

# Vacupor<sup>®</sup> NT

## Characteristics

Vacupor<sup>®</sup> NT is a microporous insulation material with an extremely low coefficient of thermal conductivity, i.e. with very good insulating properties.

Vacupor<sup>®</sup> NT consists of inorganic oxides. The main constituent is fumed silica, the other components are opacifiers for minimizing infrared radiation, and silicates.

Vacupor<sup>®</sup> NT (core material) is not flammable and meets the requirements of IMO FTPC part 1 and DIN ISO 4102 part 1, A1.

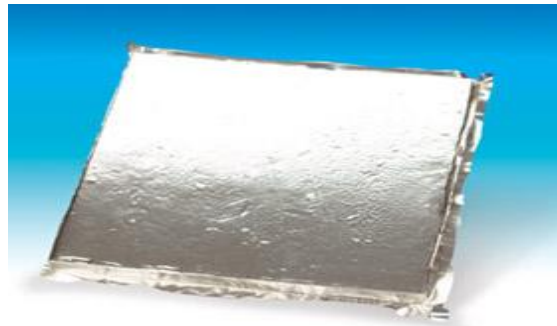
Vacupor<sup>®</sup> NT is heat sealed in a barrier film under vacuum. The very low internal pressure and the microporous panel core is responsible for the extremely low thermal conductivity values.

## Application

Vacupor<sup>®</sup> NT was specially developed for applications in vacuum insulation technology. The low density and the specially developed IR opacifiers contained in these grades greatly reduce the thermal conductivity of Vacupor<sup>®</sup> NT Systems.

**Vacupor<sup>®</sup> NT is also successfully used as insulation material in the following areas:**

- Domestic appliances (refrigerator and freezer cabinets)
- Absorption refrigerators
- Cryogenic freezer
- Temperature controlled packaging
- Transport boxes
- Facade elements
- Terrace insulation
- Cold storage floor insulation
- Tank container insulation



## Form of delivery

### 1. Standard sizes:

- 600 mm x 250 mm
- 1000 mm x 300 mm
- 600 mm x 500 mm
- 1200 mm x 500 mm
- 1000 mm x 600 mm
- 1200 mm x 1000 mm

### 2. Standard thicknesses:

- 10 mm, 15 mm, 20 mm, 25 mm, 30 mm
- Further thicknesses on request

### 3. Special formats available on request

## Restrictions on Applications

The laminated aluminum foil of the Vacupor<sup>®</sup> NT 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> NT has a very long shelf life. Please also observe our pressure rise table: Thermal conductivity as a function of interior pressure.

## Composition

Silicon dioxide	SiO <sub>2</sub>	approx. 80%
Silicium carbide	SiC	approx. 15%
Others		approx. 5%

## Product data

Properties (applicable to standard format)	Comments	Standards	Units	Values
Color	Caused by film			Silver
Density <sup>1</sup>			kg / m <sup>3</sup>	150-300
Thermal conductivity @ 1 mbar <sup>2</sup> @ ambient pressure	Measured at 22,5 °C (72.5 °F) mean temperature	DIN 52612	W / mK W / mK	≤ 0,005 ≤ 0,019
Heat resistance <sup>3</sup>	Caused by film weld seam		°C	-50 <T< 120
Maximum film projection			mm	100
Interior pressure <sup>2</sup>	As delivered		mbar	≤ 5
Theoretical pressure rise	Under standard conditions		mbar / a	0,5
Maximum panel dimensions	Length Breadth Thickness		mm mm mm	150 - 2200 150 - 1000 10 - 50
Length tolerances	0 to 500 mm 501 to 1000 mm > 1000 mm		mm mm mm	+ 1,0 / - 2,0 + 1,0 / - 4,0 + 1,0 / - 6,0
Thickness tolerances	< 20 mm 20 mm to 30 mm > 30 mm		mm mm mm	± 1,0 + 1,0 / - 2,0 + 1,0 / - 3,0
Thermal shock resistance	Vacupor <sup>®</sup> NT (core material) is insensitive to high and low temperature thermal shocks			

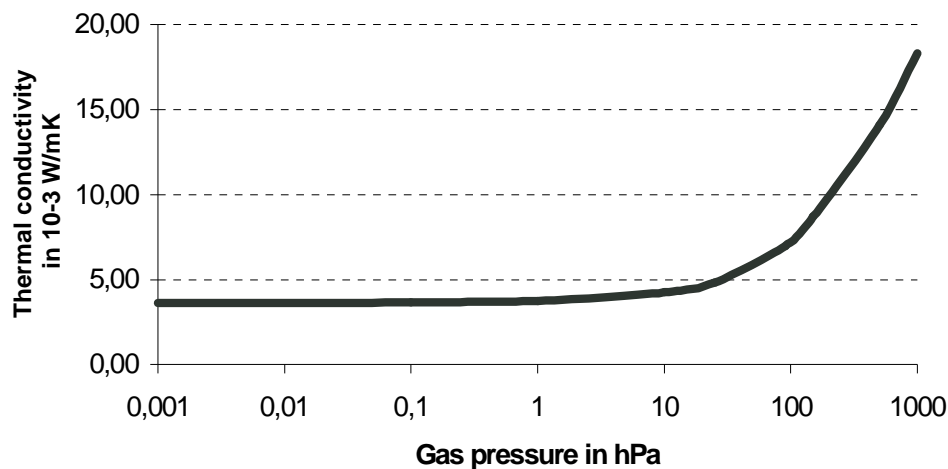
<sup>1</sup> Dependent on board thickness

<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.

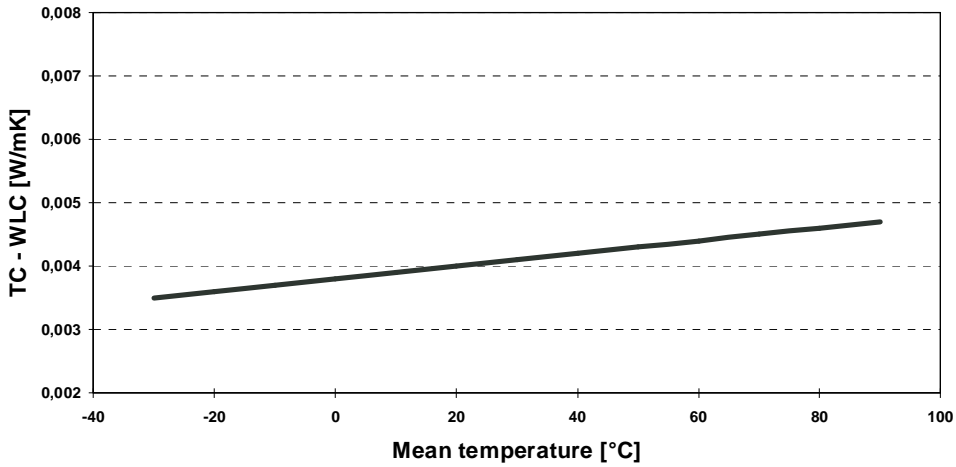
The above data are only intended as a guide and should not be used in preparing specifications.

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

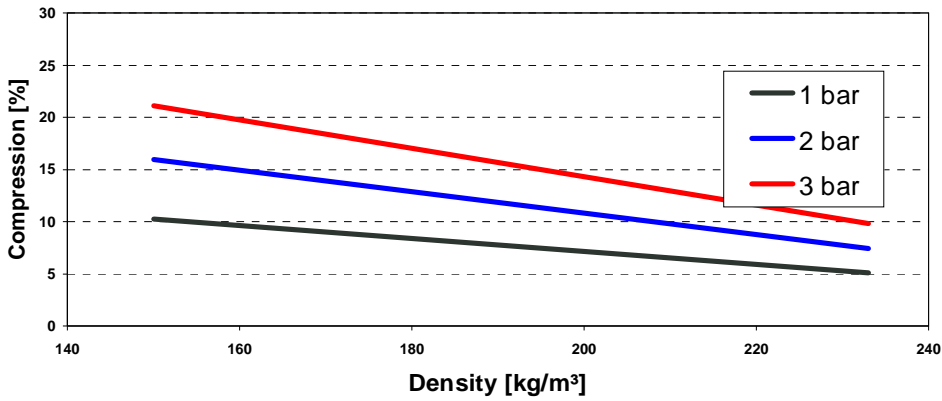


gas pressure $p_{\text{gas}}$ [ hPa ]	U- Value [ W/(m <sup>2</sup> K) ]	I [ 10 <sup>-3</sup> W/(mK) ]
< 10 <sup>-3</sup>	0.187	3.63
0.1	0.188	3.66
1.0	0.193	3.75
10	0.219	4.25
150	0.448	8.70
1000	0.943	18.30

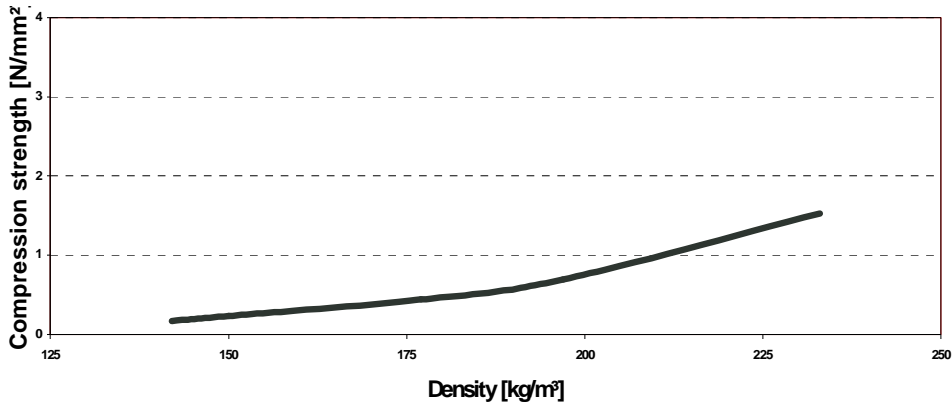
**Thermal conductivity (panel core) DIN 52612**



**Compression behavior (panel core)**



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



## Safety directions

Vacupor<sup>®</sup> NT is not a hazardous material as defined in EU directive 91/155/EEC. Please also observe our material safety data sheet.

Vacupor<sup>®</sup> NT 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.

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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.



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