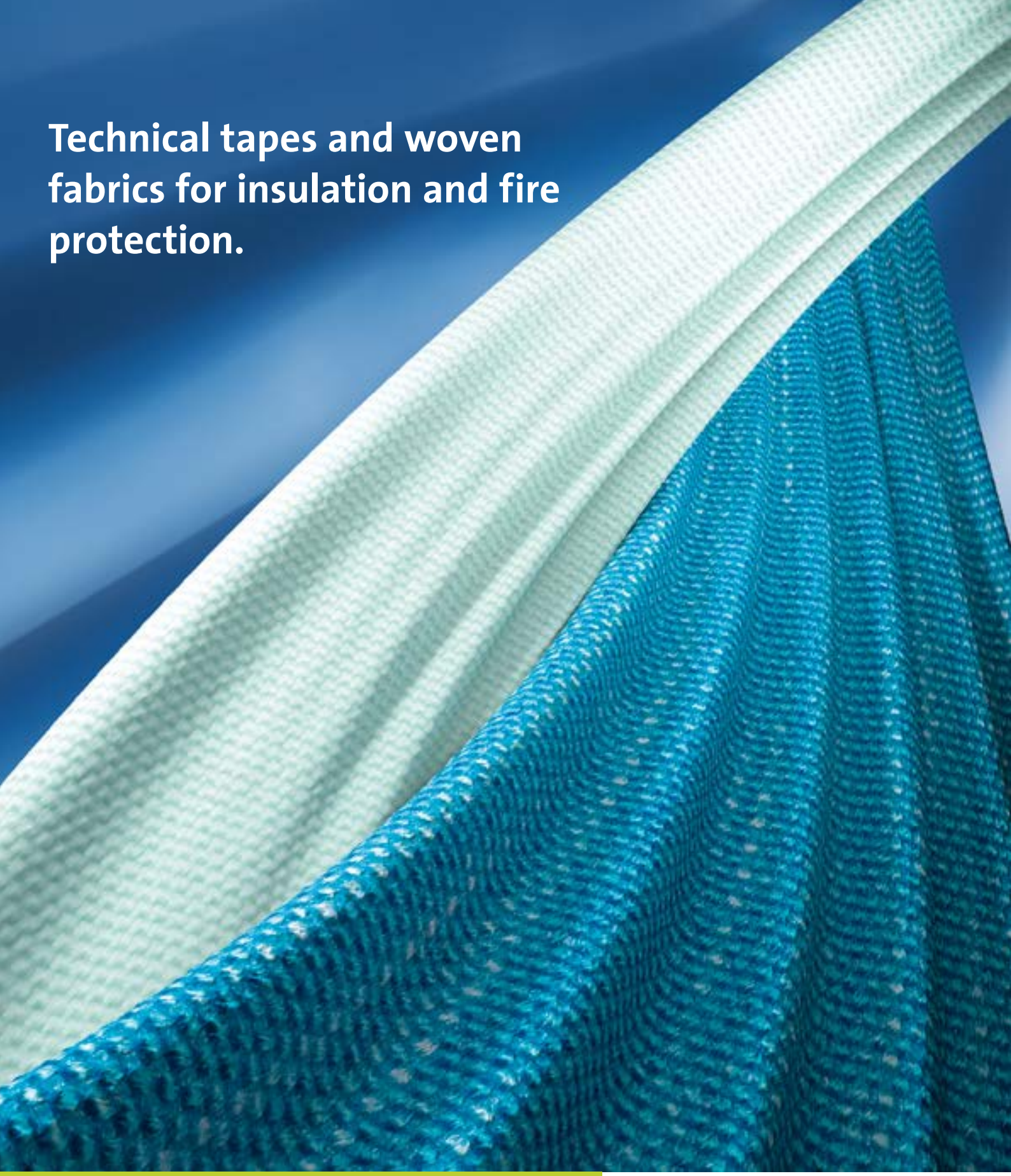
Technical tapes and woven fabrics for insulation and fire protection.



GASKETS

TECHNICAL TEXTILES

EXPANSION JOINTS

INSULATION

NEW MATERIALS

Frenzelit

creating hightech solutions

A feel for difficult insulation problems.

- **High-performance solutions for our partners in trade and industry**
- **Innovation and technology leader**
- **Uniquely broad range of solutions and products for the entire process chain**
- **Safe for the environment, safe for your health**
- **Made in Germany**

With our high-temperature resistant technical textiles, cords, tapes, and nonwoven materials, we are pioneers when it comes to modern thermal and acoustic insulation. For decades, we have been driving the development of new material properties and finishing processes. As system providers, we draw on expertise from the areas of gaskets, technical textiles, and expansion joints. We have over 480 people working for us in affiliates or as service and logistics partners in 65 countries around the world. Our goal is to fulfil even the most demanding requirements that our customers bring to us. Better than any other provider.


850 °C
750 °C
550 °C

Partnership with our customers: the material for our best innovations.

Frenzelit is one of the world's major players in the area of high-temperature insulation. For over 60 years. There's a reason for this. We have always viewed our customers as co-workers, as creative partners in the search for the best and often revolutionary solutions. Personal interaction: that is our recipe for success. That's how we get insulation solutions that are always an idea ahead of the competition.

First class for the entire process chain

Focus on the customer, strong service, flexible, fast – typically Frenzelit. That's why you can expect more from us than just the usual broad portfolio of solutions. And more than just first-class service across the entire process chain. By this we mean the zeal with which our engineers make your vision their own. In the choice of optimal insulation materials. In the development of the first CAD designs and prototypes. In the search for the most efficient mounting and assembly methods. Customised or large-scale production. And finally, delivery: world-wide and reliably on time, of course.

Securing the lead

How to handle temperatures of up to 1100 degrees? This is a question that comes up in almost all branches of industry. That the best answers always come from Frenzelit is a result of our decades of experience from many thousands of projects. Or from the uncompromising quality we demand of our products when it comes to temperature and vibration resistance, acoustic absorption, abrasion resistance, manufacturing, and textile properties. All with the one goal in mind: to secure for our customers a decisive lead in the global competition.

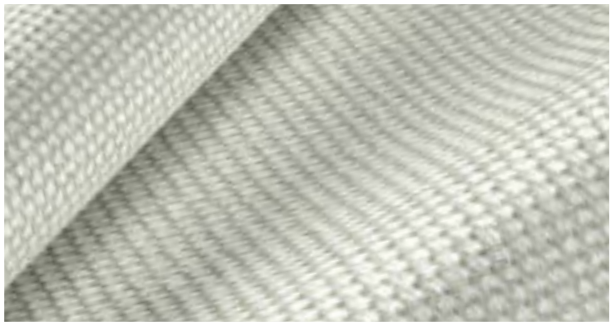
Industries

- Automotive
- Electronic devices
- Energy
- Plant engineering and equipment design
- Process industry
- Shipbuilding
- Safety engineering
- Heating and air conditioning

Areas of Application

- Sealing
- Fire protection
- Insulation (e.g. for pipes, containers, appliances, heat exchangers)
- Property protection
- Soundproofing
- Protection for hoses and electrical cables
- Thermal insulation
- Heat shields

Confidence is built on first-class basic products.



isoTHERM® S/ST

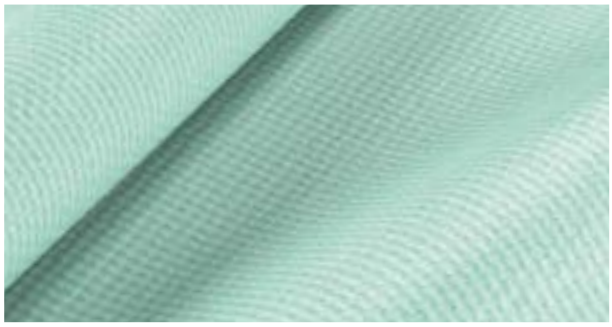
Temperature resistant up to 1050 °C (short peaks up to 1100 °C)
The products in this line: low thermal conductivity, minimal heat storage, and absolute incombustibility. isoTHERM® S/ST is skin-friendly, not hazardous to health, and has remarkable chemical resistance. Basic material: high-temperature resistant SiO_2 silicate fibres.

- Filament diameter 6-9 µm
- Incombustible (in accordance with DIN 4102)
- Shrinkage (S-type) <8%
- Shrinkage (ST-type) <3%
- SBG approval for all woven fabrics

isoTHERM® 1000

Temperature resistant up to 850 °C (short peaks up to 1000 °C)
Frenzelit's "Blue Line" of products. Outstanding fabric properties. Basic material produced through a special chemical finishing process. Components with a low melting point are removed from the E-glass filaments, thus increasing heat resistance.

- Filament diameter 6 µm
- Incombustible (Fire Classification A1 woven fabric approval according to DIN 4102)



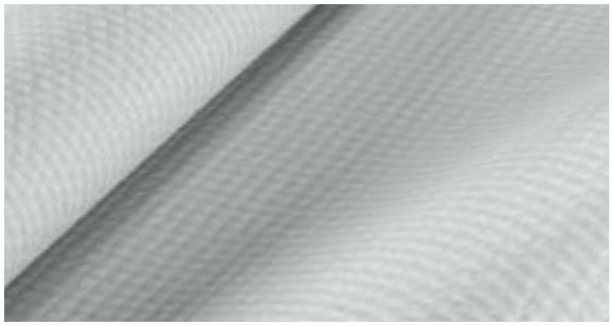
isoTHERM® 800

Temperature resistant up to 700°C (short peaks up to 800 °C)
Frenzelit's "Green Line" of products: Outstanding fabric properties, not hazardous to health. Properties: high temperature and outstanding chemical resistance. Basic material: texturised special glass.

- Filament diameter 6-10 µm
- Incombustible (in accordance with DIN 4102)
- Shrinkage <3%
- SBG approval for all woven fabrics

Even our standard models are extraordinary

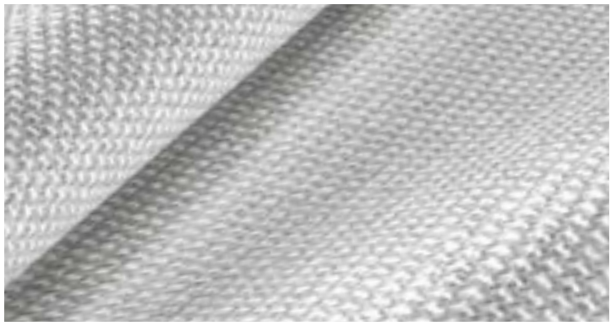
Frenzelit tapes and woven fabrics made of glass or refined glass are available in a wide range of individual solutions. Grouped into six product lines. Materials for thermal and acoustic insulation, filtration, property protection, as substrates for coatings, or composite material for plastic reinforcement. With a variety of temperature limits and technical properties. This wide range of solutions is one of the reasons for our outstanding position in the insulation industry. And by the way: The continuous filaments we use in production are bead-free – for uniformly high quality free of defects.



isoTHERM® HT

Temperature resistant up to 800 °C (short peaks up to 900 °C)
Especially resistant to high temperatures: This fabric maintains its properties even at maximum application temperatures. isoTHERM® HT is extremely abrasion resistant and drapable, and not hazardous to health.

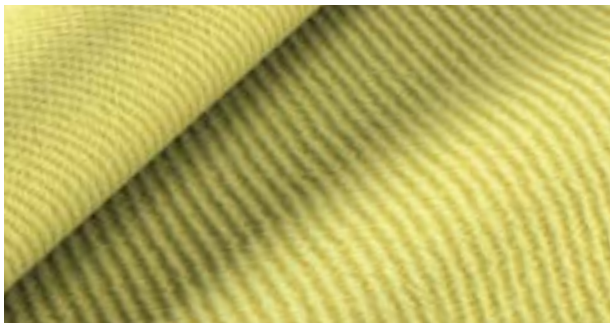
- Filament diameter 6-10 µm
- Incombustible (in accordance with DIN 4102)
- Shrinkage <2%



isoGLAS®

Temperature resistant up to 550 °C (short peaks up to 650 °C)
The texturisation of this fabric allows for a high storage volume and thus for good insulation properties. isoGLAS® products are exceptionally fabric-like and not hazardous to health. Basic material: E-glasses.

- Filament diameter 6-11 µm
- Incombustible (in accordance with DIN 4102)
- Shrinkage <1.5%
- SGB approval for all woven fabrics



novaTEX®

Temperature resistant up to 250 °C (short peaks up to 380 °C)
novaTEX® products are fabrics with high-strength properties. Basic materials are synthetic fibres such as m-Aramid, p-Aramid, or mixtures with Preox. novaTEX® fabrics are designed for use as conveyor belts and for contact hazard protection.

No risk to health

We use exclusively skin-friendly glass fibres that not hazardous to health and have no toxic components (no REACH rating necessary). The fibre diameter is at least 6µm, considerably above the WHO limit for respirability.

We combine reliability and innovative ideas for secure fire protection.

They protect reliably against fire and lead smoke to the outside. They are highly resistant to temperature, extremely flexible (and environmentally friendly!), and absolutely not hazardous to health. And because of their minimal mass, they are structurally almost insignificant. These products, developed especially for use as fire protection fabrics, are setting standards the world over.

Certified for your safety

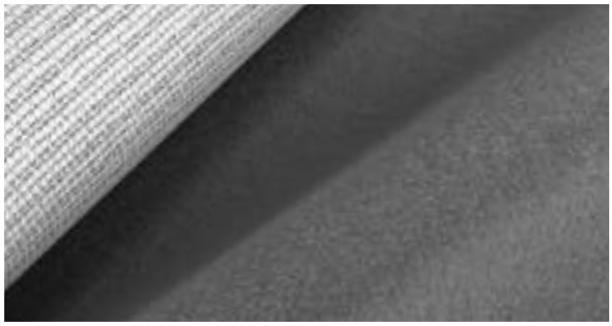
Safety and transparency are among the highest goals that we set for ourselves. This is especially true for our fire protection products. For manufacturers of smoke aprons, fire barriers, and other fire protection systems, we provide fabrics that can be modified for any protection target they require. As smoke barrier or physical barrier (Protection Target E). As a physical barriers with radiation prevention (Protection Target EW), or physical barriers and thermal insulation (Protection Target EI). Solutions from Frenzelit can meet all relevant national and international norms:

- Fire Classification DIN EN 13501-1 and Incombustible Building Materials DIN 4102
- Smoke-tight Design DIN 1634-3 with EN 12101-1:2005
- Fire Blanket DIN 1869:2001 Section 4
- Marine Equipment Directive (EU Council Directive 96/98/EC) Mared and BG Transport and Traffic, Ship Safety Division (Module D) with EC Examination Certificate (Module B) and U.S. Coast Guard

Mtex® FTR: Innovative and form-stable up to 650 °C

Stable up into extreme temperatures, no combustible binders, no flame toxicity, no offensive smoke or smells, insulates against extreme radiant heat and still keeps its form: the Mtex® innovation from Frenzelit is the first aluminium-coated fabric that meets the highest fire protection requirements. Ideal for active fire protection in supermarkets and shopping centres, or in offshore applications. Protection Target: EW.

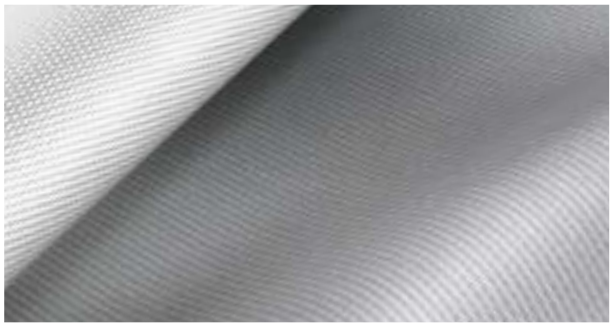
- Temperature resistant up to 650 °C
- High tensile strength with special V4A wire reinforcement
- Incombustible building material
- Radiation-retardant



isoGLAS® V4A Intum Fabric

This fabric is characterised by its extremely high fire resistance: up to 1100 °C. The basic isoGLAS® is reinforced with V4A wire and is coated with intumescent graphite on one or both sides. Area of application: textile fire protection barrier with thermal insulation. Protection Target: EI.

- Fire resistant up to 1100 °C
- Intumescent coating
- Low heat conductivity
- Does not irritate skin
- Fire-retardant, heat-retardant, radiation-retardant
- Rollable
- Expansion to many times the thickness of the coating
- Filament diameter 6-15 µm



isoGLAS® fabric with V4A wire, Alufix FR (Fire Retardant) on both sides

Coated on both sides with Alufix FR, this grey fabric from Frenzelit is highly flame-resistant and ideal for use as a fire barrier. Protection Target E.

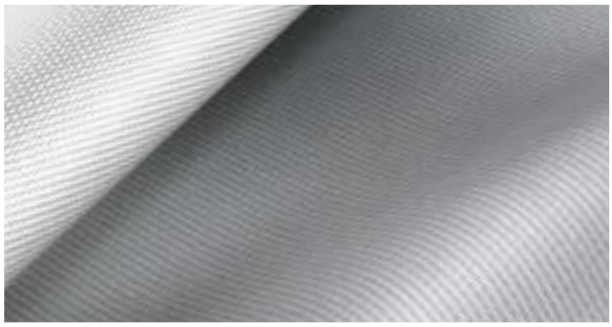
- Temperature resistant up to 550 °C
- Highly flame-resistant coating
- Weavelock design
- Filament diameter 6-15 µm
- High tensile strength with V4A wire

Approvals	
Mtex® FTR (Aluminium)	Fire Classification A1 acc. DIN EN 13501-1, Smoke Toxicity harmless acc. DIN 53 436, Gen. Building Approval (sel), Approval No. Z-56.416-981
Weavelock STF-3-059	EC Examination Certificate (Module B), Approval No. 118.113 (SBG Approval), U.S. Coast Guard Approval No. 164.112/EC0735/118.113
Alufix 3-071	EC Examination Certificate (Module B), Approval No. 118.112 (SBG Approval), U.S. Coast Guard Approval No. 164.112/EC0736/118.112

isoGLAS® EG and isoTHERM® SG/STG Boards

Made of isoGLAS®, isoTHERM® S or pre-heated isoTHERM® ST fibres, these boards can be easily tailored to individual requirements, especially in-house applications such as fire dampers, fire protection panels, or barriers for track-bound conveyor systems. Especially suited for fluctuating temperatures and cycles. Organic content <2%, shrinkage <1%.

- Temperature resistant up to 550 °C (EG)/1100 °C (SG)
- Low thermal conductivity
- Low weight with high bending resistance
- No unpleasant odours, toxic materials, or skin irritants
- Integrated fibres to prevent dust and fibre fly
- Thicknesses between 5-25 mm, widths up to 1400 mm
- Filament diameter 9 µm



isoGLAS® fabric, Alufix on one side

This isoGLAS® fabric is coated on one side with Alufix. It was specially designed for use in smoke aprons, or as weavelock finish in shipbuilding and shipyards, in power stations, in plant engineering, or in the chemical industry. Basic/entry material, very economical. Flammability class: D.

- Temperature-resistant up to 550 °C
- High gas tightness
- Weavelock design

isoGLAS® fabric, PU-coated on both sides

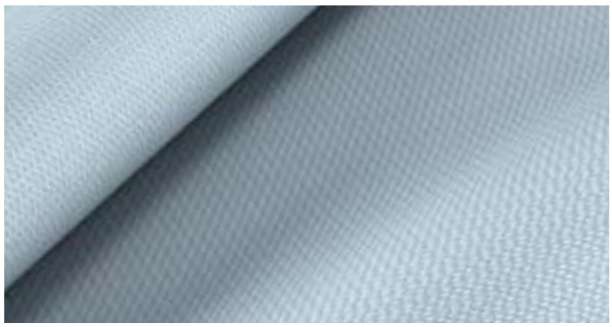
The isoGLAS® fabric is coated on both sides with a soft PU fire-retardant, making it the perfect textile for fire barriers or smoke aprons. For higher-level requirements. Flammability Class: D.

- Temperature-resistant up to 550 °C
- Flame-retardant coating
- Abrasion-resistant
- High gas tightness
- Weavelock design
- Filament diameter 6-15 µm

isoGLAS® fabric, grey silicone on both sides

This silver-grey fabric from Frenzelit is coated with 80 g/m^2 silicone on both sides. Recommended for use as smoke aprons or textile fire barriers. For technically demanding systems. Flammability Class: D.

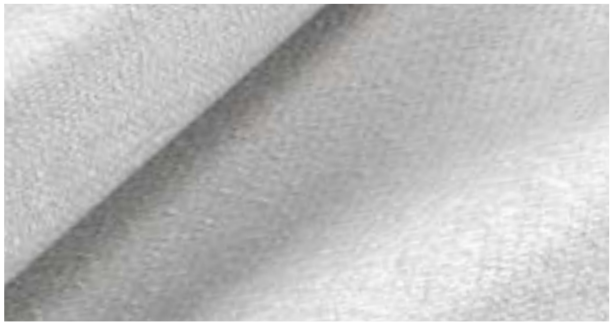
- Temperature resistant up to 200 °C
- Barely flammable
- Abrasion-resistant
- High gas tightness
- Weavelock design



isoGLAS® fabric, white silicone on both sides

The optically less conspicuous alternative fire barrier textile: the isoGLAS® fabric coated with silicone on both sides. Colour: white. For optically prominent systems. Flammability Class: D.

- Temperature-resistant up to 200 °C
- Barely flammable
- Abrasion-resistant
- High gas tightness
- Weavelock design



isoGLAS® FLD fabric

The Frenzelit isoGLAS® fabric for fire blankets. For protection against fire in commercial areas.

- approx. 350 g/m^2
- Width 1570 mm
- Thickness approx. 1,2 mm

Whether as smoke protection curtains, physical barriers, or thermal insulation – Frenzelit solutions for fire protection fabrics in high-temperature areas are setting standards the world over.

When it starts to get interesting in your think tank, that's when things come together in ours.

For over six decades we have been known as innovation drivers when it comes to finishing processes and materials for thermal and acoustic insulation. For over 130 years, the name Frenzelit has been closely associated with creative ferment and extraordinary R&D activity. This gives us the impetus to develop today's innovative solutions that will make our customers successful in the markets of tomorrow.

Research on the pulse of your developments

We have always been at home in the industry – in close partnership with our customers. Together we develop innovative products for future growth markets. From the initial idea to production-readiness. In the shortest possible time. To do this we can draw upon decades of experience and a firm scientific foundation. Our material, technological and application know-how are unique in the industry.

We have always worked with renown universities, technical colleges, and research institutes – the University of Bayreuth, for example, or the Institute for Applied Sciences in the Münchberg Textile Technology and Design Department at the Technical University, Hof, as well as with materials testing institutes and fire safety departments. This is how we create intelligent solutions with clear competitive advantages.

Together with our customers, we work to optimise insulation properties for a wide variety of applications. Our developments reliably protect humans, the environment, and machines. They lower energy consumption of products and machines. Or ensure more efficient operation of automotive components.

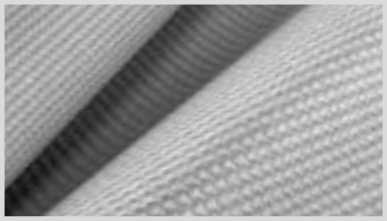
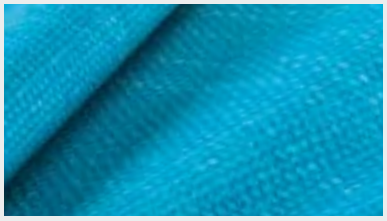
Contact R&D

The “Technical Textiles” Infoline can provide you with the help you need:

textile@frenzelit.com

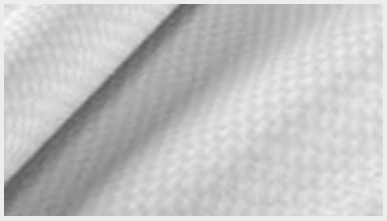
Coatings and finishes.

Coatings and finishing processes to optimise fabric properties.

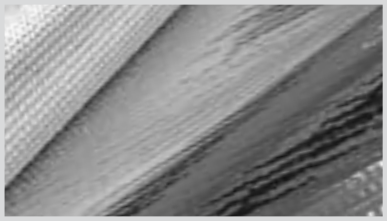
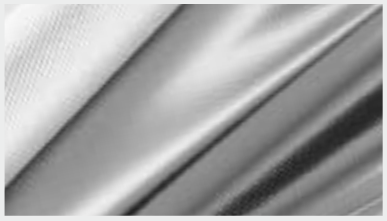
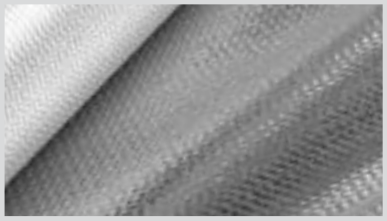
Coatings Treatment with various coating agents	**Application temperature**	**Product properties**	**Applications**
Mtex® (Aluminium) 	650 °C	Incombustible Mechanical resistance Abrasion resistance and tensile strength Thermal resistance	Automotive: Heat shields Insulation
Weavelock STF 3-059 	200 °C	Barely flammable surface material Good cut and abrasion resistance	Shipbuilding Plant engineering Power plant technology Used in the manufacture of: Cushions Mattresses Blankets etc.
Slip-resistant SBF 3-088 	200 °C	Barely flammable Good slip and abrasion resistance	Plant engineering Used in the manufacture of: Cushions Mattresses Blankets etc.
Welding protection finish 	200 °C	Barely flammable Optimal properties for welding protection Good slip and abrasion resistance	High-temperature protective blankets for welding protection Insulating cushions
Alufix 3-071 	200 °C	Barely flammable surface material Good cut and abrasion resistance	Shipbuilding Plant engineering Power plant technology Used in the manufacture of: Cushions Mattresses Blankets Curtains, etc.

Coatings Treatment with various coating agents	**Application temperature**	**Product properties**	**Applications**
Alugrey FR 	200 °C	Barely flammable High-value, flame retardant alugrey coating Increased cut and abrasion resistance Well suited for die-cutting operations	Plant engineering and chemical industry Glass and steel industries Expansion joint manufacture Electrical insulation Power plant technology Used in the manufacture of: Mattresses, blankets etc. Automotive: Insulation, shielding
Vermiculite  	750 °C	Incombustible High abrasion and flame resistance Good sliding properties Shielding	Boiler design and appliance engineering Ceramic furnaces and heating boiler design Industrial furnaces Induction furnaces Plant engineering and equipment design
Natural rubber, silicone hypalon, elastomer coatings 	200 °C	Light-, UV- and oxidation-resistant Largely resistant to acids and lyes Dirt- and oil-repellent Water and gas tightness	Plant engineering and chemical industry Power plant technology Expansion joint manufacture

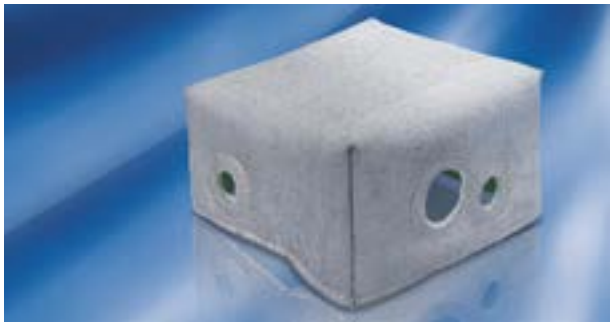
Six product lines, countless solutions. The properties of our fabrics and tapes can be modified as needed: in their mechanical durability, in their insulating effects, in their resistance to water and gas, and in many other aspects as well. Precisely adjusted to and optimised for your projects.

Impregnation Saturated impregnation with low-viscosity agents	**Application temperature**	**Product properties**	**Applications**
Graphited 	200 °C	Excellent lubricating and gliding properties	Ceramic furnaces and boiler design Industrial furnaces Plant engineering and equipment design
Black 	200 °C	Homogeneous colour throughout	Furnace doors Inspection glass seals Property protection
HT Finish 	700 °C – 800 °C	Colloidal silica finish Increased temperature resistance Improved weavelock	Plant engineering and chemical industry High-temperature protective blankets Insulating cushions Glass and steel industries Shipyards and shipbuilding

From the highly innovative Mtex® fabrics to the proven isoGLAS® products – Frenzelit provides a number of outstanding solutions for active fire protection.

Lamination Bonding two or more layers with the same or different surface properties	**Application temperature**	**Product properties**	**Applications**
Self-adhesive film 	120 °C	Easier assembly and installation Improved workability	Cable and pipe insulation Chimney construction Inspection glass seals Fire doors Pipe insulation
Aluminium sheet foil 10-50 µ 	650 °C	Lamination with good heat reflection and abrasion resistance	External layer for Heat protection cushions Insulating mattresses and automotive
Aluminiumised polyester film 	180 °C	First-class reflective properties Good oil and gas tightness	Power plant technology Electrical insulation Plant engineering and chemical industry Used in the manufacture of: Curtains Insulating mattresses
Aluminum transfer film (Mylar Folie) 	180 °C	Excellent drapability	Protective clothing Insulating cushions

Product range.



Specially designed thermoREFLEX® component, sewn together with added accessories and ready for installation.

thermoREFLEX® woven insulating fabric, die cut, cut, lasered or plotted.

assembLINE insulation made of isoGLAS® EG boards.

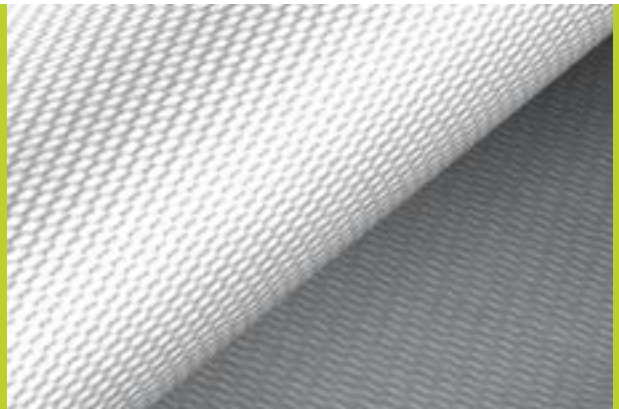
The demands for the shapes of our products are almost as numerous as the kinds of insulation tasks customers around the world are asking for. This is why Frenzelit can offer you solutions in many dimensions. From fabric rolls to precisely manufactured 3D parts. This individuality and versatility are the norm at Frenzelit. We call it "Engineered Textile Solutions."

Quality has many forms

High-temperature resistance from Frenzelit takes on many forms. Meters of fabric rolls. Precisely manufactured 2D and 3D thermoREFLEX® parts. Open or sewn. Our fabrics can be die cut according to detailed CAD designs, plotted, or cut with water jets. The fire protection boards isoGLAS® EG and isoTHERM® SG/STG can be bonded or screwed together to create highly functional insulating components – Frenzelit's assembLINE. Guaranteed to hold their shape and dimensions.

By the way: no matter which option you choose, the result will always be an example of perfect functionality. That's what we do here at Frenzelit. Our seams have to hold up under constant use so our insulation materials can do their job. That is why we also have a portfolio of superior high-temperature resistant yarns and stitches.

Woven fabrics and tapes from Frenzelit are available:
- in rolls
- die cut
- cut parts



Product types.

isoTERM® S/ST

Version	weave	weight (g/m²)	thickness (mm)	width (mm)
S	satin	600	0.7	920
S	satin	1100	1.3	920
ST	satin	600	0.7	840
ST	satin	1100	1.3	840
ST	plain	1000	2.0	1000
ST	twill	1800	3.8	1000
ST V4A	twill	730	1.3	1000
ST V4A	plain	730	1.4	1000
ST tape*	plain		2-3	10-120
ST tape*	plain		4-10	30-120

isoTERM® 1000

Version	weave	weight (g/m²)	thickness (mm)	width (mm)
E	satin	600	0.7	920
tape*	satin	1100	1.3	920

isoTERM® 800

Version	weave	weight (g/m²)	thickness (mm)	width (mm)
E	plain	650	1.0	1000
E	twill	830	1.4	1000
E	plain	1000	1.6	1000
E V4A	plain	1200	1.8	1000
E	double fabric	2000	3.0	1000
tape*	plain		2-3	10-120
tape*	plain		4-10	30-120

isoTERM® HT

Version	weave	weight (g/m²)	thickness (mm)	width (mm)
E	plain	1150	1.5	1000
E	twill	1480	2.4	1000
E	double fabric	2000	3.0	1000

isoGLAS®

Version	weave	weight (g/m²)	thickness (mm)	width (mm)
E	twill	420	0.5	1000
E	twill	450	1.0	1600
E	plain	600	1.0	1000
E	satin	630	0.65	1000
E	plain	1000	1.6	1000
E V4A	plain	1250	1.6	1000
E	double fabric	2000	3.0	1000
tape*	plain		2-3	10-120
tape*	plain		4-10	30-120

novaTEX®

Version	weave	weight (g/m²)	thickness (mm)	width (mm)
50 % Preox/ 50 % Aramid	plain	630	2.0	1000
100 % Aramid	twill	600	2.0	1000
100 % Aramid	plain	450	1.8	1000
tape*	plain		2-3	10-120

*All dimensions also available with self-adhesive film.
Other qualities, dimensions and ladder tapes, as well as tailor-made parts, available on demand.

Do you have questions about your application?

Our experts can help you with the answers:

textile@frenzelit.com

Good for people and environment.

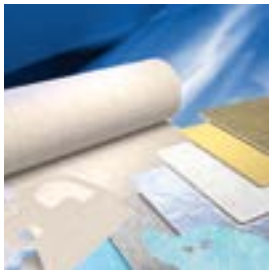
Quality assurance and environmental responsibility are the core theme in all our company's processes. Throughout the entire life cycle of our products. The Technical Textile division has been certified according to international quality management standards, quality standards in the European and American automobile industries, international environmental standards, as well as the marine work safety association Module D.

Quality management
- ISO 9001
- IATF 16949
- Marine work safety association Module D

Environmental management
- ISO 14001

Further sealing and insulating products from Frenzelit.

Technical needlemats
for thermal and acoustic insulation and the filtration industry

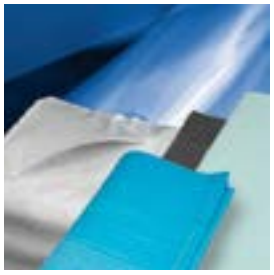


Technical cords and braids
for sealing and insulation

novaSEAL®
Boiler and tank rings

Tadpole tapes,wound packings and layered tapes
for sealing applications

Acoustic Solutions
for acoustic and heat insulation



Thermal blankets
to protect people and property

Engineered Textile Solutions
for thermal and acoustic insulation

GASKETS
TECHNICAL TEXTILES
EXPANSION JOINTS
INSULATION
NEW MATERIALS

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