



Source: Sto AG

C R E A T E S P A C E - S A V E E N E R G Y

**Innovative thermal
insulation in building
and construction with
Vacupor[®] vacuum
insulation panels**

INNOVATION INCLUDED – SENSIBLE AND
EFFECTIVE THERMAL INSULATION IN BUILDING



VACUPOR® INSIDE

*Awarded the 1st prize
the Solar-Decathlon* house of the TU Darmstadt
energy-optimized with Vacupor® VIPs*

*Solar-Decathlon 2007

VACUPOR® - OFFERS THE RIGHT SOLUTIONS FOR THE SIGNS OF THE TIMES

Climate change is a reality

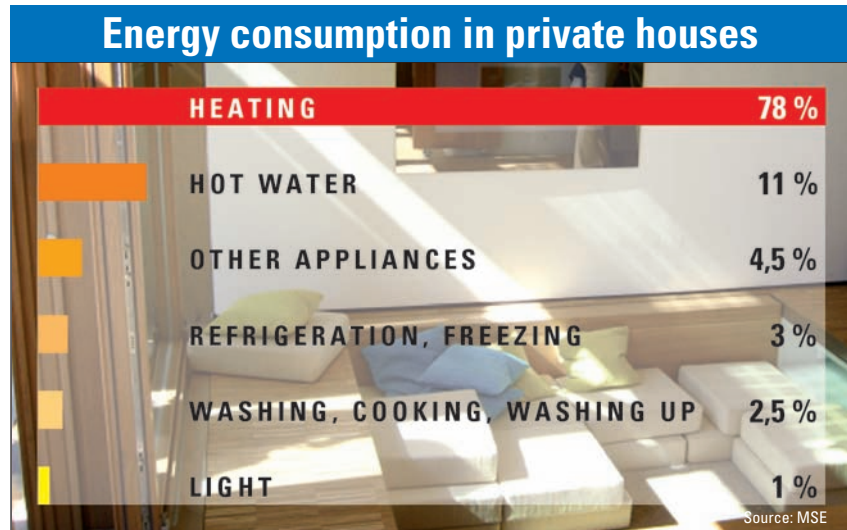
The facts indicate that the measurements of the three major climatic indicators – global warming, increase in the sea level and shrinking snow cover – have markedly changed. The European States are still calling for a 50% reduction in international CO₂ emission by the year 2050 in order to stem global warming. At the last climate summit in Copenhagen, the United Nations were unfortunately only able to agree on the very lowest political denominator – only the “two degrees target” was acknowledged and agreed. The current situation all the more urgently requires everyone to act in order to reduce CO₂ emission.

Investments for innovative thermal insulation increasingly pay off

Everyone knows that energy resources are becoming increasingly short whereas the requirements are constantly increasing worldwide. Hence, the costs for energy in private households increased by 50% on average between 1990 and 2005. In detail, the price increases are divided up as follows:

Room heating and hot water:	+68%
Process heat (cooking):	+42%
Light/miscellaneous:	+48%

Room heating is by far the biggest “energy guzzler” in a household. This is among other aspects due to the fact that a large percentage of the heat is lost through the roof, walls, windows, floor and chimney of every house.



Furthermore, the environment is heavily burdened by an unnecessarily high CO₂ emission. In the case of new buildings, the current energy conservation provisions already stipulates use of thermally insulating building materials.

Vacupor® – effective thermal insulation with markedly reduced insulation thicknesses

Wherever heat is lost in the home, matters can be improved by appropriate insulating measures. Approximately a quarter of the heat energy is wasted by insufficiently insulated external walls alone.

Optimum results can be achieved with Vacupor® VIPs with drastically reduced insulation thicknesses and significantly lower surface consumptions.

Innovative thermal insulation with Vacupor® lastingly increases the value of a property

Thermal insulation measures with Vacupor® are a sound investment, for they not only reduce the current energy costs, but also demonstrably enhance the value of a property.

House owners who act now will make a double saving

Anyone wanting to relieve the strain on the environment, and on their pocket, should make energy efficiency improvements now. Refurbishment measures are supported with a wide range of subsidies, e.g. through support programs:

- ▶ energy-efficient construction (new building)
- ▶ energy-efficient refurbishment and
- ▶ the 2009 Heat Act.

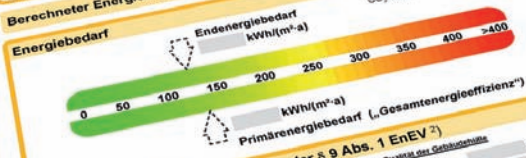
CREATE SPACE – SAVE ENERGY, PREFERABLY PLAN WITH VACUPOR® STRAIGHT AWAY



ENERGIEAUSWEIS für Wohngebäude

gemäß den §§ 16 ff. Energieeinsparverordnung (EnEV)

Berechneter Energiebedarf des Gebäudes



Nachweis der Einhaltung des § 3 oder § 9 Abs. 1 EnEV

Primärenergiebedarf	WWh/(m ² ·a)	Gebäude-Wert H ₁	WWh/(m ² ·a)
Gebäude-Wert H ₂	WWh/(m ² ·a)	EnEV-Anforderungswert H ₂	WWh/(m ² ·a)
EnEV-Anforderungswert		EnEV-Anforderungswert H ₂	

Endenergiebedarf

Energieträger	Jährlicher Endenergiebedarf in kWh/(m ² ·a) für Heizung	Wärmeabgabe	Wärmeabgabe	Gesamt in kWh/(m ² ·a)

Sonstige Angaben

- Einsetzbarkeit alternativer Energieversorgungssysteme
 - nach § 5 EnEV vor Baubeginn geprüft
 - Alternative Energieversorgungssysteme werden genutzt für:
 - Heizung
 - Lüftung
 - Warmwasser
 - Kühlung
- Lüftungskonzept
 - Die Lüftung erfolgt durch:
 - Fensterlüftung
 - Lüftungsanlage ohne Wärmerückgewinnung
 - Lüftungsanlage mit Wärmerückgewinnung
 - Schachtlüftung

Vergleichswerte Endenergiebedarf



Erläuterungen zum Berechnungsverfahren

Das verwendete Berechnungsverfahren ist durch die Energieeinsparverordnung vorgegeben. Insbesondere wegen standardisierter Randbedingungen erlauben die angegebenen Werte keine Rückschlüsse auf den tatsächlichen Energieverbrauch. Die ausgewiesenen Werte sind spezifische Werte nach der EnEV pro Quadratmeter Gebäudenutzfläche (A_n).

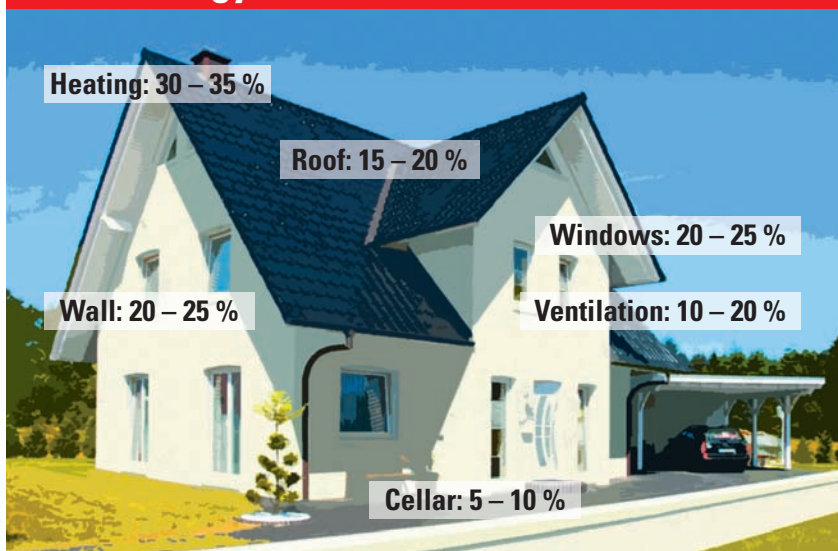
1) freiwillige Angabe
2) nur in den Fällen des Neubaus und der Modernisierung auszufüllen
3) ggf. einschließlich Kühlung
4) EFH - Einfamilienhäuser, MFH - Mehrfamilienhäuser

VACUPOR®

*Sustainability in thermal insulation from
new buildings to renovations*

EFFECTIVELY AVOIDING ENERGY LOSSES AND SAVING RESOURCES

Energy losses in a standard house



Use the energy certificate as an opportunity

Presentation of an energy certificate has become compulsory on selling or leasing a building owing to the current energy conservation provisions. This provides information about the actual energy requirements of a building.

Each building has a specific energy requirement allocated to it. Consequently, a building can be offered on the market with clear facts and figures and the purchaser or tenant can easily tell the thermal quality of a flat. The quality of the insulation plays a crucial role in the energy requirement of a building. The more efficient it is, the higher the classification of the respective property. If the building certificate indicates a low energy requirement, the property will be markedly more attractive to purchasers and tenants.

Comparison of the effect of thermal insulation on the energy balance of houses

Basis: uninsulated detached house 100 m² in size, year of construction 1960:

▶ **consumption/year approx. 3700 L of heating oil.**

Built according to the Thermal Insulation Ordinance 1982/1984:

▶ **consumption/year approx. 1500 L of heating oil.**

Built according to the Thermal Insulation Ordinance 1995:

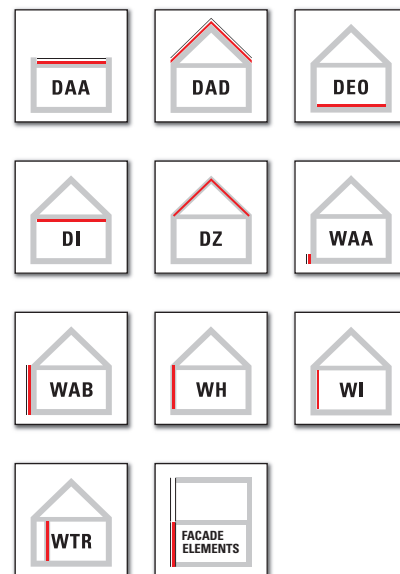
▶ **consumption/year approx. 1000 L of heating oil.**

Low energy house built according to the state of the art:

▶ **consumption/year approx. 500 – 700 L of heating oil.**

Source: Katalyse environmental database

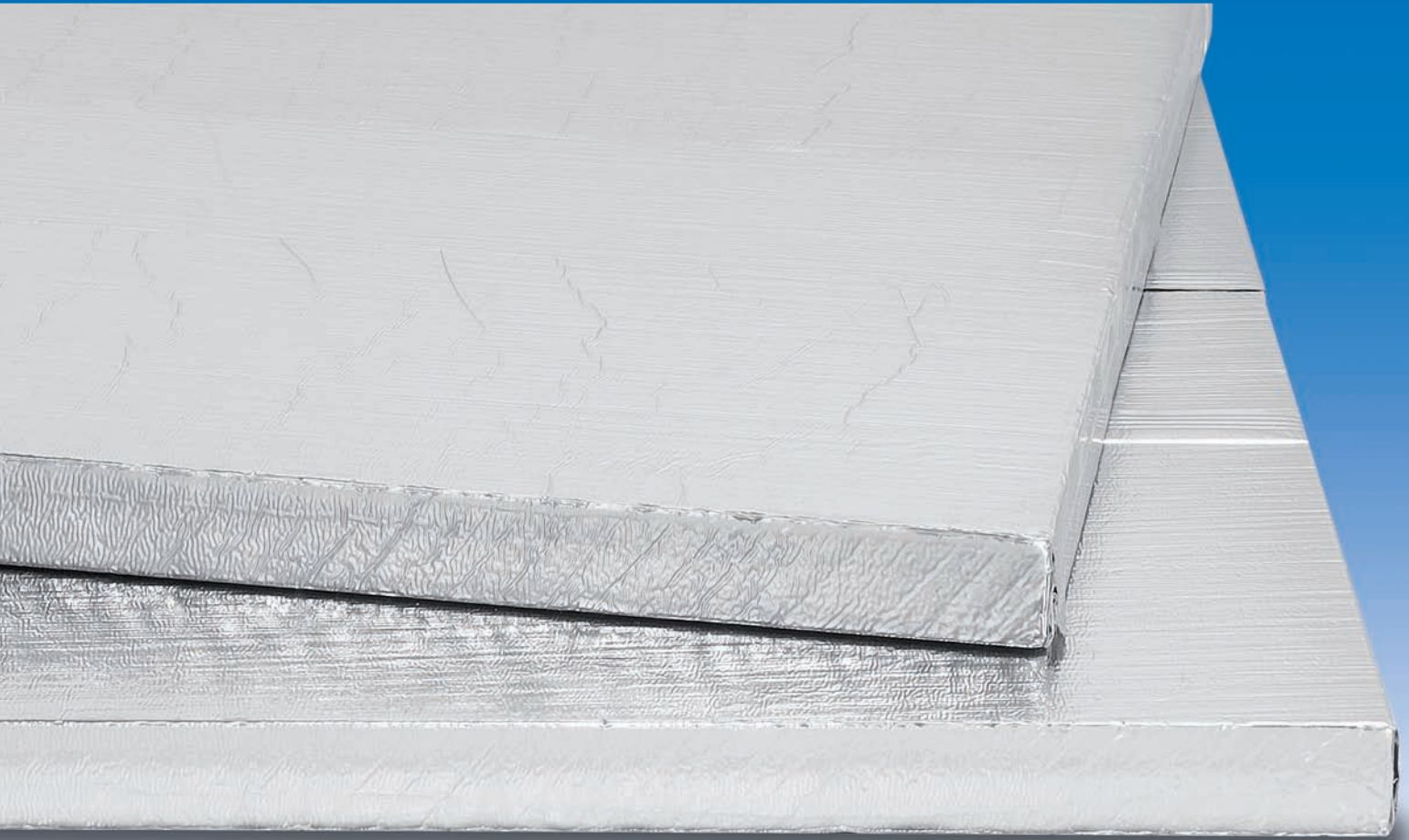
Vacupor® for different building applications



The Vacupor® advantages at a glance:

- ▶ markedly reduced energy consumption
- ▶ considerably increased gain in area
- ▶ a preferred choice in case of space problems
- ▶ aesthetically, functionally and architecturally appealing solutions for new buildings and renovations
- ▶ saving in costs for special constructions/applications
- ▶ various protective coatings available for different trades
- ▶ wide variety of sizes
- ▶ easy to recycle

**VACUPOR® – THE NEW S-TYPES WITH A RATED
VALUE OF ONLY 0.007 W/(m·K)**



VACUPOR®

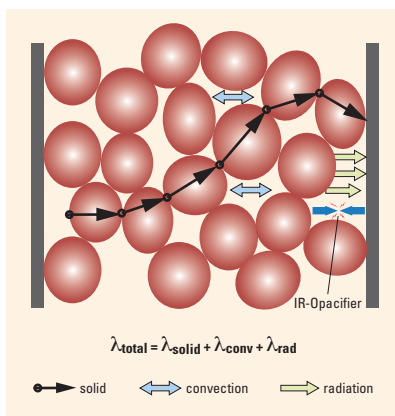
*Create space – save energy, with
vacuum insulation panels from Porextherm*

PRACTICE-PROVEN DIBT-CERTIFIED TECHNOLOGY FOR YOUR BUILDING APPLICATIONS

Vacupor® – extremely good thermal insulation values with extremely reduced thickness

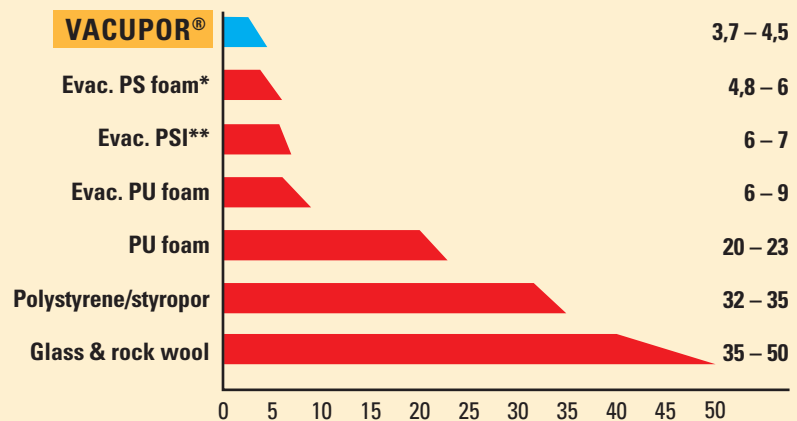
The highly efficient insulating effect of our products is based on a microporous fumed silica. There is only point contact between the spherical microporous particles. This substantially reduces thermal conduction due to contact between solid particles.

In addition, the micropores minimize thermal transmission by convection. Specially developed infrared opacifiers also reduce heat transport processes by absorption and reflection of radiation.



Consequently, it is possible to achieve very much higher efficiency than with conventional insulation materials. For

VACUPOR® compared to alternative insulating materials



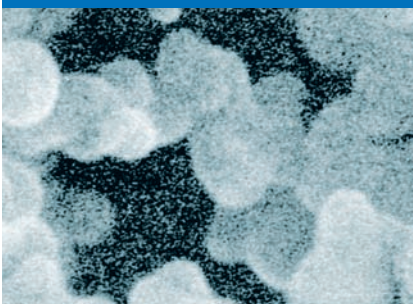
the same insulating effect, layer thicknesses can be reduced by a factor of 4 – 10 and weight by a factor of 2 – 15 with Vacupor®.

Vacupor® panels are fused under vacuum in multilayer barrier films during a special process. The evacuation of the material completely prevents any thermal transmission by convection. Vacupor® ideally combines the properties of the microporous insulating material with the advantages of vacuum insulation technology. Consequently, extremely low thermal conductivity coefficients of < 5 mW/(m*K) are achieved.

Quality assurance included

All Vacupor® B2-S types have a general technical approval by the German Institute for Building Technology (DIBt). Porextherm is certified according to ISO 9001 and ISO 14001 (environment management system). The authorized products are externally monitored by the FIW in Munich. Furthermore, Porextherm is a member of the Güteschutzgemeinschaft Hartschaum e.V. (GSH) [Rigid Foam Quality Assurance Association] and fulfills the criteria for quality assurance according to RAL-RZ 960.

Structure of the fumed silica



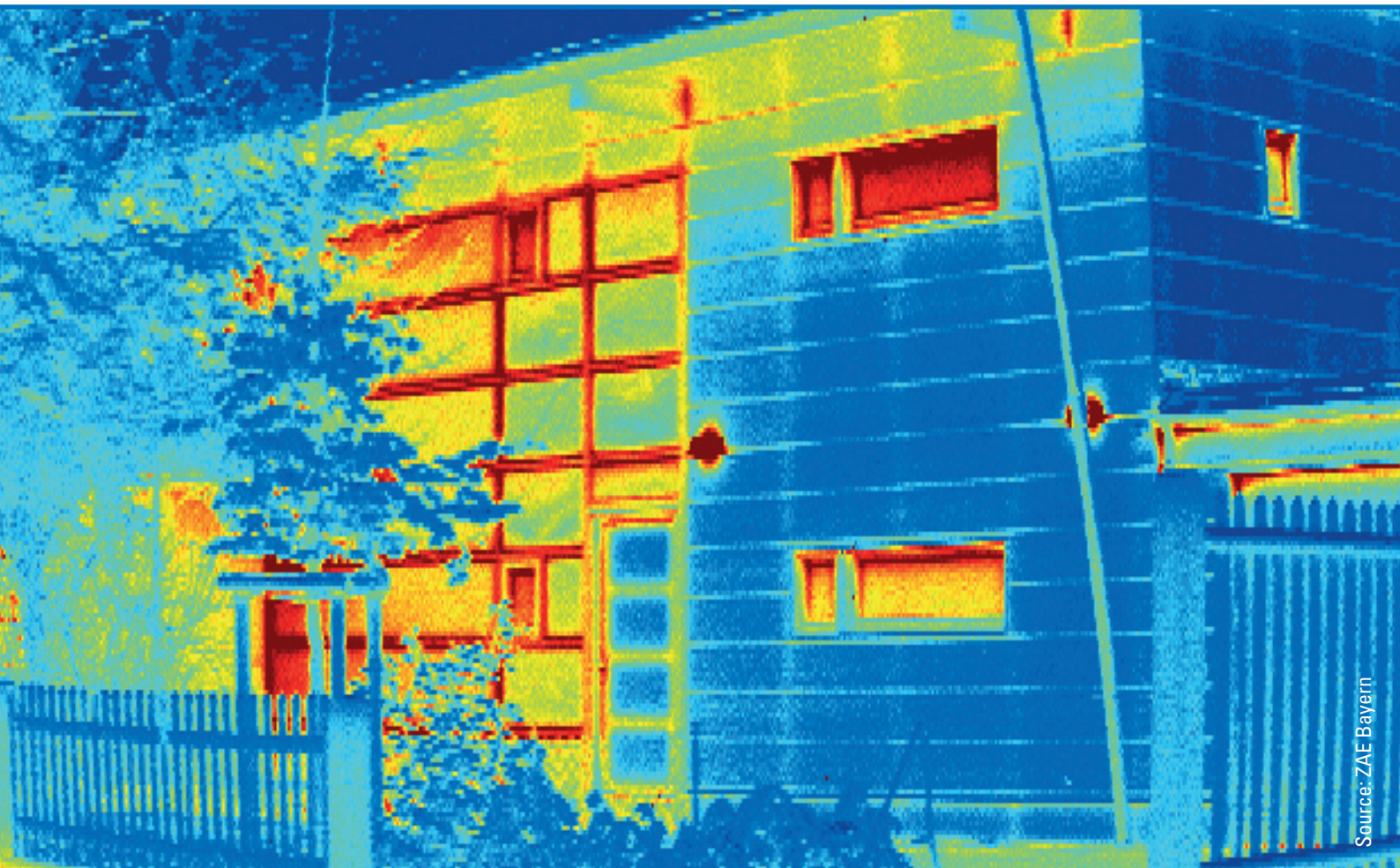
Filaments for strength



Opacifiers



VACUPOR® – STATE OF THE ART INSULATION FOR FLOORS, WALLS AND ROOFS



VACUPOR® in a range of different versions

*The innovative thermal insulation systems –
successfully used world wide*

PRACTICAL REFERENCES FOR INNOVATIVE INSULATION SYSTEMS

Reference properties all over the world prove the many advantages of Vacupor®

Vacupor® is already in frequent use as a structural and functional solution in various applications in the building industry sector

Floors

- flooring
- patios/attics
- balcony insulation
- ceilings
- basement ceilings

Walls

- facades
- facade elements
- external thermal insulation composite systems (ETICS)
- window reveals
- roller shutter boxes
- radiator recesses
- entrance door panels

Roofs

- roof terraces
- flat roofs
- sloping roofs
- dormers

Consequently, during renovations for example, the limited thickness of the



material also caters for aesthetic demands in addition to the functional requirements. Markedly less shading of windows for instance owing to a slimmer wall structure. In the case of patios, Vacupor® is characterized by a high compressive strength and allows smooth transitions owing to very low structural heights. In the flat roof area, thin energy-saving renovations are made possible in which readjusting the balustrade is not required.

Perfect insulation through proper planning

Once preliminary planning has been completed, the VIPs are manufactured to size and can be simply built in at the

construction site according to a laying plan.

Environment-friendly and completely recyclable

The materials used are environment-friendly and can be simply recycled if necessary.

Special information

Clients, planners and processors are provided further information about structural and technical details through our specific application brochures on the topics of walls, floors and ceilings.

Also consult the website:

www.bau-vip.com

Proper planning is the key



Efficiency in land use



Implement innovative building methods



VACUPOR® – OUR TECHNICALLY APPROVED PRODUCT RANGE

Allgemeine
bauaufsichtliche
Zulassung

DIBt

Deutsches Institut für Bautechnik
ANSTALT DES ÖFFENTLICHEN RECHTS

Zulassungsstelle für Bauprodukte und Bauarten
Bautechnisches Prüfam
Mitglied der Europäischen Organisation für
Technische Zulassungen EOTA und der Europäischen Union
für das Agrément im Bauwesen UEA to

Tel.: +49 30 78730-0
Fax: +49 30 78730-320
E-Mail: dibt@dibt.de

Datum:
1. Juli 2010

Geschäftszeichen:
II 51-1.23.11-567/09.3

Geltungsdauer bis:
30. Juni 2015

Zulassungsnummer:
Z-23.11-1662

Antragsteller:
Porextherm Dämmstoffe GmbH
Helsinger Straße 8, 87437 Kempten

Zulassungsgegenstand:

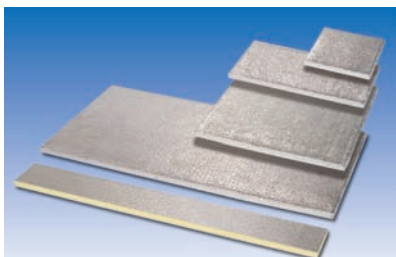
Vakuum-Wärmedämmplatten aus Kieselsäure
"Vacupor NT-B2", "Vacuspeed" und "Vacupor NT-B2-S"
"Vacupor PS-B2" und "Vacupor PS-B2-S"
"Vacupor RP-B2" und "Vacupor RP-B2-S"
"Vacupor XPS-B2" und "Vacupor XPS-B2-S"
"Vacupor TS-B2" und "Vacupor TS-B2-S"

The new Vacupor® S-types

*With a further improved rated value
of 0.007 W/(m · K)*

THE CUSTOMIZED VIPs – TO SUIT YOUR APPLICATION

New: Vacuspeed®



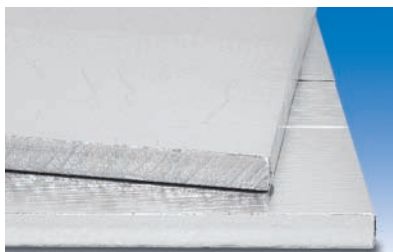
The system for rapid laying – especially in the floor area

Rated value:

Vacuspeed® 0,008 W/(m·K)

Application areas: DAD, DAA, DZ, DI, DEO, WAB, WAA, WH, WTR, WI and for facade panels

Vacupor® NT



For all applications with excellent λ values

Rated value:

Vacupor NT-B2-S 0,007 W/(m·K)

Application areas: DAD, DAA, DZ, DI, DEO, WAB, WAA, WH, WTR, WI and for facade panels

Vacupor® RP



Suitable for all floor applications

Rated value:

Vacupor RP-B2-S 0,007 W/(m·K)

Application areas: DAD, DAA, DZ, DI, DEO, WAB, WAA, WH, WTR, WI and for facade panels

Vacupor® PS



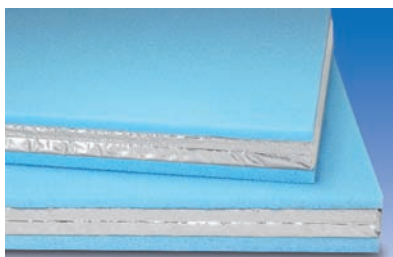
Polystyrene lamination – ideal for facade insulation

Rated value:

Vacupor PS-B2-S 0,007 W/(m·K)

Application areas: DAD, DZ, DI, DEO, WAB, WAA, WH, WTR, WI and for facade panels

Vacupor® XPS



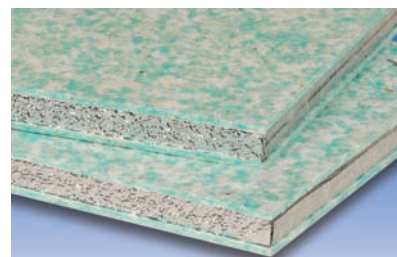
Thin XPS lamination, e.g. for use in reveals

Rated value:

Vacupor XPS-B2-S 0,007 W/(m·K)

Application areas: DAD, DAA, DZ, DI, DEO, WAB, WAA, WH, WTR, WI and for facade panels

Vacupor® TS



Surface-laminated plastic recycling step sound insulation

Rated value:

Vacupor TS-B2-S 0,007 W/(m·K)

Application areas: DAD, DAA, DZ, DI, DEO, WAB, WAA, WH, WTR, WI and for facade panels

Porextherm is your supplier of innovative thermal insulation solutions. Since the company was founded in 1989, we have been continuously increasing our core competence in the field of microporous insulation systems and have built up a wide product portfolio with partly patented products and production processes. Based on our own research and technology, we have developed an impressive range of insulation products manufactured on our state-of-the-art production facilities in Kempten/Germany.

Our service and products can be obtained either directly from us or through one of our selected and qualified trading partners.

Authorized Porextherm partner



Porextherm Dämmstoffe GmbH

Heisinger Straße 8/10
D- 87437 Kempten
Phone: + 49 (0) 831 – 57 53 60
Fax: + 49 (0) 831 – 57 53 63
eMail: info@porextherm.com
www.porextherm.com
www.bau-vip.com