

# Vacupor<sup>®</sup> TS-B2-S

Building authorities approved Vacuum-Insulation-Panel (VIP) with sound absorbing recycling plastic boards

## Characteristics

Vacupor<sup>®</sup> TS-B2-S is a microporous insulation material with an extremely low coefficient of thermal conductivity, i.e. with very good insulating properties. Vacupor<sup>®</sup> TS-B2-S consists of inorganic oxides. The main constituent is fumed silica. The other components are opacifiers for minimizing infrared radiation, and fiber filaments as reinforcing fillers.

The low density and the specially developed IR- opacifiers contained in these grades greatly reduce the thermal conductivity of Vacupor<sup>®</sup> TS-B2-S systems.

For protection purposes, both sides of the panel are already covered with a sound absorbtionsrecycling plastic board.

The German Institute for civil engineering (DIBt) granted the approval by the building authorities for Vacupor<sup>®</sup> TS-B2-S under the certification number Z-23.11-1662.

Vacupor<sup>®</sup> TS-B2-S confirms to Baustoffklasse B2. The test of behaviour in case of fire according to DIN 4102-1, May 1998, Baustoffklasse B2; test- certificate No. H.3-59/10, was issued by the Forschungsinstitut für Wärmeschutz e.V. Munich.

The core material of Vacupor<sup>®</sup> TS-B2-S is not flammable and is classified A1 according to DIN ISO EN 13501-1.

Vacupor<sup>®</sup> TS-B2-S is heat sealed in a barrier film under vacuum. The very low internal pressure and the microporous panel core is responsible for the extremely low thermal conductivity values.

## Application

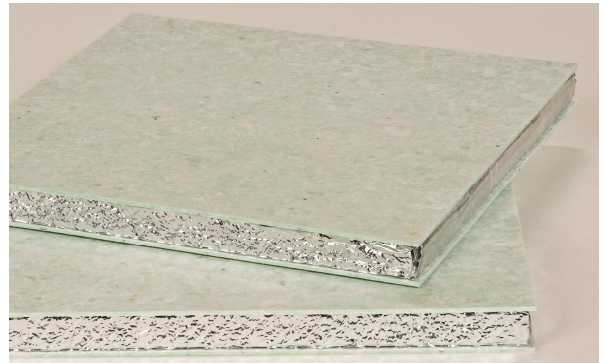
Due to the single- or double- sided coverage with sound absorbtion recycling plastic boards, Vacupor<sup>®</sup> TS-B2-S is excellently suitable for all kinds of plane layings. The construction of the insulation gets considerable easier and the VIPs can be entered without danger of damaging.

The fixing of the insulation is substantially facilitated, through the possibility of bonding with commercial adhesives.

The approval is valid for construction applications DAD, DAA, DZ, DI, DEO, WAB, WAA, WH, WTR and WI according to standard DIN 4108-10, table 1 and for prefabricated façade panels with insulated glass character.

Vacupor<sup>®</sup> TS-B2-S is also used as insulation material in the following applications:

- Reveal insulation
- Insulation of basement ceilings
- Insulation of roller shutter casings
- Insulation of internal floors



## Form of delivery

### 1. Standard sizes:

- 1000 mm x 500 mm
- 500 mm x 500 mm
- 500 mm x 250 mm
- 250 mm x 250 mm

### 2. Standard thicknesses (without protection):

- 10 mm, 15 mm, 20 mm, 25 mm, 30 mm, 35 mm, 40 mm, 45 mm, 50 mm

### 3. Embodiment

- both sides with a 4 mm sound absorbtion board

### 4. Special formats and thicknesses are available on request

## Restrictions on Applications

The laminated aluminum foil of the Vacupor<sup>®</sup> TS-B2-S must not be damaged by drilling, cutting, milling, nailing or the like, since the interior pressure of the panel will rise and the special properties of the panel, in particular its excellent insulation characteristics, will be lost.

## Shelf life

Vacupor<sup>®</sup> TS-B2-S has a very long shelf life. Please observe our pressure rise table: Thermal conductivity as a function of interior pressure.

## Product data

Properties (applicable to standard format)	Comments	Standards	Units	Values
Color	Caused by film / coverage			Silver / green
Density <sup>1)</sup>			kg / m <sup>3</sup>	170-210
Thermal conductivity	@ 1 mbar <sup>2)</sup> @ ambient pressure	Measured at 22,5°C (72.5°F) mean temperature	DIN 52612 W / (m × K) W / (m × K)	≤ 0,005 ≤ 0,019
Rated value	According to DIBt approval number Z-23.11-1662		W / (m × K)	0,007
Heat resistance <sup>3)</sup>	Caused by film weld seam		°C	-50 <T< 120
Maximum film projection			mm	0
Interior pressure <sup>2)</sup>	As delivered		mbar	≤ 5
Theoretical pressure rise	Under standard conditions		mbar / a	~ 1,0
Maximum panel dimensions	Length Breadth Thickness		mm mm mm	150 - 1500 150 - 1000 10 - 50
Length and width tolerances	0 bis 500 mm 501 bis 1000 mm > 1000		mm mm mm	+ 1,0 / - 2,0 + 1,0 / - 4,0 + 1,0 / - 6,0
Thickness tolerances	< 20 mm 20 mm bis 30 mm > 30 mm		mm mm mm	± 1,0 + 1,0 / - 2,0 + 1,0 / - 3,0
Thermal shock resistance	Vacupor <sup>®</sup> TS-B2-S (core material) is insensitive to high and low temperature thermal shocks			

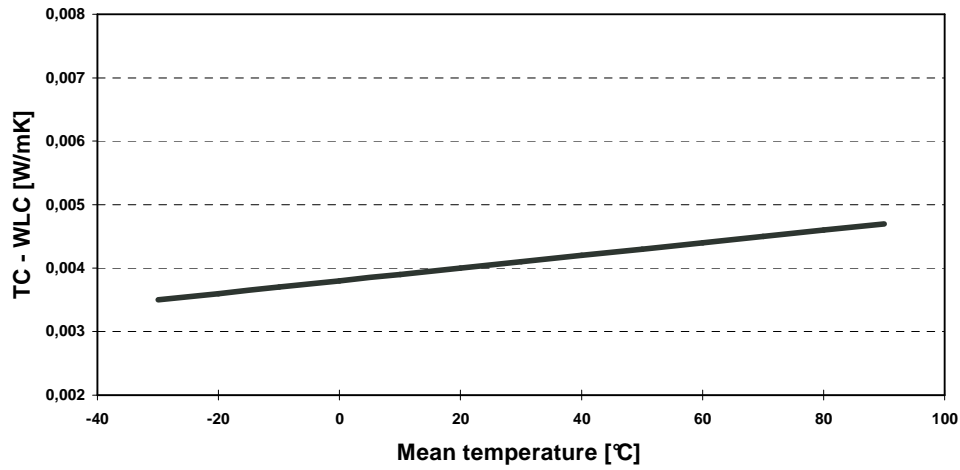
<sup>1)</sup> Dependent on board thickness

<sup>2)</sup> Dependent on the panel-size and -thickness, internal pressure can be between 0.5 – 5 mbar. The standard internal pressure in the evacuation chamber is < 0.5 mbar.

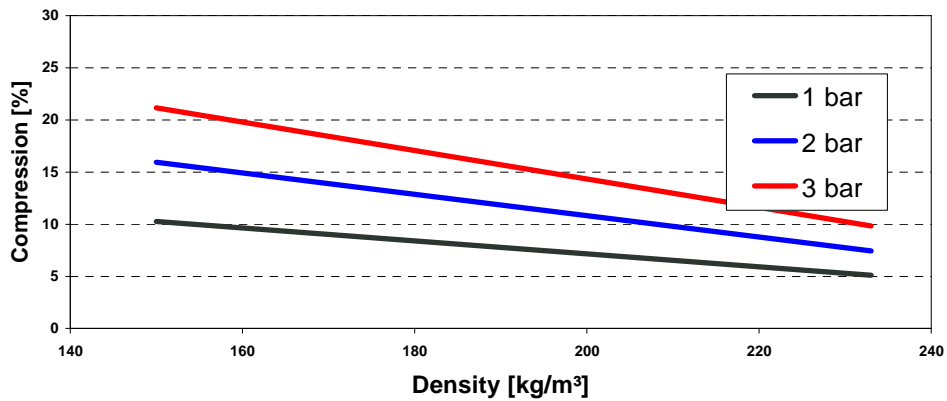
<sup>3)</sup> The limits are fixed by the barrier film (sealing material) used; constant load: ≤ 80°C (176°F); short load time with 120°C (248°F): roughly 30 minutes.

The above data are only intended as a guide and should not be used in preparing specifications.

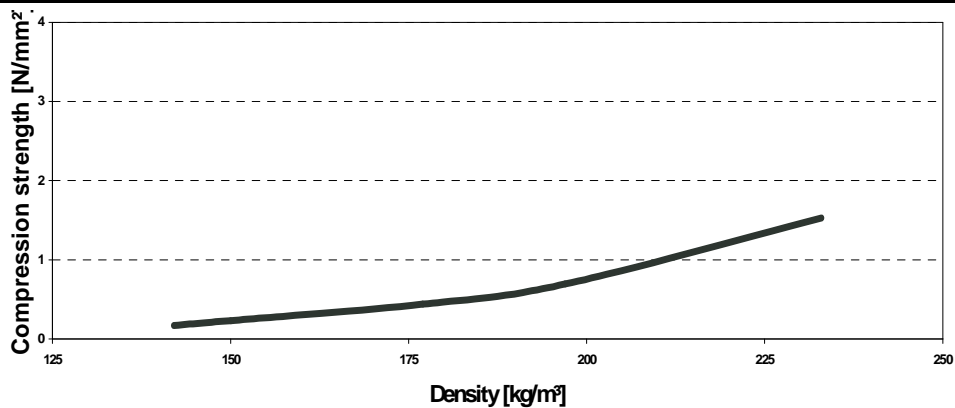
### Thermal conductivity (panel core) DIN 52612



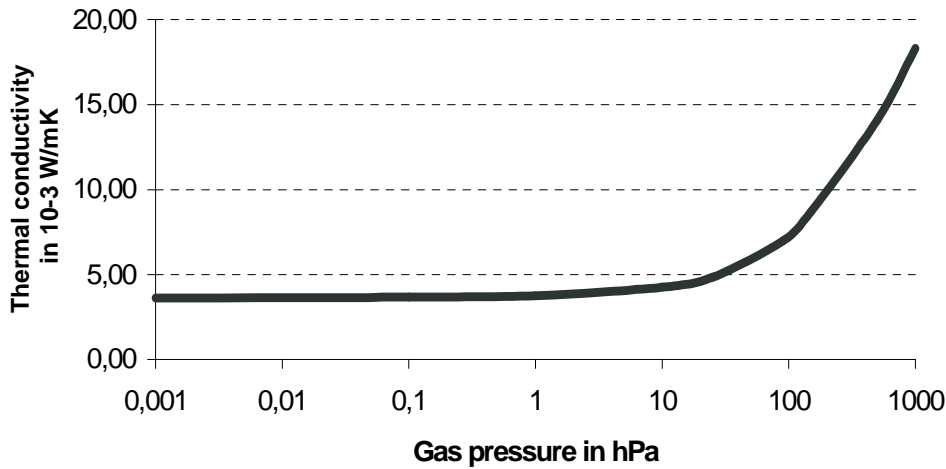
### Compression behavior (panel core)



### Low-temp. Compression strength (panel core)



## Thermal conductivity as a function of internal pressure ( DIN 52612 )



gas pressure $p_{\text{gas}}$ [ hPa ]	U- Value [ W/(m <sup>2</sup> K) ]	$\lambda$ [ 10 <sup>-3</sup> W/(mK) ]
< 10 <sup>-3</sup>	0.187	3.63
0.1	0.188	3.66
1.0	0.193	3.75
10	0.219	4.25
150	0.448	8.70
1000	0.943	18.30

### Safety directions

Vacupor® TS-B2-S is not a hazardous material as defined in EU directive 2006/1907/EEC.

Please also observe our material safety data sheet. Vacupor® TS-B2-S does not liberate hazardous decomposition products and, as far as is known at present, does not cause any problems to human health or the environment.

The data presented in this leaflet are in accordance with the present state of our knowledge, but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this leaflet should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The recommendations do not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.

Please address all technical questions that affect quality and product safety to:

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