mineral adhesives also achieve good adhesion to purenit functional materials. Due to the (one-sided) moisture input, a non-positive, load-bearing and torsion-resistant connection of the purenit functional material to the substrate is always required for surface application in order to prevent deformation. In any case, the construction of the overall structure must be carefully planned in order to prevent damage, e.g. to mineral coverings..



# Processing recommendations III: Screw and nail connections.

## Screw and nail connections

purenit functional material features numerous parallels to wood-based materials, especially chipboard, and can be processed in a similar way. However, the use of conventional fasteners (screw, nail or staple connections) requires the consideration of the specific material properties. purenit functional material reacts much more brittle to mechanical stresses of all kinds than wood or wood-based materials. Overloading can lead to spontaneous breakage. As a rule, preliminary tests with the planned fasteners are advisable.

■ In general it is recommended to pre-drill screw connections in the core or shaft diameter of the screw.

■ A sufficient distance to the material edge (approx. 7 to 10 x screw diameter) must be observed.

■ Countersunk head screws present a risk of plate breakage, especially with thinner plates and near the edges. If possible, pan-head screws should be preferred.

■ Nail and staple connections are possible. Impact performance and type must be adapted to the conditions.

■ Screw connections perpendicular to the surface (in the pressing direction of the plate) result in significantly higher screw pull-out and head pull-through values than screw connections of the narrow or end faces. The screwing direction perpendicular to the plate is therefore always to be preferred. Screw connections in the narrow side (transverse to the pressing direction) are not recommended for boards less than 25 mm thick.

■ Similar to wood-based materials, the mechanical properties, especially screw extraction values, are subject to non-uniform distribution over the surface. It is therefore advisable to always plan for several fasteners, taking into account the distances usual for wood-based materials (approx. 5 to 10 x screw diameter).

■ Additional or alternative adhesive joints are recommended.



### Note:

The mechanical characteristic values for screw extraction, head pull-through, intrados strength, bending strength as well as shear and compressive strength stated in our data sheets have been determined in extensive test series based on the test standards valid for wood materials and correspond to the characteristic values taking into account the material-related fluctuations and statistical deviation. However, neither the characteristic values nor their application for static calculations have been verified by standards or building authorities, nor are they subject to factory production control or external monitoring. Therefore, the information given should not be applied to statically relevant components.





pressure resistant thermal insulation panels made of pressed polyurethane (PU) rigid foam material

pressure resistant, heat-insulating smart material		- for low thermal bridge connection details
for universal use in flat or pitched roofs and façade structures		- for installation of construction elements
Cover layers	double-sided	non-laminated
Edge formation	all round	blunt



Thickness	[mm]	20	30	40	50	60	70	80
Thermal resistance <sup>1)</sup>	R <sub>D</sub> [(m <sup>2</sup> ·K)/W]	0,20	0,35	0,45	0,55	0,70	0,75	0,90
Heat transition coefficient <sup>2)</sup>	U <sub>D</sub> [(m <sup>2</sup> ·K)/W]	2,94	2,04	1,69	1,45	1,19	1,12	0,96
Vapour diffusion resistance	S <sub>d</sub> [m]	0,16	0,24	0,32	0,40	0,48	0,56	0,64
Package content	Pieces	30	20	15	13	10	8	7

purenit functional material		Technical data				
Characteristic	Standard/test procedure	Unit	Indicator	max	min	
Material	highly compressed, heat-insulating smart material on the basis of rigid polyurethane foam (PU) acc. EN 13165, dimensionally stable, moisture-resistant, non-rotting, resistant to mildew and decay, recyclable, safe from biological and building ecology point of view, emission-free acc. to					
Bulk density	EN 1602	kg/m <sup>3</sup>	550	+40	-40	
Dimensions						
Length	EN 822	mm	2440			
Width	EN 822	mm	1220			
Available thicknesses	EN 823	mm	10 <sup>3)</sup> , 15 <sup>3)</sup> , 20, 25, 30, 40, 50, 60, 70, 80			
Thermal conductivity	EN 12667	at thickness	d ≤ 40 mm	40 < d ≤ 60 mm	d > 60 mm	
Nominal value ( EU )	λ <sub>D</sub> ETA-18/0604	W/(m·K)	0,083	0,085	0,088	
Compressive strength						
Compressive stress at 10% compression	EN 826	MPa	7,1			
Admitted long-term pressure load at < 2% compression		MPa	1,8			
Tensile strength perpendicular to panel plane	EN 1607	kPa	800			
Bending strength <sup>4)</sup>	EN 12089	MPa	4,5			
E-module (bending load) <sup>4)</sup>	EN 12089	MPa	30			
Transverse strength <sup>4)</sup>	EN 12090	MPa	1 - 1,5			
Shear strength <sup>4)</sup>	EN 12090	MPa	1 - 1,5			
Screw removal resistance <sup>4)</sup>			Screw	woodscrew 6x60		
Surface removal				11,35		
Narrow edge removal	EN 14358	N/mm <sup>2</sup>		8,0		
Head pull-through resistance				29,0		
European Technical Assessment ( EU )			ETA-18/0604			
Fire behaviour	non-smouldering, non-melting, non-dripping					
Reaction to Fire Class / RtF ( EU )	EN 13501-1			E		
Temperature resistance		°C	-50 to +100, short-term to +250°C			
Moisture absorption <sup>4)</sup>	EN 12571	% by mass	≤ 3			
Water absorption	EN 1609	kg/m <sup>2</sup>	≤ 0,5			
Thickness swelling <sup>4)</sup>	EN 68763	%	≤ 0,8			
Water vapour diffusion resistance factor (PU)	μ		8			
Linear expansion coefficient <sup>4)</sup>	EN 1604	1/K	5 · 10 <sup>-5</sup>			
	1) Thermal resistance of the insulation panel based on the thermal conductivity nominal values acc. to ETA-18/0604, in compliance with EN 13165. 2) Insulation element U value on the basis of the thermal conductivity nominal value acc. ETA-18/0604. Heat transfer resistances R <sub>si</sub> = 0,10 m <sup>2</sup> ·K/W and R <sub>se</sub> = 0,04 m <sup>2</sup> ·K/W (Heat flow upwards) are calculated; other component layers are not considered. 3) uncontrolled thickness range - we reserve the right to deviations from technical values 4) Lab values, not part of the factory production control and external supervision					



Declaration of performance  
40131.CPR.2021.09  
purenit  
www.puren.com/download



ETA-18/0604  
Verification authority: 0751 FIW München



**easy to  
process**



**resistant to  
moisture**



**resistant to  
mold**

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