Customer-oriented high-tech solutions
for thermal and acoustic insulation.

- GASKETS
- TECHNICAL TEXTILES
- EXPANSION JOINTS
- INSULATION
- NEW MATERIALS

Frenzelit

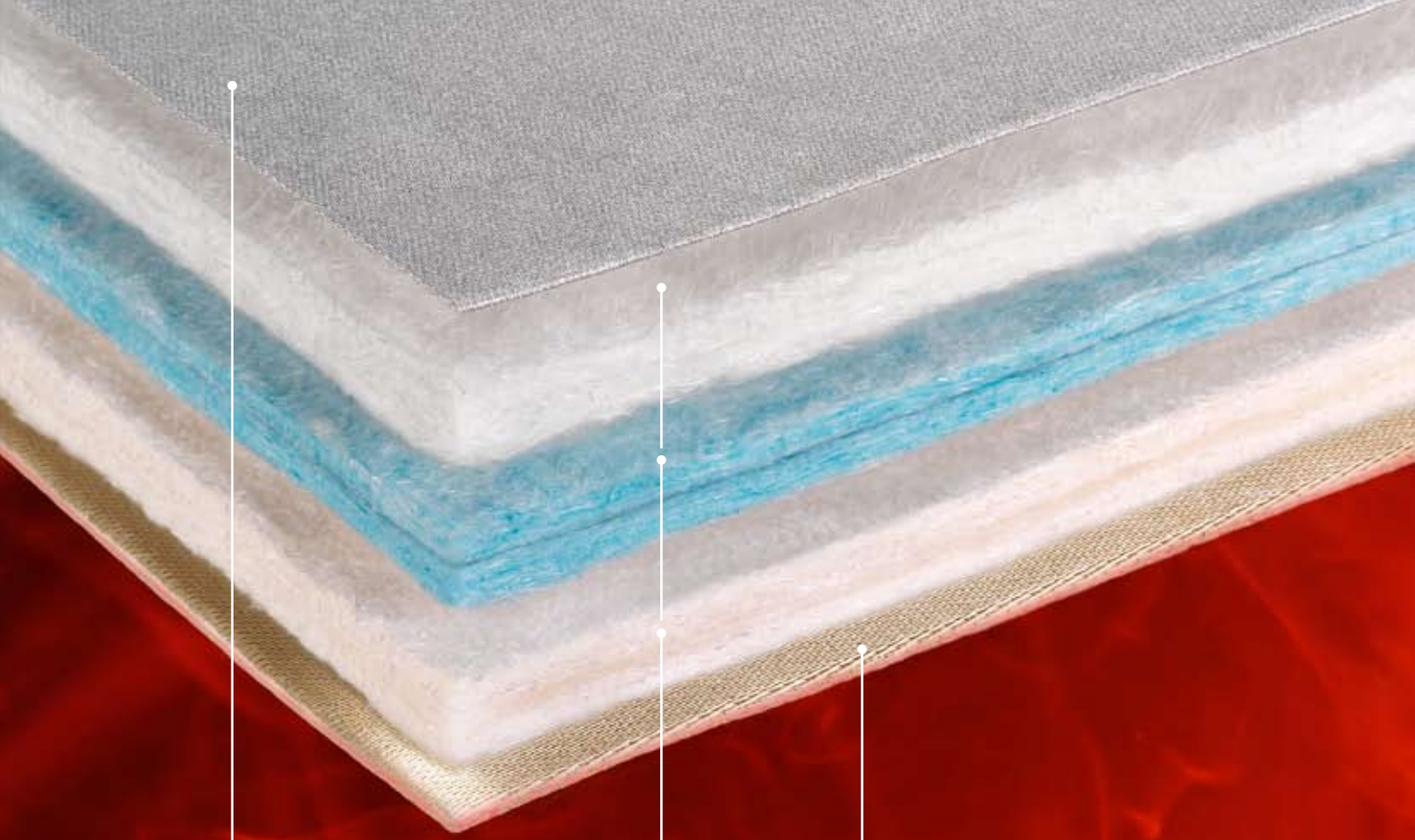
creating
hightech
solutions

“... the simplest solution would be an insulation element that fits perfectly, is made from the right material and is already shaped or sewn in such a way that it can be installed immediately, but ...”

No more “ifs and buts”! Frenzelit is not just the technology and quality leader when highly temperature-resistant needlemats, woven fabrics and tapes need to be manufactured for thermal and acoustic insulation purposes. The services we provide in connection with the extensive range of very different insulation assignments are just as varied as the potential application areas for insulation materials in vehicles, in heating systems, in machine manufacturing and plant engineering as well as in industrial processes:

As a comprehensive supplier of **high-performance solutions for temperatures of up to 1100 °C**, we already start assisting our customers when they are choosing the optimum insulation material. On your behalf, our specialists produce CAD drawings and prototypes of the insulation elements you are looking for and develop concepts that facilitate attachment and installation. We supply whatever is needed – from customised individual items to long production runs – tailored specifically to meet the customer’s requirements and delivered completely finished – on a just-in-time basis, if necessary. Incidentally: it goes without saying that our technical textiles are available simply cut-to-size or in rolls as well.

We carry out all the stages of development and production in-house at our factories. The advantage for you: this means that we are not dependent on deliveries from the other end of the world. On the contrary, we ourselves are in complete control of the entire production process. In addition to this, our customers benefit from more than 50 years of know-how about highly temperature-resistant textile materials. Experienced teams of specialists make sure your insulation element is available in prototype form within five days and starts large-scale production in the shortest possible time.



External fabric
isoGLAS® or isoTHERM®
Specially finished,
e.g. with Mtex®, Alufix, silicone,
depending on the requirements
(abrasion resistance, resistance
to weathering, UV resistance,
low emissivity, hydrophobicity,
oleophobicity, suitability for fire
protection applications, low fire
toxicity, washability)

Insulation materials
made from needlemat
isoGLAS® or isoTHERM®
Depending on the temperature
requirements: highly efficient
insulation, resistance to high
temperatures, vibration resistance,
shot-free, low heat flux and thus
low heat loss, low heat conductivity,
high thermal resistance

Internal fabric
isoGLAS® or isoTHERM®
Reinforced with stainless steel
wire if necessary (higher wear
resistance, mechanical strength
for better insulation integrity,
emergency operating features,
high heat resistance)

versatile...

The strength of our products and services: they are multifunctionally versatile solutions for **insulation requirements** in the following fields: automotive engineering, heating and air conditioning, safety engineering, the energy and process industries as well as machine manufacturing and plant engineering or shipbuilding.

The product configurations: three roads to the optimum solution

Precise dimensions are essential if insulation is to work properly. There is a choice of three different product configurations, so that the optimum solution can be found for each individual application:

- **Two-dimensional insulation components – they are cut, punched, lasered or plotted from woven fabrics and needlemats**

- **3D moulded components – they are punched out of the basic material to have exactly the right dimensions and are shaped as required via precursor technology**

- **Finished parts – they are shaped, sewed and provided with ancillary components like buttons or Velcro fasteners so that they are ready for immediate installation**

Cut to size

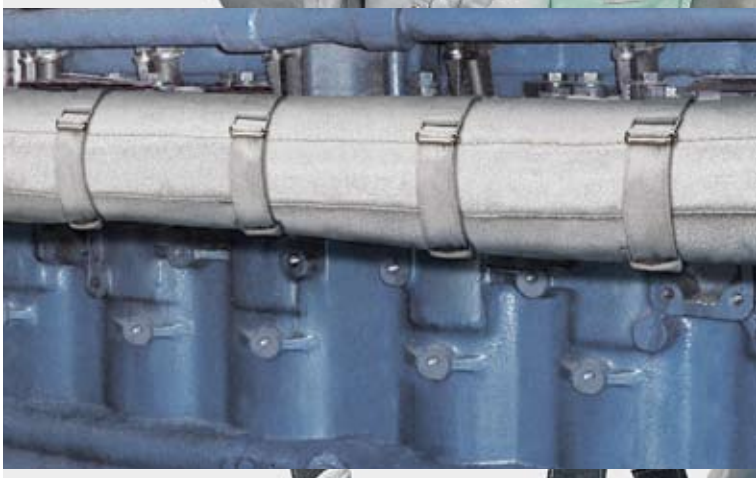
There is a choice of 27 basic woven fabric versions and 6 standard needlemat materials for insulation solutions in different temperature ranges up to 1100 °C. Where necessary, additional versions are produced to meet customers' individual requirements. The basic shapes needed are created via CAD (e.g. from dwg, dxf or jpeg files) and are then produced precisely down to the smallest detail with the help of punching or water jet cutting systems.

With the required shape

A perfect fit in the third dimension: finished 3D moulded parts are produced from the insulation material via precursor technology with the help of appropriate tooling. Dimensional stability and exact dimensions facilitate the installation of insulation components – and, in particular, guarantee maximum possible functionality too.

Sewn and finished

The demands we make on sewing thread and ancillary components are just as high as the requirements on our woven fabrics and needlemats, so that the seams of our insulation solutions do not fail in continuous operation. The finishing department has the choice of a variety of highly temperature-resistant sewing yarns and seam designs for the different applications. If necessary, snap fasteners, eyes, buckles, hooks or Velcro fasteners are fitted, so that installation and removal are simplified even when difficult locations are involved.



The basic materials: technical woven fabrics, tapes, needlemats and ancillary components

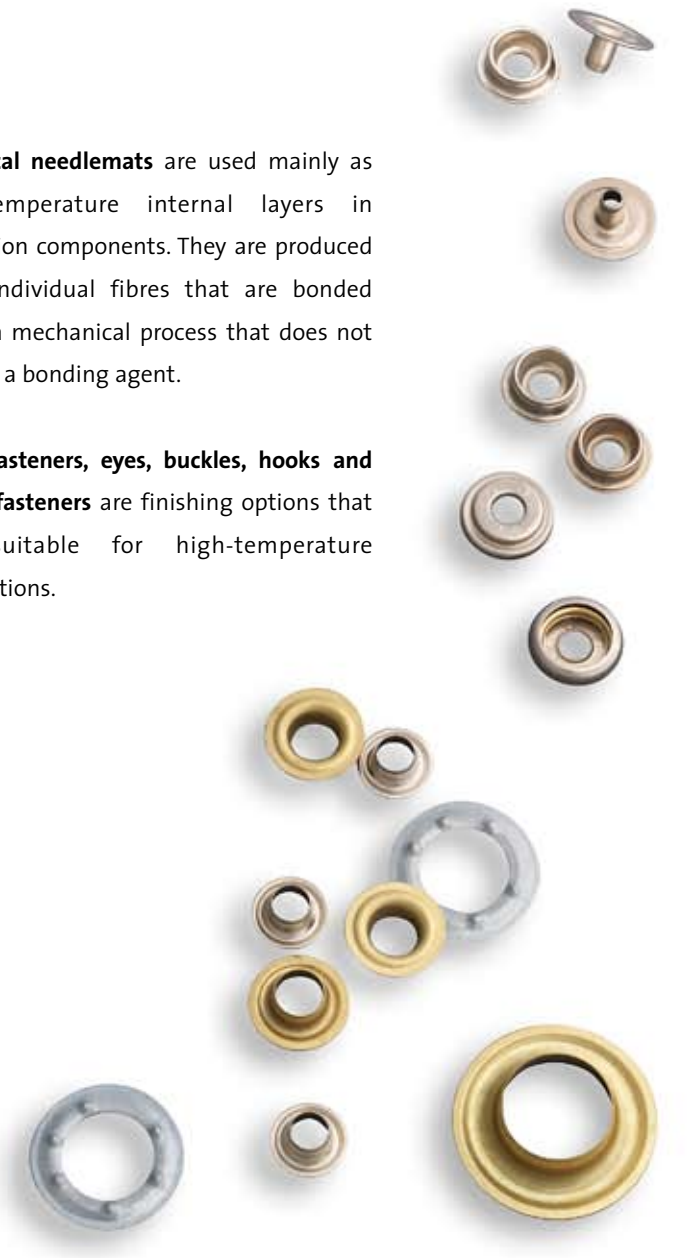
The advantage you enjoy: we know all about our material – right down to the minutest detail. We develop and produce all the technical woven fabrics and needlemats directly in-house.

We manufacture our **high-performance woven fabrics** specially for use as insulation material. If required, they can be woven with additional V4A wire reinforcement. It is also possible to incorporate a PU, silicone or Alufix coating or an HT finish (e.g. with vermiculite, boron nitride or an intumescent), in order to adapt the properties of the material to the specific application area. Many of our woven fabrics have been tested by independent institutes in Germany and other countries to determine their fire properties and have been classified as A1, M0 or M1.

- **isoTHERM® BCT**
  Application temperature limit 1100 °C
  Made from highly temperature-resistant staple fibres with excellent textile properties
- **isoTHERM® S/ST**
  Application temperature limit 1050 °C
  Made from highly temperature-resistant SiO_2 silicate fibres
- **isoTHERM® 1000**
  Application temperature limit 850 °C
  Made from chemically treated glass fibres, identification colour: blue
- **isoTHERM® 800**
  Application temperature limit 750 °C
  Made from special textured glass, identification colour: green
- **isoTHERM® HT**
  Application temperature limit 800 °C
  The woven fabric is particularly resistant to high temperatures thanks to a special finish
- **isoGLAS®**
  Application temperature limit 550 °C
  Produced on the basis of e-glass
- **isoGLAS® GN**
  Application temperature limit 550 °C
  Based on low-size glass fibres, which means that the material produces particularly little smoke and odour as well as practically no formaldehyde
- **novaTEX®**
  Application temperature limit 250 °C
  Very strong woven fabric based on aramid

Technical needlemats are used mainly as high-temperature internal layers in insulation components. They are produced from individual fibres that are bonded using a mechanical process that does not require a bonding agent.

Snap fasteners, eyes, buckles, hooks and Velcro fasteners are finishing options that are suitable for high-temperature applications.



Photos on the top left:
Woven fabric production (left)
High-speed needlemat line (right)

Photos on the bottom left:
Technical tapes and woven fabrics (left)
Technical needlemats (right)

...ready for immediate use

- Insulation hoses
- Sleeving
- Moulded parts with precise dimensions
- Insulation pillows for machines and equipment
- Heat shielding
- Exhaust gas pipe insulation
- Catalytic converter insulation
- Insulation jacketing
- Safety blankets and curtains
- Fire blankets
- Welding protection
- Insulation for the housings and walls of electrical equipment
- Door insulation for oil/condensing boilers
- Burner insulation
- Textile launders
- Fire protection
- ...

Produced for you

You benefit from what we try to achieve: individually optimised insulation reduces the energy consumption of products and machines, enables vehicle components to operate more efficiently and provides reliable protection to people, the environment and machines.

- The composition and quality of all the raw and other materials used are checked regularly in the Frenzelit test laboratory.
- Our engineering experts develop exact concepts in response to issues and problems encountered in the thermal or acoustic insulation field and advise you about possible options – even on-site, if you like!
- The individual insulation solutions are implemented initially as designs and then as prototypes – in close co-ordination with the customer.
- We settle such peripheral issues as delivery packaging or component identification in good time too.
- We have the same standards whether we are producing individual components or are manufacturing in series: we always make sure our products are of the highest possible quality, e.g. with RUN@Rate and FMEA analyses.

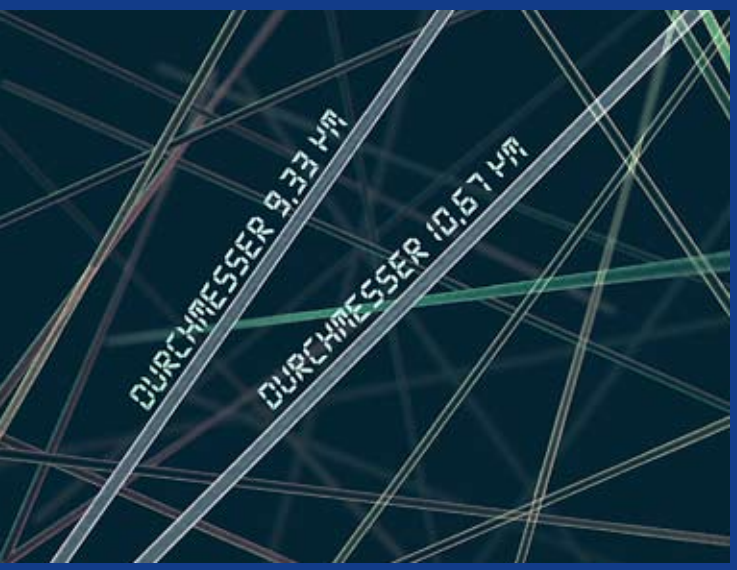
Advice/assignment

Design

Prototype

Testing/optimisation

Production/delivery



Frenzelit has maintained its position as innovation driver for processes and materials used in thermal and acoustic insulation for decades now. Our patents and new developments set standards, as the following examples demonstrate:

Secure bonding

Mtex® (composite metal/textile material) is the unique new generation of materials made by Frenzelit: the insulation materials are coated with metal (primarily aluminium) using a newly developed process that does not require an additional bonding agent. The result is bonding of a quality never reached before, even in high temperature ranges. The composite material remains fully effective even at 600 °C and no toxic substances are released. This makes Mtex® ideal for applications in which fire protection properties are required. Mtex® has low emissivity, i.e. little heat is released into the surrounding area.

Long-term functional stability

Glass fibres that are non-hazardous to health are the preferred material we use as the basis for high-temperature applications. The fibre diameter of **at least 6µ** is considerably higher than the WHO respirability limit. The fibres do not contain any toxic components either, while they are easy on the skin (no REACH classification necessary). The insulation materials are shot and glass bead-free. The endless fibres used in this context guarantee maximum quality without any blemishes as a result.

The better choice

Dimensionally stable textile elements are impressive **solutions to the problems** that are encountered in many application areas. When heat shielding is required, for example. Since huge costs are incurred (e.g. for tooling) when alternative metallic materials are used, textile heat shields are the substantially less expensive option in many cases.

Do you have any questions about your application?

Our information service will help you:

insulation@frenzelit.com

Good for people and the environment.

Frenzelit has obtained certification that the company complies with the requirements of ISO 9001, IATF 16949 and ISO 14001, while the textiles division also complies with marine work safety association Module D. This means complete transparency in all areas and therefore gives our customers a high degree of security.

Qualitymanagement

ISO 9001

IATF 16949

MarineworksafetyassociationModuleD

Environmental management

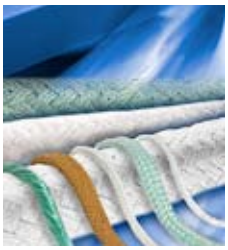
ISO 14001

Further products from Frenzelit for sealing applications, filtration, thermal and acoustic insulation

Technical woven fabrics and tapes
for sealing and insulation

Technical needlemats
for thermal and acoustic insulation as well as filtration

Technical cords and braids
for sealing and insulation



novaSEAL®
Rubber-coated fabric gaskets for boilers and containers

Tadpole tapes, wound packings and layered tapes
for sealing applications

Acoustic solutions
for acoustic and thermal insulation

Blankets
for protecting people and property

GASKETS

TECHNICAL TEXTILES

EXPANSION JOINTS

INSULATION

NEW MATERIALS

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Frenzelit

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