HKO

HEAT PROTECTION | TRUST THE EXPERTS

THERMAL INSULATIONS

HIGH-TEMPERATURE SEALINGS

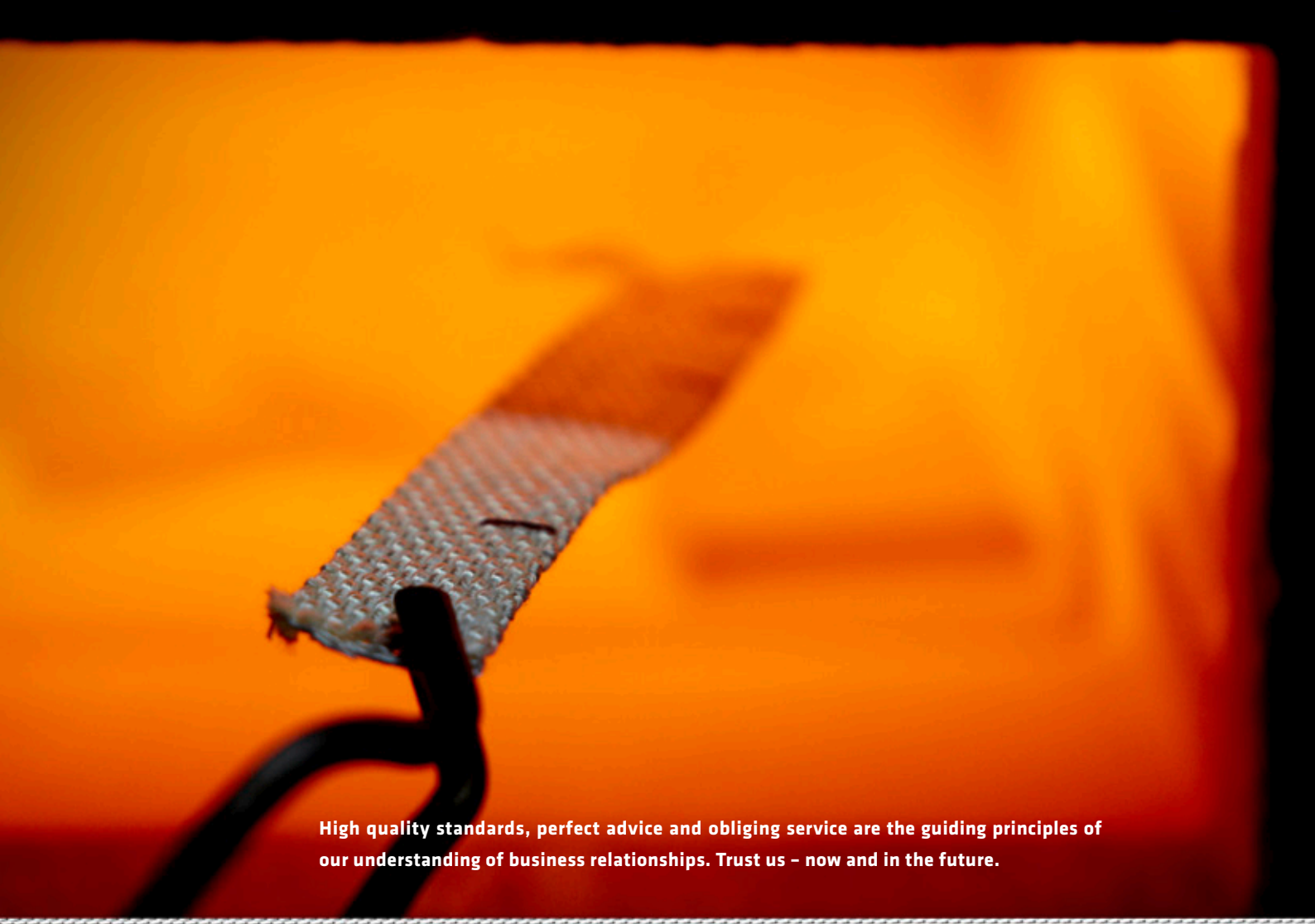
FIRE AND HEAT PROTECTION

TRUST THE EXPERTS

TRUST THE EXPERTS!

Our claim is our promise.

Using this brochure we would like to not only present ourselves as innovative developer and manufacturer of forward-looking and sustainable specialty products, we also would like to be measured based on us keeping the promise of trusting, solution-oriented, and mutual cooperation!



High quality standards, perfect advice and obliging service are the guiding principles of our understanding of business relationships. Trust us – now and in the future.

Competency, Experience and Know-how

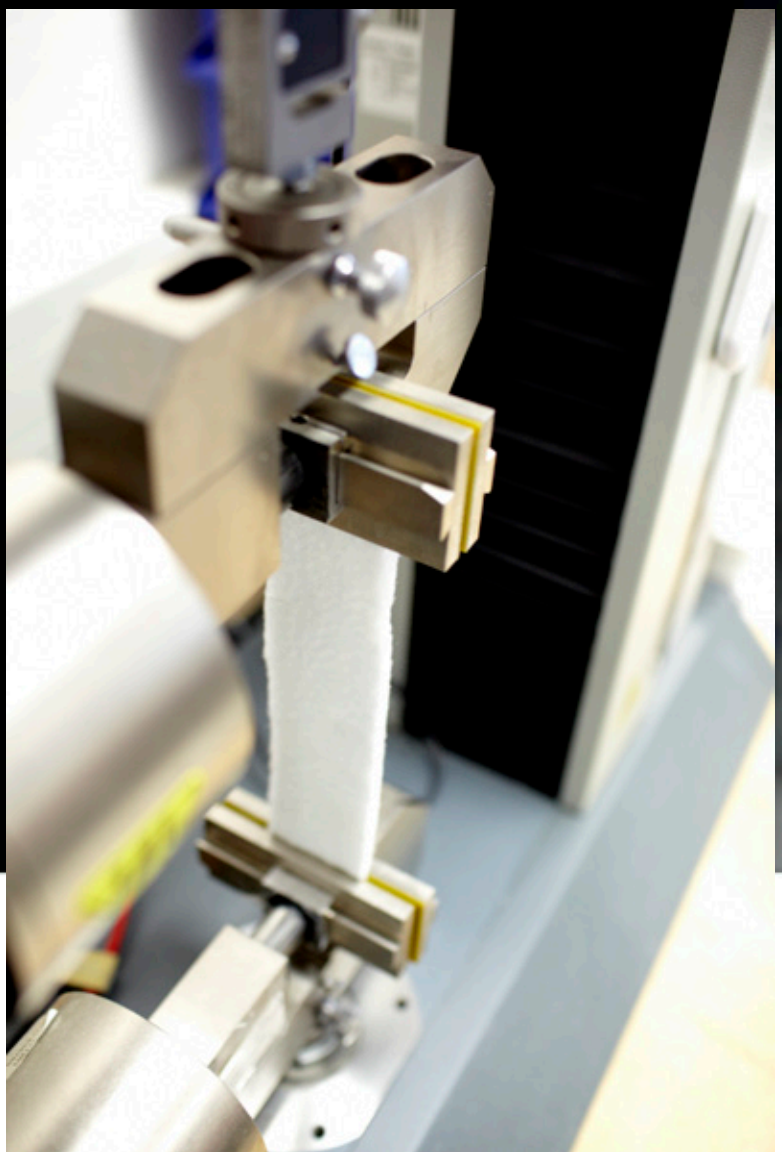
TRUST THE EXPERTS!

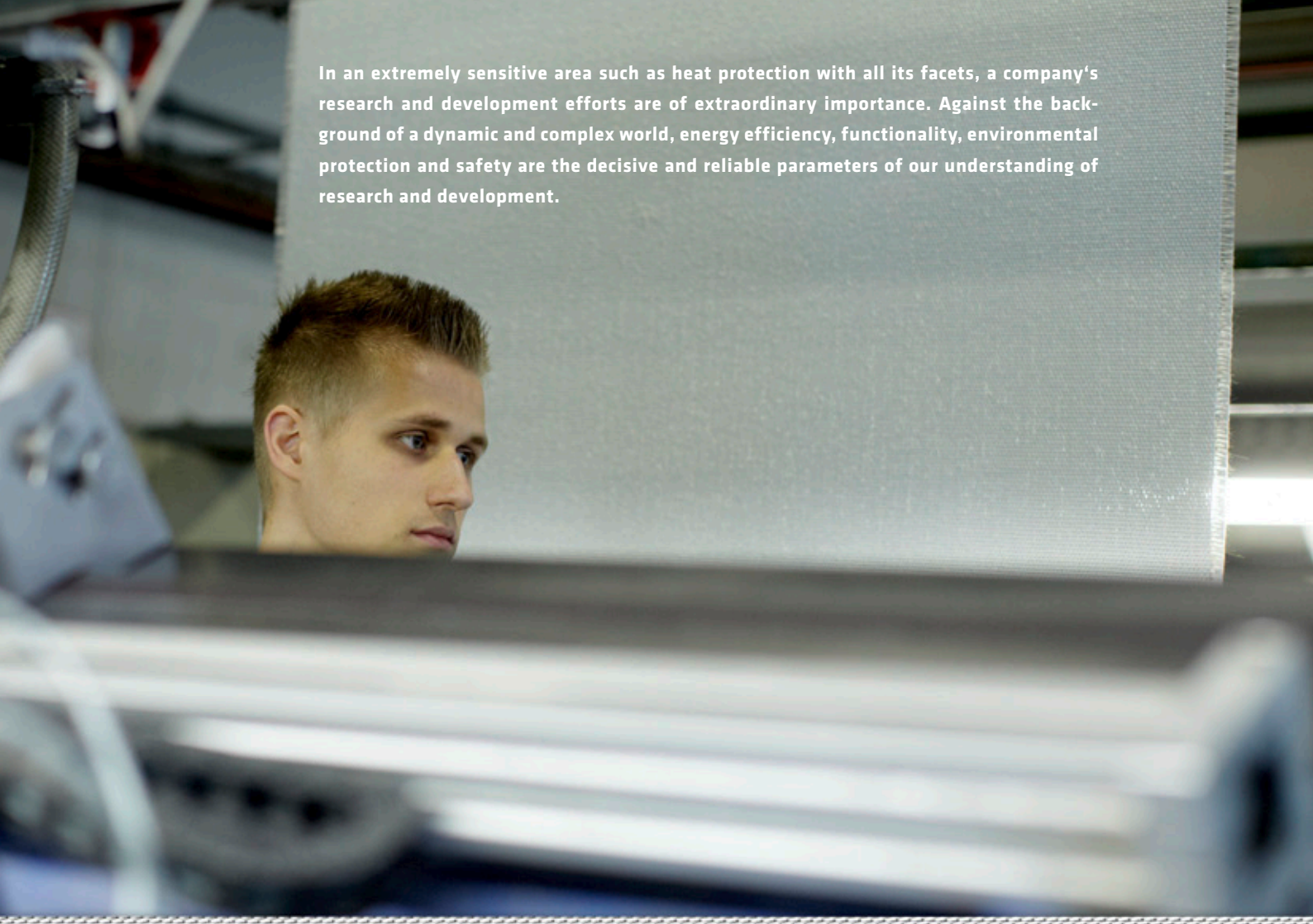
HKO GmbH was founded in 1974 by five employees in Oberhausen. Focus of the company was the distribution of heat protection products primarily using asbestos fibers for industrial applications. After asbestos fibers were classified as highly health damaging in the late seventies, the HKO Group pioneered in the development and establishment of glass fibers as asbestos replacement.

Since then the HKO Group has continuously advanced to be one of the leading specialty suppliers in the industry. The small trading company developed in only 30 years to an internationally established, vertically integrated manufacturer with a comprehensive product portfolio for extreme high temperature ranges. Our modern production facilities in Germany and China, our sales and engineering offices in France and the USA, as well as numerous cooperation and sales partners worldwide reflect the international competency of the Group. They establish the foundation for our continuous, healthy and sustainable worldwide growth. Experts in sales, technology, research and development justify the technological primacy of the HKO Group in the worldwide competition.

Customer proximity and customer service are further benchmarks of the HKO Group in order to ensure intelligent and appropriate problem solutions for our customers developed by qualified and motivated employees.

Research and Development





In an extremely sensitive area such as heat protection with all its facets, a company's research and development efforts are of extraordinary importance. Against the background of a dynamic and complex world, energy efficiency, functionality, environmental protection and safety are the decisive and reliable parameters of our understanding of research and development.

Research and Development

A RED HOT TOPIC

In our high-tech laboratories, chemists, textile engineers and technicians work with know-how and passion on forward-looking products. The close interaction between sales and technology in the HKO Group ensures sustainable market and customer orientation of our research and development efforts.

Patent applications and utilization far above the industry average are only examples of the union between science/theory and practical application in the HKO Group. Beyond that, due to intelligent and flexible manufacturing processes, we are able to adjust our products to changing boundary conditions such as amendments and type approval regulations. Due to our close partnerships with renowned universities and leading institutes, our research projects are widely established.

In the HKO laboratories, our products are subjected to continuous and thorough quality inspections. Whatever the market will wish for or require in the future: Your problem is our motivation!

TRUST THE EXPERTS!

Production and Sales

We understand our trade and speak the language of our customers.

Innovative, modern production equipment and processes ensure market-driven, flexible and, in particular, customized fulfillment of customer requirements. Continuous training and advanced training, as well as distinct quality awareness of our employees in production and technology are the reason for the high quality standard of the HKO products now and in the future.

Many years of experience, expert knowledge, customer orientation and 9 native languages in our sales organization represent the fact that the HKO Group advanced to one of the most important contact partners for thermal questions of any kind. Whether textile, fabric or tissue - we speak your language.

Put us to the test – we find creative solutions suitable for your market for the versatile, challenging requirements in the branches and industries serviced by us.

We – the employees of the HKO Group worldwide – have one common goal: long-term customer satisfaction!

Production and Sales

TRUST THE EXPERTS!

International certifications and permits ensure the continuously high quality of our products.

Certificates

- **DIN EN ISO 9001:2008**
- **Quality management system**
- **GB/T19001-2000 IDTidt ISO 9001:2000**
- **GB/T 24001-2004/ISO 14001:2004**
- **GB/T 28001-2001**
  Shanghai Audit Center of Quality System
- **ISO/TS 16949**
  Quality management system for the automotive industry
- **Modul D – Ship outfitting**
  Quality management system for products according to module D of the Ship Outfitting Directive
- **Ökoprofit**
  Ecological Project for Integrated Environmental Technology

Permits

- **EC-type examination certification/US Coast Guard**
  Type testing to the requirements of the Ship Outfitting Directive
- **BWB/WIWEB**
  Product releases for the German armed forces for use in ships and boats of the German Navy for special application cases
- **DNV**
  Product approvals by Det Norske Veritas
- **GL**
  Product approvals by Germanische Lloyd
- **Transport Canada**
  Product approvals by Transport Canada

Service and Logistics

Service and Logistics

TRUST THE EXPERTS!

Customer service, customer care, customer satisfaction, customer orientation ... many words, many phrases. We – the employees of the HKO Group – are here for you! Service is not only a word for us to decorate this brochure: To us service means commitment, passion and competition!

Our technicians and engineers are already involved during the design and development of specific applications. This way we are able to combine technical and commercial aspects of your requirements and projects in a marketable way.

Successful, sustainable and, in particular, long-term collaboration requires perfect logistics and disposition services as well. Our modern high rack warehouse is an example that we do not only ensure constant availability of our standard products, but that we can also reliably deliver customer-specific components and articles. For this purpose, we installed a global logistics system to reliably and quickly deliver our products to any requested location.

Thermal Insulations shipbuilding industry

FROM TOASTERS TO THE „DREAM VOYAGER“

If you would like to protect sensitive components against high temperatures, to minimize heat loss in pipelines, engines and turbines, or to insulate rear and internal panels of devices and instruments: In the matter of thermal insulations the HKO experts are globally demanded dialog partners.

Our highly efficient materials provide valuable services in different industries. The product portfolio of the HKO Group offers solutions for the demanding challenges in the chemical industry, complicated tasks in power plants, and new applications in automotive engineering, shipbuilding, and materials for furnace renovation. Even manufacturers of conventional electrical appliances can benefit from our range of services.

Thermal Insulations shipbuilding industry

Our range of products in the area of Thermal Insulations

- Needle mats, mechanically stitched, without bonding agent, made of Thermo-E glass, Hakotherm®-800, Hakotherm®-1200, and Hakotherm®-1300 from 550 °C to 1,100 °C, thickness up to 50 mm
- Stitch-bonded needle mats, made of Thermo-E glass, Hakotherm®-800, Hakotherm®-1200, and Hakotherm®-1300 from 550 °C to 1,100 °C, thickness up to 12 mm
- Textile heat protection fabrics
- Laminations, coatings, self-adhesive and special fitments
- 3-D molded parts
- Insulating plates
- Textile special solutions

Hyun Jin, South Korea, shipbuilding engineer

TRUST THE EXPERTS!

„We have successfully collaborated with the HKO Group for a long time. In shipbuilding we benefit from the extraordinary large portfolio of high-quality insulation products. From building the ship to the interior decoration."

Thermal insulations for the automobile industry

YOUR DEMAND IS OUR DRIVING FORCE

Engine compartments, exhaust gas systems, turbochargers or sensitive duct systems – we have the solutions for all thermal problems in the automotive manufacturing. Whether it is the heat shield or insulation at the HOT END or COLD END – we lead your problems concerning insulation, acoustics and shielding to a HAPPY END.

New regulations, emission limits, registration requirements, high performance engines do not stand in the way of the creativity and innovative strength of HKO experts; rather, they are the driving force for our automotive activities. Ecology or economy, whichever way, you will drive well with us.

Thermal insulations for the automobile industry

Applications for thermal insulations in the automobile industry

- **Engine compartments**
  - Stitch-bonded mats and stampings made of Hakotherm®-1200
- **Exhaust gas system**
  - Needle mats and stampings made of Thermo-E glass, Hakotherm®-800, Hakotherm®-1200 and Hakotherm®-1300
  - Stitch-bonded mats and stampings made of Hakotherm®-1200
  - Stitch-bonded mats made of Thermo-E glass
  - Moulded components made of Thermo-E glass, Hakotherm®-800, Hakotherm®-1200 and Hakotherm®-1300
  - Stuffing fibres made of Thermo-E glass, Hakotherm®-800 and Hakotherm®-1200
- **Turbocharger**
  - Moulded components made of Hakotherm®-1200
- **Duct system**
  - Ready-made sleeves made of Hakamid®
  - Ready-made sleeves made of Thermo-E glass
  - Ready-made HKO Heat-Shields

Jürgen Zurheide, Germany, Mechanical Engineer in Automotive Technology

TRUST THE EXPERTS!

"We always received full support from the competent team of the HKO Heat Protection Group for our problems. Together, we were able to develop solutions for problems with insulation materials for protecting our duct systems, from prototypes to series production."

High-Temperature Sealings

SEALING FOR SECURE FEELING ...

... for us a symbol of our quality standard to reliably seal (blast) furnaces, boilers, chimneys, dryers, heat exchangers, etc. in an energy-efficient and emission-resistant way. HKO products, such as packaging, ropes and webbings, ensure perfect sealing in foundries, coke oven plants and power plants, in furnace manufacturing as well as in the heavy metal and steel industry.

Our range of products in the area of High-Temperature Sealing

- Packaging made of Hakamid®, Thermo-E glass, Silontex®, Haceram, CMS-Bio, Hakotherm®-1200, from 350 °C to 1,100 °C
- Special packaging with increased wear resistance and density, specifically adapted to this application
- Knitted ropes, ropes and webbings made of Hakamid®, Thermo-E glass, Silontex®, Haceram, CMS-Bio, Hakotherm®-1200, from 350 °C to 1,100 °C
- T-section sealings, welted sealings, pre-fabricated
- Webbings, woven up to 50 mm thickness
- Pre-fabricated shaped sealings
- Sealing plates

Fritz Kämper, foreman in a foundry in Dortmund

TRUST THE EXPERTS!

„It is actually a small miracle, the extreme loads packaging made of Silontex® is able to withstand. The experts of the HKO development department really did a brilliant job.“

Fire and Heat Protection

PREVENTION IS THE BEST PROTECTION

In order to prevent the development and spreading of fire, and to minimize its impact as much as possible, we offer special fabrics for preventive fire protection. These fabrics are used by our customers to fabricate e.g. effective fire and smoke protection gates as well as smoke curtains.

In order to protect persons against extreme temperatures, we manufacture heat-shielding fabrics and knitted fabrics. These are used worldwide for the production of personal protective equipment. Our high-quality fabrics and knitted fabrics ensure highest safety.

Our range of products in the area of Fire and Heat Protection

- For transport protection: Resource for functional protection of devices, semi-finished and finished products
- For personal protective equipment (PPE): Knitted fabrics and fabrics for the fabrication of textile heat-protective clothing (head to toe)
- For welder protection: Complete range of fabrics used in welder protection
- For fire protection: Special fabrics for the fabrication of smoke protection gates, smoke curtains and fire curtains, fire blankets and special fabrics
- For fire protection insulations in shipbuilding: Heat protection fabrics and needle mats

Jim Anderson, USA, Firefighter

TRUST THE EXPERTS!

„As I feel very safe in my protective suit, it is easy to keep a cool head even in the hottest moments of a firefighting job.“

Thermal insulations, high-temperature seals, fire and heat protection ...

Thermal Insulations

High-Temperature sealings

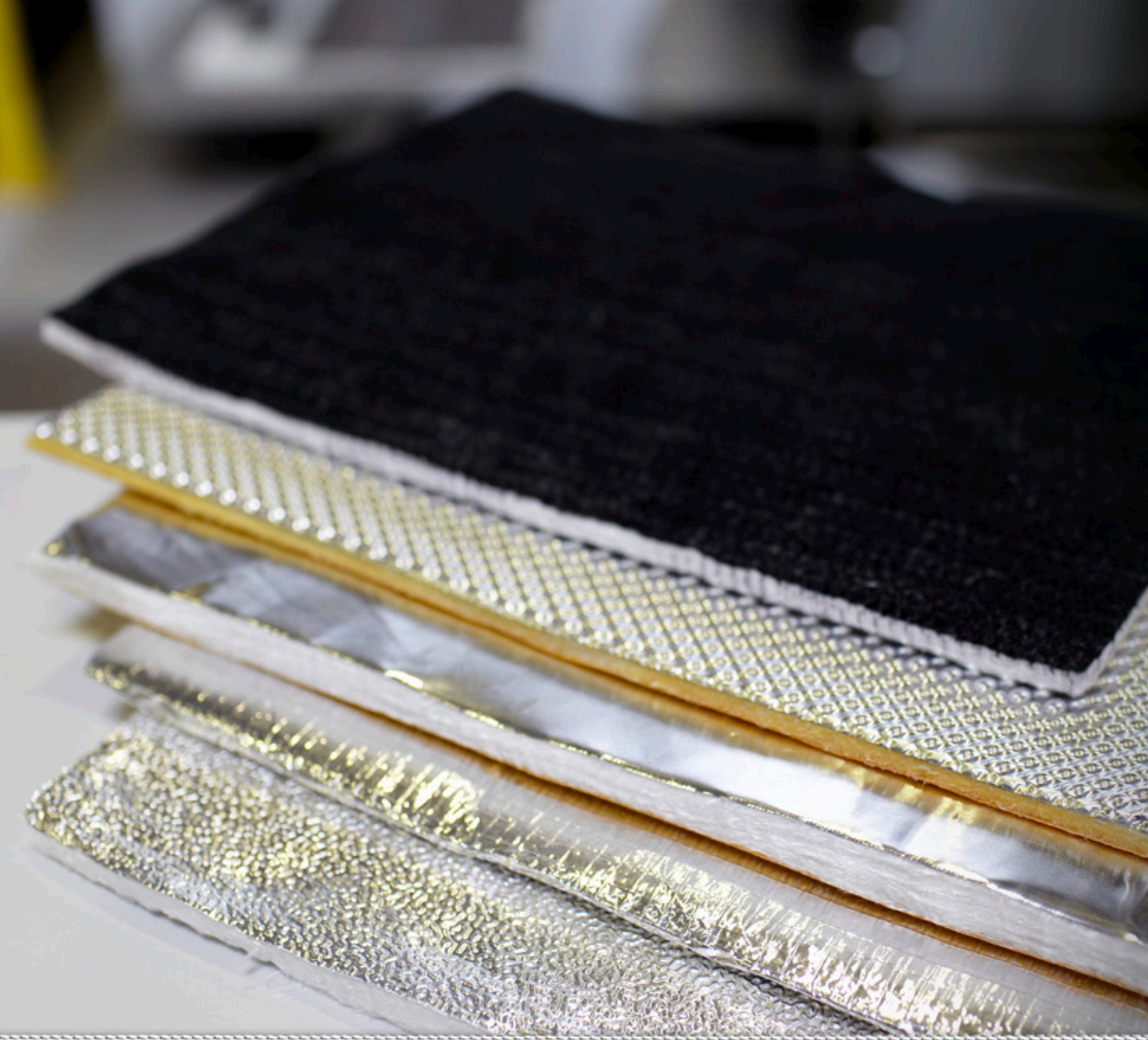
Fire and Heat Protection

EXPERTISE FOR PROFESSIONAL SOLUTIONS

... are the benchmark points of all activities of the HKO Heat Protection Group. These topics are summarized in three dedicated brochures.

- Presentation of our thermal insulation materials for the purpose of reducing heat loss, energy consumption, and protecting sensitive components.
- Sealing materials used in applications where moving or stationary separation surfaces require containment of liquids and gases, and to prevent the loss of heat.
- Textile solutions to avoid and reduce the generation, propagation and impact of fire and extreme heat.

We would be pleased to discuss any application areas not featured in these brochures. We welcome a detailed discussion during a personal consultation at your location, or in the event you would like to visit any of our facilities. We are confident that we can determine the correct product for your application.



Our products

TRUST THE EXPERTS!

The HKO product portfolio of technical textiles ranges from narrow textiles, fabrics, needle mats, 3-D moulded components to textile special solutions. Broad-based and innovative solutions for thermal treatment, coating and lamination are the spearhead of the outcome of our R&D and, naturally, the guarantee for the technological market leadership of the HKO Group.

You can safely trust the HKO product spectrum for temperature ranges of 350°C to approx. 1,600 °C.

Our products

Hakamid®, Hakanit®

Hakamid® and Hakanit® products are manufactured from Aramid fibres; they can also be supplied with different blends.

Thermo-E-Glas

E glass is the high quality manufacturing base for the Thermo-E glass products of the HKO Heat Protection Group. It is distinguished by its high thermal strength and excellent electrical insulating properties.

Hakotherm®-800, Silontex®

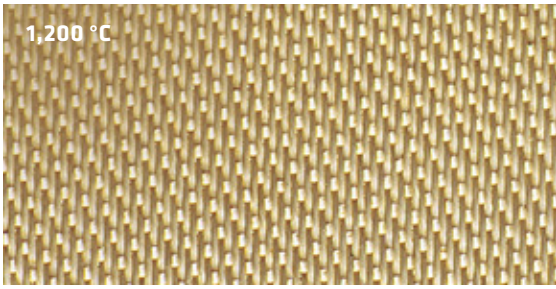
These products of the HKO Heat Protection Group are made of calcium-silicate fibres and possess a filament diameter above 6µ. They offer excellent protection against fluid metals and metal splurges in the light and heavy metal industry.

Hakotherm®-1200, Silicatherm®

Hakotherm®-1200- and Silicatherm® products are made of silicon fibres. They are manufactured from endless yarns having a filament diameter above 6µ.

Silicatex®

The Silicatex® product line is based on a silicate fibre with a high degree of purity (SiO2 content approx. 98.9 %). Due to their high sustained temperature resistance Silicatex® products offer excellent protection against fluid metal splurges and burning cinders.



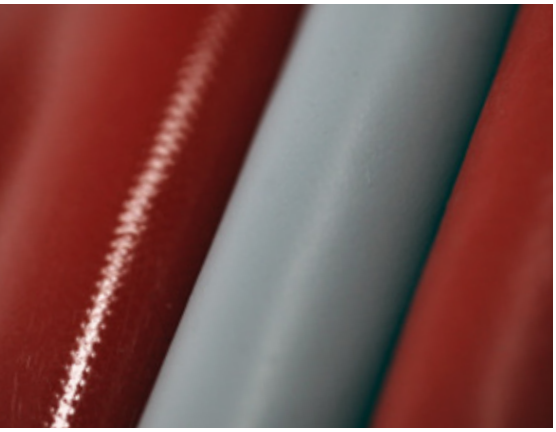
SILICONE COATINGS

Silicone

- One-sided/two-sided coating with silicone rubber with high load capacity even under extreme mechanical, thermal and electrical influences.
- Good light, UV, and oxidation resistance
- Considerable resistance to acids and alkaline solutions, weatherproof
- Good dirt- and oil-repellent effect, good electrical insulation

Standard silicone

- Temperature resistance from approx. –50 °C to approx. +250 °C with excellent flexibility
- Different color settings possible



Transfer silicone

- One-sided coating using the transfer process -
- Surface:
  - Closed or uniform
  - Mat or glossy
  - Smooth or structured

High-temperature silicone

- Improved temperature resistance from approx. –50 °C to approx. +300 °C
- Short-term (1 h) to approx. +350 °C
- Different color settings possible

Topcoat

- Silicone rubber topcoat with dry, soft touch for improved fabrication characteristics

HIGH-TEMPERATURE TREATMENT

HTM600

- Flame-resistant inorganic treatment up to approx. 600 °C
- Soft touch, dust-binding
- Increased slip resistance

CS

- Flame-resistant treatment up to approx. 700 °C
- Permanent temperature resistance, short-term up to approx. 750 °C
- High slip and cut resistance
- Different color settings possible

HT90

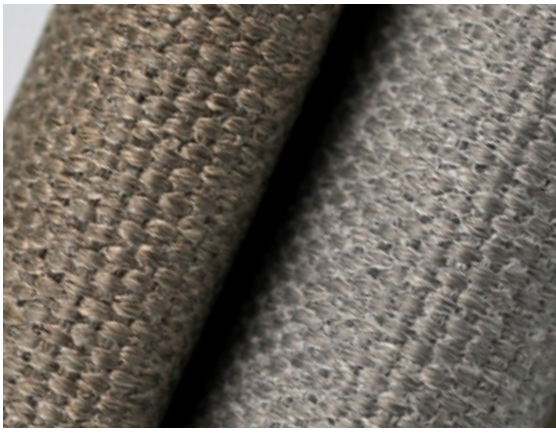
- Inorganic, white special treatment for short-term temperature loads of up to 900 °C
- Permanent temperature resistance up to approx. 750 °C
- Fabric with high rigidity

AR/FH1000

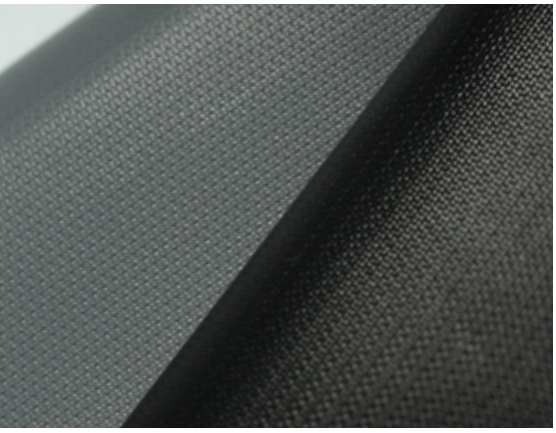
- Golden brown fabric treatment for improved abrasion, cut, and tear resistance
- Temperature resistance up to approx. 1,000 °C

G-Tec/G-Tec Ultra

- Improved wear resistance:
  - Excellent abrasion resistance
  - Martindale (8 h/650 °C) > 8,000 cycles
- Flame-resistant, 30 s edge flaming = self-extinguishing
- Available in different color settings
- **G-Tec**
  - Gray special treatment with metal oxide.
  - Temperature resistant up to 700 °C (permanent temperature)
  - as well as short-term (8 h) 750 °C
- **G-Tec Ultra**
  - Additional, multi-step treatment minimizes smoke and off-gassing



COATINGS



Alufix, G1/G2, W1/W2

- Flame-resistance Polyurethane coating with aluminum pigmentation
- Solvent- and halogen free
- No thermal decomposition up to approx. 200 °C
- Maximum application temperature approx. 500 °C
- Short-term temperature up to approx. 600 °C
- Improved slip and cut resistance
- Additional flame resistant treatment
- Diverse certifications and testing evaluations are available
- W1/W2–SW1 treatments available as white or black Polyurethane coating

Oleophob

- Impermeable to oil at room temperature for 3 months (certified by HKO laboratory test method)
- Oil resistance with grade 8 ensured on non-annealed materials (based on AATCC 118)
- No change with respect to flammability
- Oleophobic properties resist organic acid concentrations common in practical applications, hard water, and commercial diesel or gasoline fuels
- Long-term temperature resistance up to 200 °C (4 h) and short-term (1 h) 300 °C
- Slight color changes possible after high temperature exposure

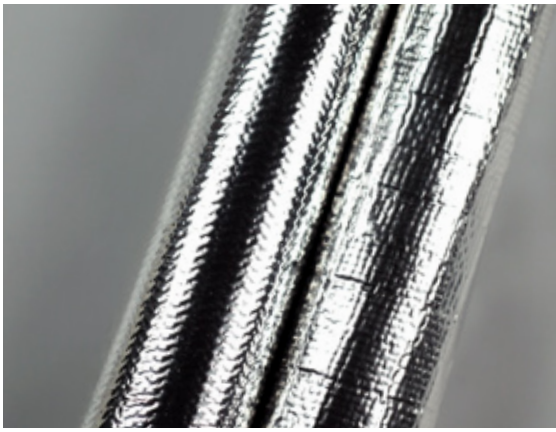
PTFE

- One-sided/two-sided coating based on PTFE
- Excellent anti-adhesive properties
- Low friction coefficient
- Temperature resistance: -25 °C to +260 °C, higher short-term
- Available in multiple color variations
- Variants: static (gray), antistatic (black)

LAMINATIONS

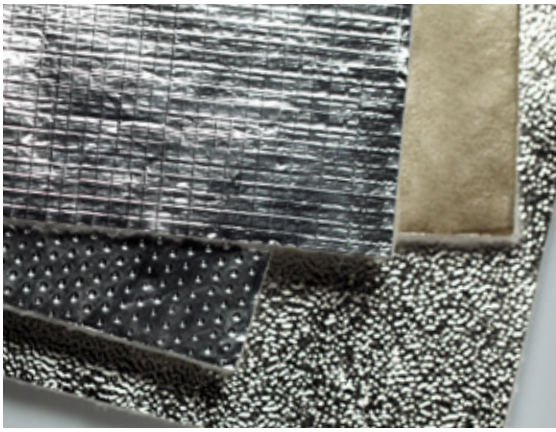
Aluminum / stainless steel foil

- One-sided bonded to fabrics or needle mats
- Abrasion and flex resistant
- High thermal radiation reflection capacity depending on the foil material
- Maximum application temperature:
  Standard approx. 170 °C contact heat, higher resistance after initial exposure
- Available in smooth, perforated, coarse grain, and embossed finishes



Aluminum-pigmented transfer foil

- One-sided aluminum pigmentation film
- Flexible and smooth
- Abrasion and flex resistant
- Good thermal radiation reflection capability
- Variants: mat or mirror finish

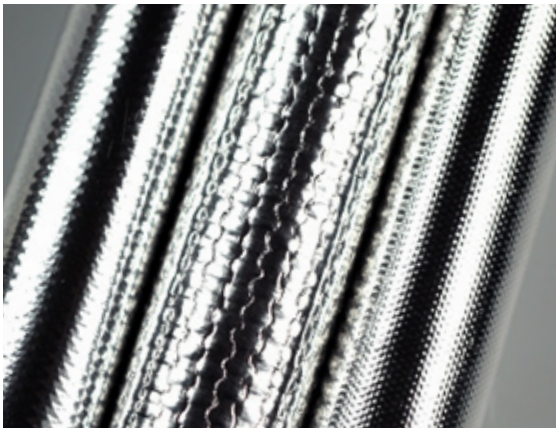


Al-PES foil

- One-sided lamination of polyester foil vapor-barrier with aluminum on one or two sides of 6 µ or 12 µ thicknesses
- Good thermal radiation reflection capability
- Good media resistance, gas-tight
- Maximum contact heat approx. 180 °C–200 °C
- Maximum application temperature:
  Standard approx. 170 °C, higher possible after exposure

Self-adhesive coating

- Available with option of paper foil liner, or scrim
- Higher strength and cut resistance
- Protection against fraying
- Excellent as an assembly aid
- Suitable for fabric and needle mat lamination
- Available with different temperature resistances upon request



Our products

Yarns

- Temperature resistance from approx. 400 °C to 1,000 °C
- Textured and/or twisted, available with chromium steel wire reinforcement
- Thermo-E glass, 34–4000 tex
- Silontex®, 300 tex x 2–1250 tex x 3
- Hakotherm®-1200, 66–2000 tex

Ropes

- **Twisted**
  - Temperature resistance from approx. 350 °C to 1,000 °C
  - Hakamid®, Thermo-E glass, Silontex®, and Hakotherm®-1200, 3–30 mm diameter

- **Knitted rope**
  - Temperature resistance from approx. 400 °C to 1,000 °C
  - Thermo-E glass, 3–30 mm diameter, available in white and anthracite
  - Hakotherm®-1200, 3–30 mm diameter

- **Knitted ropes with metal overbraid**
  - Temperature resistance from approx. 350 °C to 1,000 °C
  - Available products range from Hakamid® to Hakotherm®-1200 materials

- **Braided rope**
  - Temperature resistance from approx. 400 °C to 1,000 °C
  - Wide- and narrow meshed overbraid
  - Thermo-E glass, 3–40 mm diameter
  - Silontex® and Hakotherm®-1200, 3–35 mm diameter

HACERAM® AND CMS-BIO PRODUCTS AVAILABLE UPON INQUIRY

NARROW TEXTILES

Packing

- **Square and rectangular braided**
  - Temperature resistance from approx. 350 °C to 1,000 °C
  - Hakamid®, Thermo-E glass, and Silontex®, 5–80 mm
  - Hakotherm®-1200, 4–80 mm

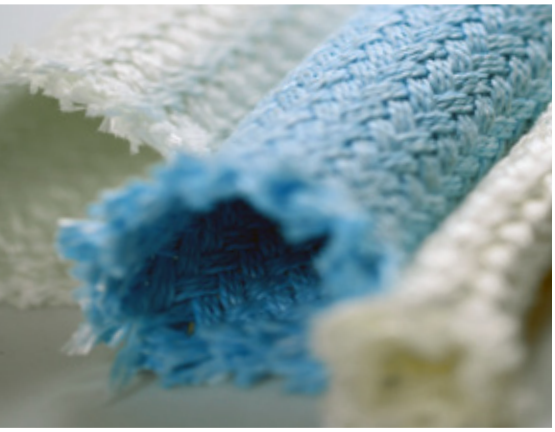
- **Round braided**
  - Temperature resistance from approx. 350 °C to 1,000 °C
  - Hakamid® 6–80 mm diameter
  - Thermo-E glass, 3–80 mm diameter
  - Silontex®, 4–80 mm diameter
  - Hakotherm®-1200, 4–80 mm diameter

- **Tubular packing**
  - Temperature resistance from approx. 750 °C to 1,000 °C
  - made from Silontex®, 15–120 mm diameter
  - made from Hakotherm®-1200, 12–120 mm diameter
  - Available with chromium steel wire reinforcement overbraid
  - Core material produced using CMS-Bio, Hakotherm®-800 or Hakotherm®-1200

- **Treatments/arrangements**
  e.g. FH1000 or graphite
  - Temperature resistance increase
  - Mechanical load capacity increase

HACERAM® AND CMS-BIO PRODUCTS AVAILABLE UPON INQUIRY

Our products



Sleeves

- **Braided**
  - Temperature resistance from approx. 350 °C to 1,000 °C
  - Hakamid®, 10–120 mm inner diameter
  - Thermo-E glass, 6–120 mm inner diameter
  - Silontex®, 8–120 mm inner diameter
  - Hakotherm®-1200, 5–120 mm inner diameter

- **Thermo-E glass filament sleeve, braided**
  - Temperature resistance up to approx. 550 °C
  - 0.5–200 mm inner diameter
  - Available with chemical impregnation or silicone-coated

- **Wire sleeve, overbraided or knitted**
  - Temperature resistance from approx. 300 °C to 1,000 °C
  - Multiple material composite combinations are available
  - Overbraid made of Hakamid®, Thermo-E glass, Silontex® or Hakotherm®-1200

- **Fire protection sleeve**
  - 10–300 mm inner diameter

- **Ready-made from fabrics**
  - Made of Hakamid®, Thermo-E glass, Silontex®, Hakotherm®-1200 and Silicatherm
  - Manufacturing according to customer requirement

HACERAM® AND CMS-BIO PRODUCTS AVAILABLE UPON INQUIRY

NARROW TEXTILES

Woven webbings

Temperature resistance from approx. 350 °C to 1,000 °C

- **Hakamid®**
  - 2–20 mm thickness, widths upon inquiry, optionally with brass reinforcement
- **Thermo-E glass**
  - 1–3 mm thickness, widths upon request, one-layer weaving, plain or twill weave
  - 4–50 mm thickness, widths upon request, multi-layer weaving, plain weave
- **Silontex®**
  - 2–3 mm thickness, 15 – 300 mm width, one-layer weaving, plain or twill weave
  - 4–50 mm thickness, widths upon request, multi-layer weaving, plain weave
- **Hakotherm®-1200**
  - 2–3 mm thickness, 15 – 300 mm width, one-layer weaving, plain or twill weave
  - 4–15 mm thickness, widths upon request, multi-layer weaving, plain weave

Hakamid pneumatic webbing for conveying channels

- Thickness: approx. 4.5 mm
- Width: approx. 150–700 mm
- Additional thicknesses and widths upon request

Ladder webbing

- Thermo-E-Glass, Silontex® and Hakotherm®-1200
- Temperature resistance from approx. 400 °C to 1,000 °C
- 2–6 mm thickness, widths upon request

Fine webbing, woven

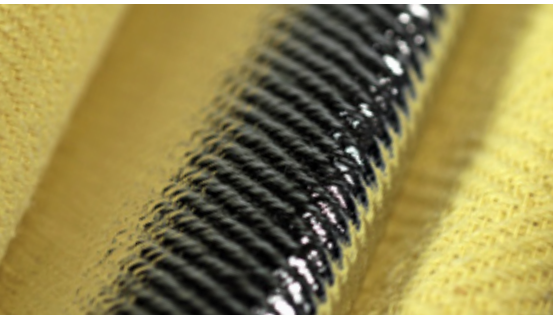
- Temperature resistance from approx. 400 °C to 1,000 °C
- Thermo-E glass, 0.1–0.4 mm thickness, widths upon inquiry
- Hakotherm®-1200, 0.2–0.5 mm thickness, widths upon inquiry

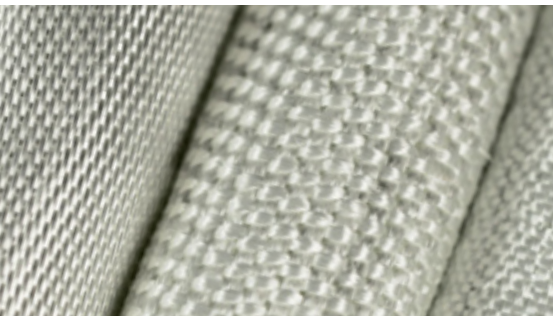
Knitted webbing made of Thermo-E glass

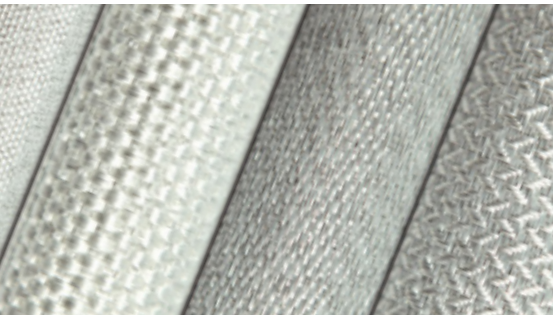
- Temperature resistance up to approx. 550 °C
- 2–4 mm thickness, 8–30 mm widths, available one-side self-adhesive to aid in assembly

HACERAM® AND CMS-BIO PRODUCTS AVAILABLE UPON INQUIRY

Our products







Hakamid® fabric

- Temperature resistance up to 350 °C possible
- Thickness: approx. 0.5–2.2 mm
- Weight: approx. 210–750 g/m²
- Weave: Herringbone, twill, plain and panama

Hakanit® knitted fabric

- Temperature resistance up to 350 °C possible
- Weight: approx. 45–70 g/m in case of cuff wear, approx. 190–320 g/m² in case of knitwear
- Knitwear available as sleeve or wide fabric
- Weave: Fleece, double face, interlock, cuff, rep 4/4, terry

Thermo-E glass fabric made of filament yarns

- Temperature resistance up to approx. 550 °C
- Thickness: approx. 0.2 – 1.4 mm
- Weight: approx. 100–1,000 g/m²
- Weave: Plain, cross twill, checked and satin 1/7

Thermo-E glass fabric made of textured yarns

- Temperature resistance up to approx. 550 °C
- Thickness: approx. 0.9–4.5 mm
- Weight: approx. 430–3,000 g/m²
- Weave: Plain, twill 2/2, twill, cross twill and panama

Thermo-E glass fabric with V4A wire made of textured or filament yarns

- Temperature resistance up to approx. 550 °C
- Thickness: approx. 0.5–1.7 mm
- Weight: approx. 460–1,200 g/m²
- Weave: Plain, panama, cross twill, satin 1/7 and twill

HACERAM® AND CMS-BIO PRODUCTS AVAILABLE UPON INQUIRY

FABRICS/ KNITTED FABRICS

Silontex® fabric made of textured and twisted yarns

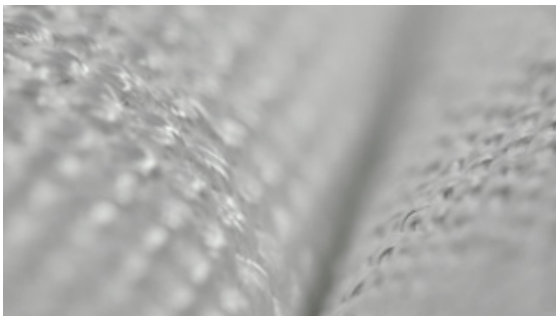
- Temperature resistance up to approx. 750 °C
- Thickness: approx. 1.8 – 3.2 mm
- Weight: approx. 1,100 – 2,000 g/m²
- Weave: Plain and twill

Silicatherm® fabric made of filament yarns

- Temperature resistance up to approx. 1,000 °C
- Thickness: approx. 0.5 – 1.3 mm
- Weight: approx. 300 – 1250 g/m²
- Satin weave
- Available as annealed/pre-shrunk fabric

Hakotherm®-1200 fabric made of textured yarns

- Temperature resistance up to approx. 1,000 °C
- Thickness: approx. 1.0 – 3.0 mm
- Weight: approx. 740 – 2,000 g/m²
- Optionally available with V4A wire reinforcement



Silicatex® fabric made of filament yarns

- Temperature resistance up to approx. 1,200 °C
- Thickness: approx. 0.7 – 1.3 mm
- Weight: approx. 650 – 1,250 g/m²
- Satin weave
- Available as annealed/pre-shrunk fabric
- Available as cut webbing with one-side cut-resistant treatment, widths upon request

HACERAM® AND CMS-BIO PRODUCTS AVAILABLE UPON INQUIRY

Our products

Needle mats

- Temperature resistance from 550 °C to 1,600 °C
- Thermo-E glass, type NE and Hakotherm®-800, type NA
  - Thickness: approx. 3–50 mm
  - Area weight: approx. 300–8,000 g/m²
  - NESA type available with low-odor/low-emission characteristics
- Hakotherm®-1200, type SK; Hakotherm®-1200 Turbo, type ST, and Hakotherm®-1300, type SI
  - Thickness: approx. 3–30 mm
  - Area weight: approx. 400–5,100 g/m²

Needle stitch-bonded mats

- Temperature resistance from 550 °C to 1,100 °C
- Thermo-E glass, type NGME
- Hakotherm®-800, type NGMA
- Hakotherm®-1200, type NGMS
- Hakotherm®-1300, type NGMI
  - Thickness: approx. 4–12 mm
  - Area weight: approx. 900–2,900 g/m²
  - Stabilized stitching using high temperature sewing threads

Molded parts as 3D parts and tubular sleeves

- Temperature resistance from 550 °C to 1100 °C
- Made of Thermo-E glass, Hakotherm®-800, Hakotherm®-1200, Hakotherm®-1200 Turbo and Hakotherm®-1300
- 3D molded parts constructed from vibration-resistant needle mats
- Produced using inorganic bonding agent

HACERAM® AND CMS-BIO PRODUCTS AVAILABLE UPON INQUIRY

NEEDLE MATS/MOLDED PARTS

Stamped parts

- Temperature resistance from 550 °C to 1,100 °C
- Two-dimensional shapes
- Stamped, made of Thermo-E glass, Hakotherm®-800, Hakotherm®-1200 and Hakotherm®-1300
- Available with self-adhesive treatments to aid in assembly

Custom built products

- Lamination of fabrics and needle mats with aluminum foil, stainless steel foil, or self-adhesive treatment
- Lamination of need mats with various fabrics
- Hybrid mat manufactured from different materials

Stuffing fibers

- Made of Thermo-E glass, Hakotherm®-800 and Hakotherm®-1200
- Temperature resistance from 550 °C to 1,600 °C

Fiber boards

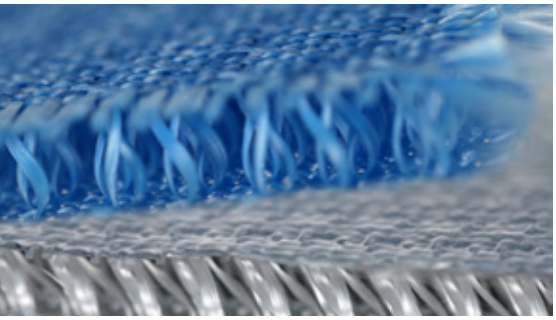
- Temperature resistance from 1,000 °C to 1,250 °C
- Hakotherm®-1200
  - Thickness: approx. 10–200 mm
- Hakoplan-1100-Bio, free of ceramic fibers
  - Size: 1,000 x 1,000 mm
  - Thickness: approx. 2–10 mm

HACERAM® AND CMS-BIO PRODUCTS AVAILABLE UPON INQUIRY

Our products

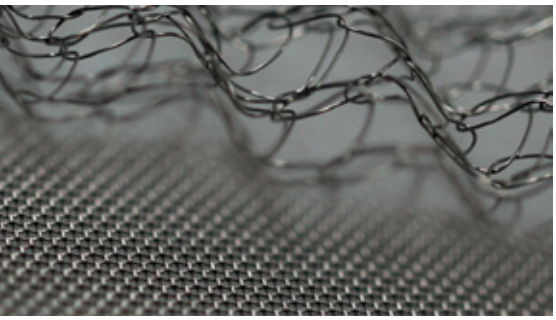
HKO-Megatex

- Available as fabrics or needle mats
- Metal coatings: stainless steel, brass, copper, titanium and titanium nitride
- Other metal coatings upon request
- The innovative HKO Megatex products are manufactured without the addition of organic polymers
- This special finishing process eliminates the classic weaknesses found from organic bonding, or other coatings resulting in smoke/ odor development, and low temperature resistance



Thermo-E glass 3D fabric made of filament yarns

- Temperature resistance up to 550 °C
- Width: approx. 635 and 1270 mm
- Standard thicknesses and weights:
  - 3 mm, 780 g/m²
  - 5 mm, 840 g/m²
  - 8 mm, 930 g/m²
  - 10 mm, 1,430 g/m²
  - 12 mm, 1,500 g/m²
  - 15 mm, 1,600 g/m²
  - 18 mm, 1,680 g/m²
  - 22 mm, 1,720 g/m²
- Available with FH1000, CS, silicone and polyurethane coating as well as different foil laminations



Wire fabrics and knitted wire fabrics

- Available in various steel types, e.g. 1.4301
- Wire diameter, mesh size, and widths upon request
- Knitted fabrics available in waved finish

Molded parts/ready-made fabric parts

- Fabricated using high temperature sewing threads, Velcro straps, or snap fasteners

SPECIAL PRODUCTS

Spacer fabrics

- Made of ECR glass
  - Thickness: 12 and 16 mm
  - Weight: 1,200 and 2,800 g/m²
  - Width: 610 and 1,000 mm
- Made of Hakotherm®-1200-S
  - Thickness: 6, 12 and 16 mm
  - Weight: 2,150, 2,155 and 2,400 g/m²
  - Width: 610 and 1000 mm

Talpatex

- HKO Talpatex coating is an intumescent coating
- Processed according to customer requirements or application purposes
- Possible expansion temperatures using a Polyurethane matrix: 150 °C, 200 °C and 300 °C
- Possible expansion temperatures using a silicone matrix: 200 °C and 300 °C
- Low expansion temperature: fast flame containment
- High expansion temperature: additional protection from rapid flame propagation
- Minimum coating application: approx. 400 g/m²
- Insulating and expanding effect
- Incombustible, color: black

Sewing threads

- Made of Hakamid®, Thermo-E glass or Hakotherm®-1200
- Available with or without steel wire reinforcement

Textile profile gaskets and multi-layer stitched webbing

- Pre-fabricated and woven
- Manufactured for your unique application purposes

TRUST THE EXPERTS!

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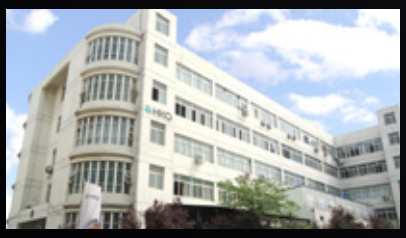

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