



## European Technical Approval ETA-13/0515

*English translation prepared by DIBt - Original version in German language*

**Handelsbezeichnung**  
*Trade name*

Vacupor NT-B2, Vacuspeed, Vacupor NT-B2-S, Vacupor PS-B2,  
Vacupor PS-B2-S

**Zulassungsinhaber**  
*Holder of approval*

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**Zulassungsgegenstand  
und Verwendungszweck**  
*Generic type and use  
of construction product*

Wärmedämmplatten aus Vakuum-Isolations-Paneelen (VIP)  
*Thermal insulation boards made of vacuum insulation panels (VIP)*

**Geltungsdauer:** vom  
*Validity:* from  
bis  
to

22 June 2013  
22 June 2018

**Herstellwerk**  
*Manufacturing plant*

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DEUTSCHLAND

Diese Zulassung umfasst  
*This Approval contains*

9 Seiten  
*9 pages*

## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998<sup>4</sup>, as amended by Article 2 of the law of 8 November 2011<sup>5</sup>;*
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
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- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

<sup>1</sup> Official Journal of the European Communities L 40, 11 February 1989, p. 12

<sup>2</sup> Official Journal of the European Communities L 220, 30 August 1993, p. 1

<sup>3</sup> Official Journal of the European Union L 284, 31 October 2003, p. 25

<sup>4</sup> *Bundesgesetzblatt Teil I 1998*, p. 812

<sup>5</sup> *Bundesgesetzblatt Teil I 2011*, p. 2178

<sup>6</sup> Official Journal of the European Communities L 17, 20 January 1994, p. 34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of the product and intended use

#### 1.1 Definition of the construction product

This European technical approval applies to the thermal insulation boards of vacuum insulation panels (VIP) and, if applicable, the respective top layers according to Table 1 glued on over the entire surface.

The designations of the insulation boards are mentioned in Table 1.

The thermal insulation boards consist of a supporting core of highly dispersed silicic acid, sealed under vacuum in a triple-metallized high-barrier foil. At the shorter edges of the thermal insulation boards the upper and lower foil layer is welded, and then folded down and fixated with the help of an adhesive tape. On the surface of the thermal insulation boards there are two more welding seams in the longitudinal direction, which are also fastened by means of adhesive tape on the surface.

Alternatively a circumferential sealing seam can also be formed at the edges, which is also folded down, and fixated using an adhesive tape fitting closely.

The projecting foil flaps of the laminated thermal insulation boards are hidden by the casing.

The vacuum insulation panels (without top layer) have the following dimensions (nominal dimensions):

Length:  $\geq 400$  mm

Width:  $\geq 300$  mm

Thickness: 10 mm to 50 mm

For use in edge areas and corner areas of the surface to be insulated special formats that deviate from the above longitudinal and latitudinal dimensions are possible.

The top layers have the following dimensions:

Length:  $\geq 400$  mm

Width:  $\geq 300$  mm

Thickness: see Table 1

Table 1: Designations of the insulation boards, Type and thickness of the top layers

No	Designations of the insulation board	Type of the top layer	thickness of the top layer
1	Vacupor NT-B2	-	-
2	Vacuspeed	-	-
3	Vacupor NT-B2-S	-	-
4	Vacupor PS-B2	EPS-boards, one-sided or both-sided	10 - 20 mm
5	Vacupor PS-B2-S	EPS-boards, one-sided or both-sided	10 - 20 mm

The thermal insulation boards "Vacupor NT-B2-S" and "Vacupor PS-B2-S" are the products "Vacupor NT-B2" and "Vacupor PS-B2" respectively with a heat treatment going beyond the usual drying of the supporting core before the evacuation process.

## 1.2 Intended use

The thermal insulation boards are used for the thermal insulation of walls, floors and roofs within buildings.

The thermal insulation boards may only be installed in structures where they are protected from precipitation, weathering and moisture.

Regarding the application of the thermal insulation boards, the respective national provisions shall in addition also be observed.

The provisions made in this European technical approval are based on an assumed working life of the thermal insulation boards of 25 years, provided that the conditions laid down in sections 4.2, 5.1 and 5.2 for packaging, transport, storage, installation and use are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## 2 Characteristics of the product and methods of verification

### 2.1 Composition and manufacturing processes

Depending on composition and manufacturing processes the thermal insulation boards shall comply with those on which the approval tests were based. Composition and manufacturing process are deposited with Deutsches Institut für Bautechnik. On this point, see also clause 4.1.

### 2.2 Dimensions (length, width, thickness)

Length and width of the vacuum insulation panels (without top layer) are determined according to EN 822:1994-11. The deviations of the measured single values from the specified nominal dimensions amount to a maximum of  $\pm 5$  mm.

The thickness shall be determined in accordance with EN 823:1994-11. No test result deviates from the nominal thickness by more than  $\pm 10$  %.

Length and width of the top layers shall be determined in accordance with EN 822.

The thickness shall be determined in accordance with EN 823 and does not deviate from the values given in Table 1 by more than  $\pm 1$  mm.

### 2.3 Nature (squareness, flatness)

The vacuum insulation panels shall be of uniform thickness at all points. They shall have straight and parallel edges.

The vacuum insulation panels shall be rectangular and their surfaces even.

When testing the squareness in accordance with EN 824:1994-11 on 10 boards, the deviation for each individual measurement in longitudinal and width direction amounts to a maximum of 6 mm/m of the respective length of the leg.

The deviation from flatness, tested according to EN 825:1994-11, is not more than 4 mm/m.

### 2.4 Density

Each single value of the density of the vacuum insulation panels (without top layer) amounts a minimum of  $170 \text{ kg/m}^3$  and a maximum of  $210 \text{ kg/m}^3$  when tested according to EN 1602:1997-01.

### 2.5 Mass per unit area of the multi-layer metallized high-barrier foil

The mass per unit area of the multi-layer metallized high-barrier foil amounts to at least  $100 \text{ g/m}^2$ .

## 2.6 Thermal conductivity

The thermal conductivity of the vacuum insulation panels at a reference temperature of 10 °C is determined according to the standard EN 12667:2001-01. The top layers are neglected.

The nominal value of the thermal conductivity is based on a limit value which must not be exceeded during production (category 2). The limit value of the thermal conductivity under dry conditions (before ageing) amounts to  $\lambda_{10,dry,limit} = 0.0053 \text{ W/(m}\cdot\text{K)}$  for "Vacupor NT-B2", "Vacupor PS-B2" and "Vacuspeed" as well as  $\lambda_{10,dry,limit} = 0.0044 \text{ W/(m}\cdot\text{K)}$  for "Vacupor NT-B2-S" and "Vacupor PS-B2-S".

The nominal value of the thermal conductivity taking into account the thermal bridge effect and ageing, determined according to the EOTA assessment criteria, is:

for "Vacupor NT-B2", "Vacupor PS-B2" and "Vacuspeed"  $\lambda_D = 0.0077 \text{ W/(m}\cdot\text{K)}$  (category 2)

for "Vacupor NT-B2-S" and "Vacupor PS-B2-S"  $\lambda_D = 0.0066 \text{ W/(m}\cdot\text{K)}$  (category 2)

The nominal value is determined as follows in accordance with the EOTA assessment criteria:

$$\lambda_D = (\lambda_{10,dry,limit} + \Delta\lambda_a) \cdot F_{tb} \cdot F_h$$

where  $\Delta\lambda_a = 0.0010 \text{ W/(m}\cdot\text{K)}$  – increase in thermal conductivity after ageing method

$F_{tb} = 1.10$  – Correction factor for the thermal bridge effect

$F_h = 1.10$  – Correction factor for the effect of moisture

## 2.7 Compressive stress at 10 % deformation

When testing the thermal insulation boards according to EN 826:1996-05 each single value of the compressive stress at 10 % deformation is at least  $\sigma_{10\%} = 180 \text{ kPa}$ .

## 2.8 Dimensional stability under specified temperature and humidity

The dimensional stability at 70 °C and 90 % relative humidity shall be determined according to EN 1604:2007-06.

The relative changes in length, width and thickness of the thermal insulation boards do not exceed the value of 1 %.

## 2.9 Deformation under specified compressive load and temperature

The deformation shall be determined at 40 kPa and 70 °C (168 h) according to EN 1605:2007-06

The change in thickness of the vacuum insulation panels (without top layer) amounts to a maximum of 3 %.

## 2.10 Tensile strength perpendicular to faces

The tensile strength of the thermal insulation boards perpendicular to faces shall be determined according to EN 1607:1997-01. No test result falls below the value of 30 kPa.

## 2.11 Reaction to fire

The reaction to fire of the thermal insulation boards is tested according to the standard EN ISO 11925-2:2010 and classified according to the standard EN 13501-1:2007+A1:2009-09.

The thermal insulation boards meet the requirements of class E according to EN 13501-1.

## 2.12 Internal pressure

The internal pressure of the vacuum insulation panels shall be determined 24 hours after the production by means of a laser distance meter<sup>7</sup>.

The internal pressure must not exceed the value of 5 mbar on delivery of the VIP elements.

<sup>7</sup>

Measurement of the internal pressure by means of a foil lift-off process.

### 2.13 Behaviour under point load

The behaviour under point load at 5% deformation is determined according to EN 12430:1998+A1:2006. The point load  $F_p$  amounts to at least 500 N for "Vacupor NT-B2" and at least 400 N for "Vacupor PS-B2".

### 2.14 Tensile strength of the multi-layer metallized high-barrier foil

The tensile strength of the multi-layer metallized high-barrier foil shall be determined in accordance with EN ISO 527-3 before and after ageing according to the EOTA assessment criteria.

In the as-delivered condition and after ageing the tensile strength is at least 80 MPa.

### 2.15 Oxygen permeability of the multi-layer metallized high-barrier foil

No performance determined.

### 2.16 Release of dangerous substances or radiation

Note: In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

## 3 Evaluation and attestation of conformity and CE marking

### 3.1 System of attestation of conformity

According to Decision 1999/91/EC<sup>8</sup> of the European Commission amended by Decision 2001/596/EC<sup>9</sup> system 3 of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 3: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
  - (1) factory production control;
- (b) Tasks for the approved body:
  - (2) initial type-testing of the product.

Note: Approved bodies are also referred to as "notified bodies".

### 3.2 Responsibilities

#### 3.2.1 Tasks for the manufacturer

##### 3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this European technical approval.

The manufacturer may only use raw materials listed in the technical documentation of this European technical approval.

<sup>8</sup>

Official Journal of the European Communities L 29/44, 03.02.1999

<sup>9</sup>

Official Journal of the European Communities L 209/33, 02.08.2001

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.<sup>10</sup>

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

#### 3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks in the field of the construction product referred to in section 3.1, in order to undertake the actions laid down in section 3.2.2. For this purpose the control plan according to sections 3.2.1.1 and 3.2.2 shall be handed over to the approved body by the manufacturer.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

#### 3.2.2 Tasks for the approved bodies

The approved body shall perform the following tasks in accordance with the provisions of the control plan:

- initial type-testing of the product.

For the initial type-testing, the results of the tests performed for granting the European technical approval can be used, unless there are changes in the production or at the manufacturing plant. Otherwise the necessary initial type-testing shall be coordinated between Deutsches Institut für Bautechnik and the approved bodies involved.

The approved body shall retain the essential points of its actions referred to above and document the results obtained and conclusions drawn in a written report.

### 3.3 CE marking

The CE marking shall be affixed to the packaging or on the accompanying commercial documents, e.g. EC declaration of conformity. The letters "CE" shall be followed by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the European technical approval,
- identification of the product (trade name),
- nominal value of the thermal conductivity for category 2,
- reaction to fire: class E according to EN 13501-1,
- compressive stress at 10 % deformation,
- nominal dimensions of length, width and thickness.

<sup>10</sup>

The control plan is a confidential part of the European technical approval and only handed over to the approved bodies involved in the procedure of attestation of conformity. See section 3.2.2.

#### **4 Assumptions under which the fitness of the product for the intended use was favourably assessed**

##### **4.1 Manufacturing**

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, shall be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and, if appropriate, whether an additional assessment or alteration to the approval, shall be necessary.

##### **4.2 Installation**

The thermal insulation boards may only be installed in structures where they are protected from precipitation, weathering and moisture.

During installation the processing instructions supplied by the manufacturer shall be taken into account. The installation of the thermal insulation boards may only be performed by specialized companies trained by the manufacturer that are kept in a list by the applicant.

The product shall be protected from moisture and mechanical damage during installation. The conditions according to clause 1.2 shall be observed.

##### **4.2.1 Parameters for the design of construction works or parts of the works**

###### **4.2.1.1 Design value of thermal conductivity**

The design value of thermal conductivity of the vacuum insulation panels shall be determined according to the relevant national regulations.

The top layers shall be omitted for the calculation of the thermal resistance of the components.

###### **4.2.1.2 Nominal thickness**

When calculating the thermal resistance, the nominal thickness of the vacuum insulation panels (without top layer) shall be applied.

##### **4.2.2 Executing companies**

The thermal insulation boards may be processed only by companies appearing on a list by the manufacturer that have sufficient experience with the installation of the product. The manufacturer shall train these companies to this effect.

During the installation the following shall in particular be observed:

- With each delivery, the thermal insulation boards shall be checked by visual inspection.
- The thermal insulation boards must not be mechanically damaged by sawing, cutting or drilling.
- The substrate for laying the thermal insulation boards shall be flat.
- Adequate protection of the thermal insulation boards from damage shall be ensured also during the working phase, for example, by attaching a facing shell.



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## **5 Indications to the manufacturer**

### **5.1 Packaging, transport and storage**

The thermal insulation boards shall be packed such that they are protected from moisture and mechanical damage during transport and storage, and the vacuum is not destroyed by causing damage to the high-barrier foil.

### **5.2 Use, maintenance, repair**

In the information accompanying the CE marking the manufacturer shall specify that the product shall be installed following the installation instructions of the manufacturer (only by trained specialized companies according to 4.2.2) and shall be protected from moisture and mechanical damage during transport, storage and installation.

Dirk Brandenburger  
Head of Department

*beglaubigt:*  
Iffländer