eco INSTITUT
TESTED PRODUCT
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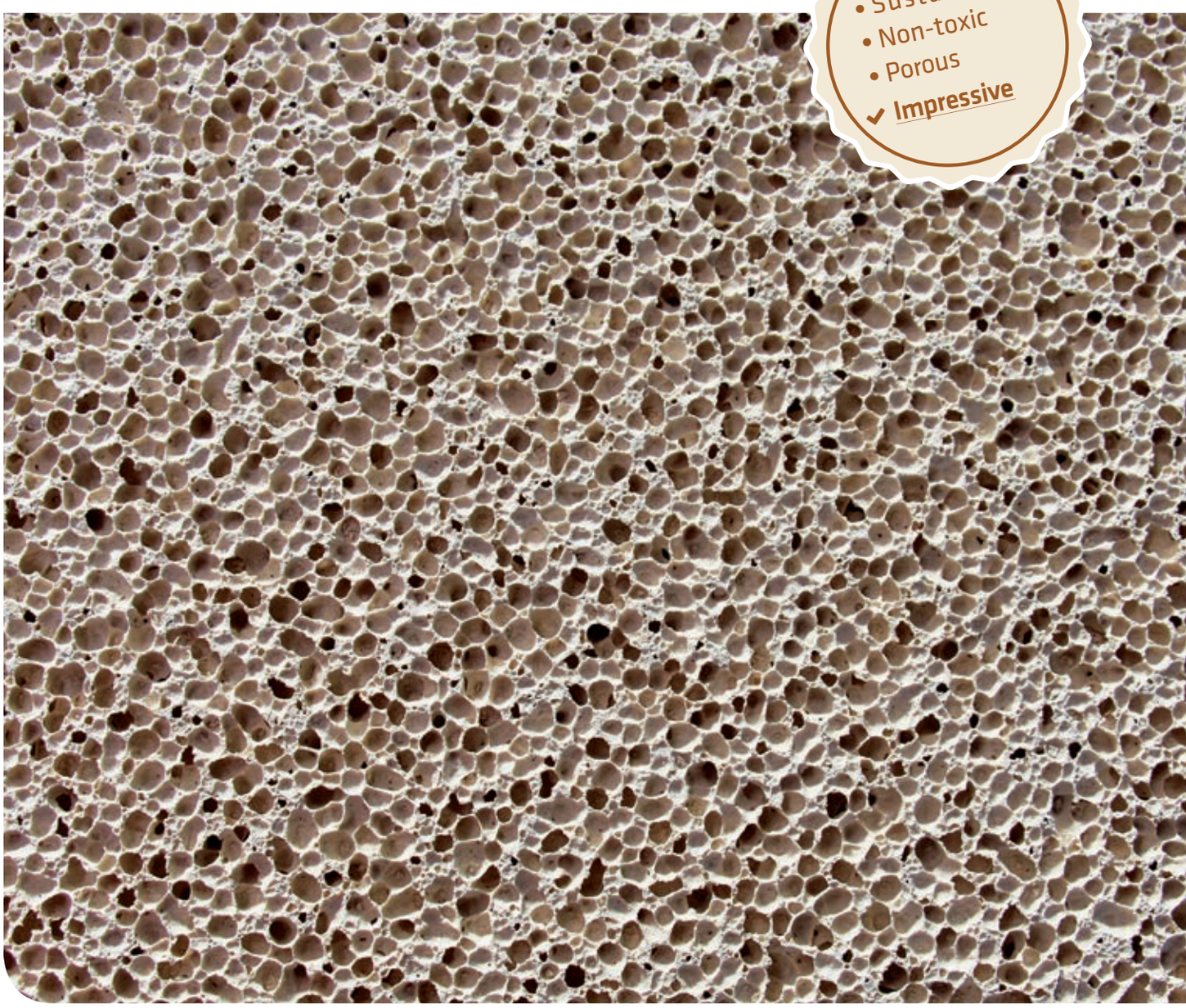
LIQUID PORE

LIQUID PORE®

Genuine and sustainable insulation.

- Sustainable
- Non-toxic
- Porous
- ✔ Impressive



Non-combustible A1

low-emission production

100% recyclable

Non-toxic facade

Europe-wide patent

HEAT RETENTION

HEALTHY INDOOR TEMPERATURE

NON-COMBUSTIBLE A1

NON-TOXIC

POROUS

SUSTAINABLE

LIQUID PORE®

Genuine and sustainable insulation.

In times of energy transition and wildly fluctuating prices for natural resources like oil and gas, it's important to scrutinise your own consumer behaviour. On the one hand, it's vital to use as little energy as possible, while on the other, the energy that you do consume must be used with maximum efficiency. Efficient wall insulation is an important step in achieving both these goals. The demands placed on construction materials, however, are enormous, and only highly efficient and innovative construction materials will suffice.

Liquid Pore® is an eco-friendly insulation board made of mineral foam on calcium sulphate, allowing for the sustainable, efficient and ecologically sound insulation of interior and exterior facades.

Its unique ability to retain heat enables maximum utilisation of the heat energy being consumed. At the same time, Liquid Pore® retains solar heat even at low, sub-zero temperatures, efficiently transmitting it to the underlying construction layers. An additional, truly 'green' source of heat –available for free from nature.

Liquid Pore® provides a better inside environment thanks to the permeability of the wall construction, as the excess air moisture resulting from vapour diffusion can be transported through the wall to outside. This ensures that inside always has a comfortable feel.

In addition, problems typical of some other insulation materials – such as combustibility, algae growth, dampness in the wall structure, mildew or woodpecker holes – are no longer an issue due to the product's outstanding features.

An all-round clean solution for a healthy and pleasant indoor temperature for the whole family.

SUSTAINABILITY INCLUDED.

Liquid Pore carries a spectacularly low load of grey energy.

ACTIVE FIRE PROTECTION AND ECO-FRIENDLINESS – HOW DO THEY GO TOGETHER?

Wintertime heat loss through transmission occurs when the heat moves from 'warm' to 'cold', or from inside to outside. An air cushion consisting of countless small pores will generally curb the flow of heat – and this is how Liquid Pore® works as well. In contrast to other, light insulation materials, Liquid Pore® is a dense, fine-pored mineral foam with an extremely stable cellular structure and a high heat storage capacity, resulting in a significant slowing of the transmission effect.

Conserving heat: the key to energy efficiency

Even at low sub-zero temperatures, Liquid Pore® stores solar heat and steadily transmits it to the underlying construction layers. In the winter, an exterior facade heats itself at temperatures ranging from about -12°C to +35°C. The stored solar heat creates a barrier that not only slows the flow of the heat from inside to outside but at times even completely stops it. Circulating air currents also distribute the heat obtained over the entire house wall and adjacent building components.

You will observe this effect in your own home, giving it a pleasant temperature.

Warm in the winter, cool in the summer – always just right.

The design of a building usually only considers how to maintain a consistently warm temperature at home during the cold season. However, for a comfortable indoor atmosphere, it's just as important to keep all rooms at a pleasant temperature on hot summer days so that they don't become too hot. Liquid Pore's® remarkable heat storage feature is also effective in this regard. The insulation boards function differently from the way they do in the winter, acting as a buffer that stores the summertime heat intake and then releases it gradually.

Comfortable inside temperature on hot days – without air conditioning

With a thickness of only 6 cm, heat only begins to penetrate the Liquid Pore® mineral insulation board after 5.5 hours, and the next wall only after that. For a solid exterior wall, this results in a delay – also known as a 'phase shift' – of up to 11 hours. We call it a valuable contribution to well-being and environmental protection. After all, those living spaces and offices that experience less indoor heat in the summertime will also require less or even no use of air conditioning, which in turn protects the environment.

Counteract algae growth naturally – with Liquid Pore®

Liquid Pore is a solid mineral facade insulation material which stores heat, in turn putting a stop to algae growth on house walls from the outset.

What causes algae? A good exterior paint job usually lasts about 20 years. Should an expensive new coat of paint still be required after only a few years, a common reason is that there is just a light insulation material incapable of storing any heat lying behind the thin layer of plaster. The morning dew forms on the cold facade, which in turn favours the growth of algae.

For that reason, a great many plasters and paints contain biocides, which often still wash out within just 5 years and can adversely affect the environment as a result. To conceal the problem, extremely thick layers of plaster are applied in some cases, which in turn results in equally high costs. You end up fighting the effects rather than directly removing the source of the problem.

Flammability: an important question for facades

Liquid Pore® mineral foam boards are non-combustible (German building material class A1 in accordance with DIN 4102-1) and have been proven to be non-toxic with regard to fumes. By contrast, polystyrene insulation does not meet the requirements for fire protection classification 1, despite the fact that this material is widely used as building insulation.

The main reason for this is its inexpensive price. But in many cases, this calculation doesn't work. The media is often full of stories about burning house walls, which pose an equal danger to both occupants and the fire brigade. Facades insulated with plastic can turn into deadly traps in the event of a fire as the material begins to melt and the hot, dripping plastic blocks evacuation routes.

In addition to the risk of fire, there are also legal complications to consider: 'Should a house catch fire, the owners of the neighbouring house damaged by that fire have the right to claim compensation. This is of particular relevance in the case of terraced houses whose facades are insulated with combustible material such as polystyrene, meaning that a fire could result in its spreading to the adjoining building because of the failure to construct a vertical firewall made of non-combustible material, as stipulated in local building codes (BGH ruling of 1 April 2011, V ZR 193/10)'.

Far left picture Liquid Pore® can be used for interior, exterior and roofing insulation. The heat storage capacity helps the house remain cool in the summer and warm in the winter.

Top picture Liquid Pore® mineral foam boards are non-combustible. This means they can be used without hesitation in apartment and terrace house construction.

PRIMARY ENERGY DEMAND OR GREY ENERGY – SUSTAINABILITY PUT TO THE TEST

Primary energy demand, also called 'grey energy', is currently a much-discussed topic when it comes to product sustainability. Many products pride themselves on the notion of sustainability. But what do 'grey energy' and 'sustainability' mean, and how can they be reliably compared? A close examination and careful evaluation of a product's features is needed to form a genuine basis for comparison.

What exactly does 'grey energy' mean?

'Grey energy' is the term used to describe the amount of energy required for the manufacture, transport, warehousing, sale and disposal of a product. The calculation includes both the energy used for raw material extraction as well as for the production processes applied to the manufacture of all preliminary products. 'Grey energy' is thus the indirect energy expenditure required to place the product in the hands of the consumer. When a product requires a low amount of 'grey energy', it can be considered sustainable.

Compare sustainability transparently

The notion of sustainability is associated with the examination of the entire life cycle of a product. All influencing variables are examined, from the grey energy involved in the production process through to the use of the product and its disposal. To be able to compare products in relation to their sustainability, you must have access to a standardised and comparable database. Whether kW/m3, kg, MJ/kg or MJ/m2, the designations are varied and cannot be compared without conversion. A variety of online tools are available to help perform the conversions. Equally important for a transparent comparison is the use of the same system boundary. The system boundary enables one to determine whether to include the energy savings expected during the product's use. This is an important deciding factor as to whether or not a product should be considered sustainable.

A question of perspective

A striking example of this is the solar panel. In this case, the product is associated with a large amount of grey energy. However, this is counteracted by an equivalent amount of anticipated future energy savings within a reasonable time frame.

A similar offset is required when evaluating thermal insulation materials, for example, where heat loss (U-value) should be compared with material thickness. Depending on the particular thermal insulation material and its thermal storage capacity, different amounts of material will be required to achieve sufficient insulation.

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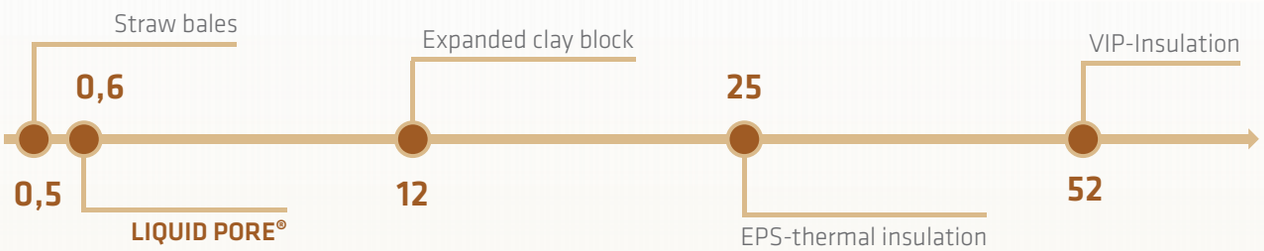
GREY ENERGY

With Liquid Pore®, the energy savings begin before installation.

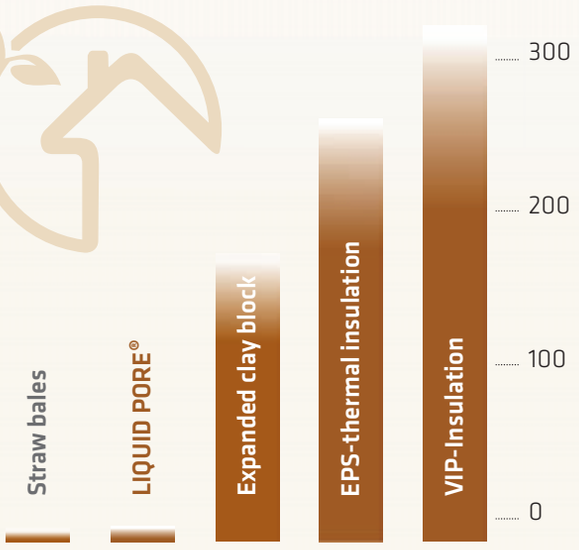


Time required until energy-neutral (in years)
Data sourced from www.wecobis.de

In the diagram above Liquid Pore® is produced with a revolutionary, low level of energy consumption. The patented cold process, with no addition of external energy, makes it possible to achieve energy neutrality in use much faster than with conventional types of insulation.

In the diagram to the right
Thanks to a patented manufacturing process, the energy used in the production of Liquid Pore® mineral insulation boards amounts to a mere fraction of the energy used to produce comparable products.

A genuine, green footprint.



Energy needed for production (grey energy) in kWh/m³
Data sourced from www.wecobis.de

EUROPEAN APPROVAL AND PATENT FOR INTERIOR AND EXTERIOR INSULATION

Evidence of genuine innovation.

The market for insulation materials is large and complex. Manufacturers regularly outdo each other with new products and features. In practice, however, these often don't last.

European approval – a standard

European approval of a building material is fundamental argument in favour of that building material. To obtain approval, the manufacturer must pass a variety of product tests. This provides customers with the certainty that they are using a product tested and certified according to valid European standards.

Patented manufacturing process

The innovative strength of Liquid Pore® mineral foam boards is also attested by patent applications in Europe, the US and other regions. The unique cold process allows for production with hardly any addition of external energy, an invaluable advantage over the competition's products, which carry a heavy load of grey energy. This also makes it possible to achieve a high and, most importantly, consistent product quality.

An investment in the future

With Liquid Pore®, you are choosing a sustainable solution that meets and exceeds all applicable regulations and represents a true investment in the future. Invest in it now, and you and your family will benefit for many years to come.

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GENERAL PART

Organ za tehnično ocenjevanje, ki je izdal ETA *Technical Assessment Body issuing the ETA*	**ZAG Ljubljana**
Komercialno ime gradbenega proizvoda *Trade name of the construction product*	**LIQUIDPORE – Mineralischer Dämmstoff mit Verbundmaterialien zur Innen- und Außendämmung**
Družina proizvoda *Product family to which the construction product belongs*	**04: Zunanji toplotnoizolacijski sestavljeni sistem z ometom (ETICS) na osnovi mineralne celične izolacije Liquidpore®, namenjeni za izolacijo zunanjih zidov zgradb** *04: External Thermal Insulation Composite Systems with rendering (ETICS) on mineral cellular insulation Liquidpore® for the use as external insulation to walls of buildings*
Proizvajalec *Manufacturer*	**TT – Dämm Hameln GmbH** **Langes Feld 19** **31860 Emmerthal** **Germany**
Proizvodni obrat *Manufacturing plant*	**TT – Dämm Hameln GmbH** **Langes Feld 19** **31860 Emmerthal** **Germany**
Ta Evropska tehnična ocena vsebuje *This European Technical Assessment contains*	14 strani vključno z 1 prilogo, ki je sestavni del te tehnične ocene *14 pages including 1 annex which form an integral part of this technical assessment*
Ta Evropska tehnična ocena je izdana na podlagi Uredbe (EU) št. 305/2001 na podlagi *This European Technical Assessment is issued in according to Regulation (EU) No 305/2011, on the basis of*	Smernice za evropska tehnična soglasja ETAG 004, izdaja februar 2013, ki se uporablja kot EAD *Guideline for European Technical Approval ETAG 004, edition February 2013, used as EAD*

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Isolant thermique minéral
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The manufacturer of Liquid Pore® is T.T.-Dämm Hameln GmbH, a company belonging to the ATHE-Therm Group.

ONE SIZE FITS ALL.

Delivery dimensions are 60x40 cm, adjustable as needed at the installation site

LIQUID PORE®

Demonstrably easy to install

The great strength of the Liquid Pore® mineral insulation board lies in the simplicity of its use. Installation is no more complex than with conventional insulation systems. Delivery includes mineral mortar glue, batts and the Liquid Pore® boards, along with all components needed for a modular solution so that you can start installing right away.

Liquid Pore® mineral insulation boards come in different thicknesses, depending on their purpose. Specific dimensions are available upon request.

The Liquid Pore® boards are simply glued flat to the wall using a mineral mortar adhesive. The mineral base allows for a porous structure. This enables the facade to 'breathe' and noticeably improves the indoor environment.

A stabilizing fabric is glued to the Liquid Pore® boards with a mineral mortar adhesive. Using a spatula, you can then easily smooth out the surface.

Lastly, the scratch coat is applied on top of a final primer and smoothed out. Thanks to the use of mineral materials, it's possible to create a 'healthy' facade that improves well-being.

LIQUID PORE ® MINERAL INSULATION BOARDS – SIMPLY IMPRESSIVE

Lambda effective – A question of perspective

In practice, the coefficient for thermal conductivity is mainly determined by its lambda value. However, this approach involves considerable risk. As part of its approval as an insulating material, the material's thermal conductivity is measured using a stationary method. However, this method differs significantly from actual conditions in solid buildings. The result is heavily distorted, creating a serious disadvantage for innovative and adaptable construction materials.

Innovative products capable of adapting their properties to environmental influences must therefore be treated in a realistic way. Among other things, heat storage capacity, opaque heat gains, the structure's moisture content, a porous construction and measurement margins must all be factored into the equation.

Consequently, as a manufacturing requirement in accordance with the recognized rules of technology, we use a λeff when carrying out heat protection calculations for Liquid Pore® in order to find the value for the equivalent thermal conductivity according to DIN EN ISO 6946 28.

The standards for heat protection, in particular DIN V 4108-6, cannot be used for Liquid Pore® owing to the above product characteristics.

What is particularly important is that there is no customer disadvantage, as the manufacturer in any event assumes all liability and guarantees the functionality of the product's physical features.

Calculation value for Liquid Pore (λ effective)	
North wall	0,040
South wall	0,029
East wall	0,036
West wall	0,034

λ effective (0,035) is the average value of the calculated values listed above

Healthy
Non-toxic

Non-combustible
A1

100% recyclable

Sustainable
low grey energy

Compressive strength
652 kPA

λ_d effective
0,035

LIQUID PORE ®

Technical data

Product features		
Bulk density		262 kg/m^3
Flexural strength	DIN 18560	1,7 N/mm^2
Compressive strength	DIN 18555 Part 3	652 kPa
Thermal conductivity (static)	DIN 12667	0,048* W/mK
Thermal resistance	DIN 12667	0,620 Rm^{2}K/W
Water vapour diffusion resistance	DIN EN 12575	2,44 µ value (-)
Diffusion resistance	DIN EN 12575	0,13 sd-value (m)
Diffusion rate	DIN EN 12575	1,75 E-06 G (kg/m^{2}s)
Minimum diffusion resistance	DIN EN 12575	2,40 µ value (-)
Maximum diffusion resistance	DIN EN 12575	2,48 µ value (-)
Sizes, special dimensions by agreement		40 x 60 (Height 6-15) cm
Specific heat capacity		1013 J/kgK c_{spez}
Dimensional stability (Length / Width)	DIN EN 1603	0 %
WDVS building material class	A2 by DIN 4102	
Insulation material Euroclass	A1 by DIN 4102-1	
Flammability	non-combustible	
Non-toxic in the event of a fire	harmless	
Rated sound absorption		38%

* Value measured by the MPA.

ADAPTABLE USE.

Liquid Pore mineral insulation boards can also be used for interior insulation. Together with an efficient wall heating system, you can ensure that your home is ready for the future.

LIQUID PORE®

Genuine and sustainable insulation.

Ihr Ansprechpartner für die Schweiz

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