



Reference:

Knaus Tabbert: impressively comfortable thanks to HICOTEC® TP films from Frenzelit.

Knaus Tabbert, Mottgers / Germany

GASKETS

TECHNICAL TEXTILES

EXPANSION JOINTS

INSULATION

NEW MATERIALS



creating
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solutions

Caravan manufacturing

Frenzelit HICOTEC® TP in caravans:

Feel-good technology makes cold feet a thing of the past

The times of spartan boxes on wheels offering minimum comfort are over. People who have caravans nowadays are not looking for an alternative to the comfort they enjoy at home; on the contrary, they expect their mobile home to meet the same high standards. The new KNAUS and TABBERT caravans and RVs satisfy 5-star feel-good requirements, including underfloor heating. An extremely thin high-tech film from Frenzelit, which converts a small amount of electricity into a large amount of heat, puts an end to cold feet.



Villa on wheels: top model "TABBERT Puccini".

HICOTEC® TP leaves no caravan enthusiast cold

The unique HICOTEC® TP (= Thermal Power) heating system is a development by the "New Materials" Division of Frenzelit-Werke GmbH & Co. KG (Bad Berneck / Germany). HICOTEC® TP combines composite fibre materials with electrical heating functions. The perforated composite film is a fibre-reinforced PET film with incorporated copper contacts. Since the electrical surface resistance level can be varied as required, these



HICOTEC® TP.

materials can be used as electric radiant heating elements, e.g. to heat floors, for interior components or as process heating equipment. The extremely thin film (80 μ - about 4x as thick as a human hair!) is fitted between the floor and the floor covering, without changing the height of the floor to any noticeable extent. Capacities of 95 W/m² are achieved via the low-voltage power supply system. The film guarantees consistent heat distribution over the entire surface with only minimal temperature fluctuations.

An ideal solution to create a thoroughly pleasant atmosphere in caravans, RVs, boats or other mobile environments – following very short heating-up and without motor operation.

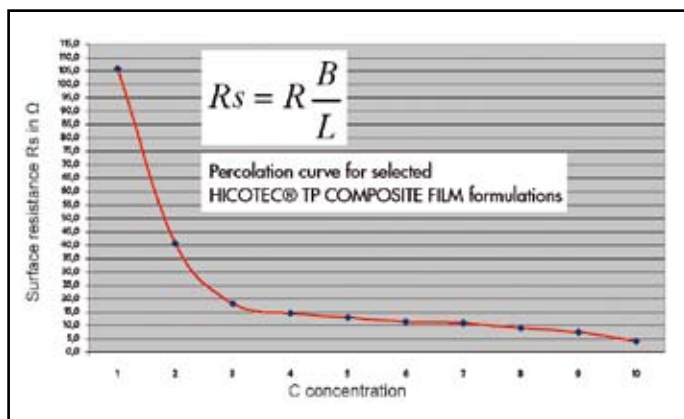


Pleasantly warm: essential for a cosy atmosphere.

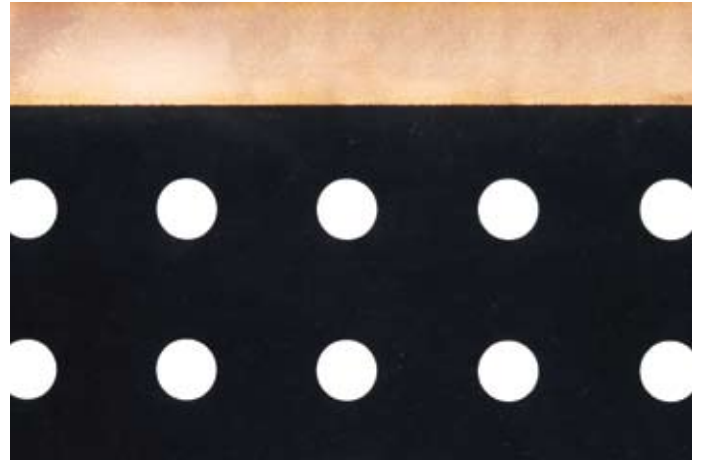
Perforation guarantees perfect bonding

These films were used for the first time at the Knaus Tabbert plant in Mottgers / Germany. The Frenzelit engineers supported Knaus Tabbert to develop, test and implement the HICOTEC® TP application in series production in the context of the development partnership between the two companies. Due to the design of the heating film, it proved to be very easy to install. The heating system is laid directly on the adhesive layer from the reel without any additional advance treatment. As a result of the perforation of the film, very good bonding can be achieved between the substrate material and the floor (PVC in the case of the KNAUS and TABBERT brands) with a single layer of adhesive. There are no noticeable differences in the height of the floor even when the material is not laid to cover it completely, since the film is extremely thin.

Thanks to the insensitivity of the film to damage and thanks to the minimal contact surfaces of the functional fibres used, it is no problem to drill holes and make cut-outs in the course of subsequent assembly operations, while no short circuiting or malfunctioning occurs when screws are attached to the floor either. A feel-good environment supplied in reels – a process that is suitable for retrofitting applications too.



Electrical conductivity depending on the C-concentration.



Perforated HICOTEC® TP film with copper conductive strip.



„TABBERT Vivaldi“ inside ...



... and outside.

Do you have any questions about your application?

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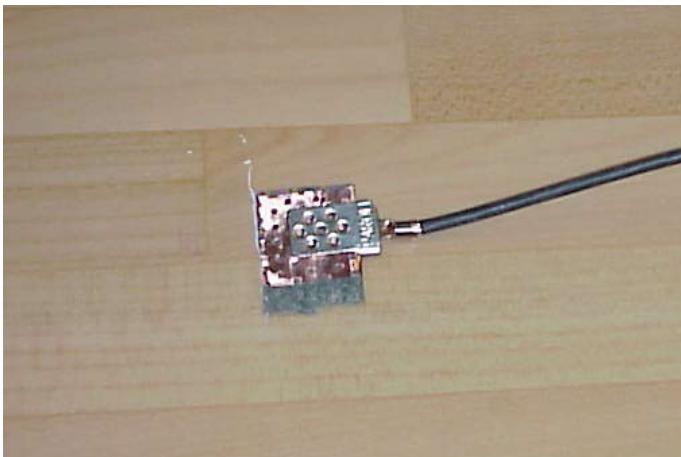
www.frenzelit.com



Innovation partners: (from left to right) Claus Müller (Frenzelit), Jürgen Stelzner (Knaus Tabbert) and Hans-Jürgen Roß (Frenzelit).



Basic operation: fitting HICOTEC® TP heating film underneath the PVC floor covering on the chassis plate.



Window to the technology: film with electricity connection.

Comfort on wheels

All the latest RVs and caravans from the Knaus Tabbert Group have been supplied with the facilities “made by Frenzelit” that are required to create a pleasantly cosy atmosphere since October 2007. This is opening up a new dimension in travel – combining face-to-face encounters with nature outdoors with an indoor environment that permits luxurious living in comfort that leaves nothing to be desired. A concept that for the very first time makes the freedom of caravan and RV travel an appealing alternative for attractive target groups.



Bird's eye view of the Mottgers plant.

Frenzelit product range



Gaskets and gasket materials

Comprehensive know-how acquired over a period of many years and process engineering skills enable Frenzelit to set new standards in the production of modern sealing materials. Frenzelit supplies a complete range of gaskets, with novaphit[®], the generation of gaskets made from pure graphite reinforced with expanded metal, the material concept novatec[®] - "engineered graphite with Kevlar[®] (a trademark registered by DuPont)", the high-pressure gasket material novapress[®], the PTFE gaskets novaflon[®] and the metal, dispenser and screen printing gaskets novaform[®].



Technical textiles

Skills in the development and processing of highly temperature-resistant fibres combined with decades of experience have made Frenzelit one of the leading manufacturers of technical textiles. The range of sealing and insulating materials consists of various product lines such as isoGLAS[®], isoTHERM[®], novaTEX[®], novaSEAL[®] and isoKERAM[®] with different temperature limits up to 1200°C.



Expansion joints

More than forty years of experience go into the production of our fabric and elastomer expansion joints for power engineering and plant manufacturing applications. Due to the extremely exacting demands made in operation, exclusive use is made of highest-quality special woven fabrics produced in-house from glass, SiO₂-glass or aramid fibres as well as the necessary coatings. PTFE composite material and PTFE, rubber and steel expansion joints round off the product range.



Insulation

The insulation range includes not only heat insulation materials such as woven fabrics, woven tapes and nonwoven fabrics from the isoGLAS[®] and isoTHERM[®] product lines but also isoplan[®] insulation panels and special materials for transport rollers used in high-temperature applications, novaplan[®] heat shielding materials and cushioning materials for acoustic insulation.



New materials

Frenzelit develops and produces a range of high-performance nonwoven materials under the name HICOTEC[®]. These materials are based on use of such high-performance fibres as carbon fibres. They have different properties from both technical textiles and high-performance papers. They are "new materials" for new application areas.



HICOTEC® TP for Knaus Tabbert



Technical data

- HICOTEC® TP: perforated composite film
- Supplied in reels up to 250 m long
- Working width: 580 mm to 1100 mm
- Thickness: 80 μ
- Basis weight: 100 g/m²
- Capacity: from 85 W/m² to 200 W/m²
- Voltage: SELV
- Perforation: 18 % free area (typical figure)
- Temperature range: 27 to 29 °C

Yes, we are interested in HICOTEC® TP.

Please send us the following, with no commitment for us:

- Detailed information material
- Please arrange an appointment with us.

Surname, first name

Company

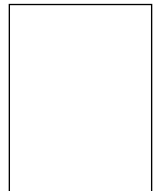
Address

Postcode, town/city

Country

Telephone/fax

E-mail



Reply

Frenzelit-Werke GmbH & Co. KG
P.O.Box 11 40
95456 Bad Berneck
Germany

Frenzelit: „creating high-tech solutions“ Innovations today for the world tomorrow

Frenzelit-Werke GmbH & Co. KG develops, produces and sells high-pressure gaskets, technical textiles for insulation, sealing and filtration as well as expansion joints for plant engineering. About 400 employees work at the production facilities in Frankenhammer and Himmelskron in Germany. Subsidiaries and sales offices in the USA, Russia, the Czech Republic, China and India are impressive evidence of the global presence that the medium-sized company from Upper Franconia in Southern Germany has established. The managing partner is Dr Wolfgang Wagner. Frenzelit was founded in 1881. The company has ISO 14001 environmental management certification; quality certification has been obtained by the gaskets and technical textiles divisions (ISO/TS 16949:2002) and the expansion joints division (ISO 9001:2000).

HICOTEC® TP: advantages at a glance:

- Extremely light
- Extremely thin
- Heat efficiency level of almost 100 %
- Customised application
- Incorporated flush copper circuit
- Insensitive to damage
- Can be perforated
- Contacts that resist ageing
- Easy bonding



Solution partners

Jürgen Stelzner,
master electrician, Installation Engineering Manager at Knaus Tabbert Group GmbH, Mottgers plant:



"It frequently takes years to discover what an idea is really worth. Or – like in this case – just a few seconds. The technology of the HICOTEC® TP radiant heating system combines high capacity with minimum weight and minimum space. Which, in turn, gives our interior designers the freedom to think about using the material not only for underfloor heating but also for wall and ceiling applications or underneath mattresses."

Thomas Breinfalk,
Central Marketing Manager at KNAUS TABBERT GROUP GMBH:



"More mobility automatically means less space but neither less comfortable living nor less effective heating. A highly impressive combination of space, comfort and value for money is what makes the Knaus and Tabbert brands so distinctive. The innovative radiant heating system, for which no space has to be sacrificed, is helping us to stand out from the competition even more effectively."

Claus Müller,
engineering graduate, New Business Development Manager at Frenzelit-Werke GmbH & Co. KG:



"The innovative HICOTEC® TP radiant heating system enables the manufacturers of RVs or caravans to enter a new comfort dimension without making any sacrifices where their interior design concepts are concerned. Because the extremely thin film increases the height of the floor so little that it is not even noticeable. The potential applications for HICOTEC® TP have not been exhausted by a long way once it has been used for "classic" underfloor heating. There are plenty of other innovative openings for HICOTEC® TP in caravans that have not been exploited yet."

Hans-Jürgen Roß,
physics graduate, development department, gaskets/new materials division at Frenzelit-Werke GmbH & Co. KG:



"The morphology of membrane materials reinforced with long fibres leads with the use of reinforcement fibres that conduct electricity to antistatic films which are an appropriate choice as radiant heating elements for underfloor systems or interior components when the electrical surface resistance level is set accurately."

KNAUS TABBERT: individual travel in natural surroundings

Knaus Tabbert Group GmbH was formed from Knaus KG, which was established by Helmut Knaus sen. in Marktbreit / Germany in 1960. KNAUS TABBERT has about 1 600 employees today. More than 20 000 caravans and RVs were sold in the 2006/2007 financial year, generating sales of EUR 330 million. The headquarters of the company is in Jandelsbrunn / Germany. Further locations are in Mottgers / Germany and Nagyoroszi / Hungary. The corporate group supplies six independent brands of state-of-the-art RVs and caravans (KNAUS, TABBERT, T@B, WILK, WEINSBERG and EIFELLAND) throughout Europe. Dipl.-Kfm. Thomas Dickenberger is the Chairman of the Management Board of Knaus AG.

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