Industrial applications

Textiles for fire and flame

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Industry sectors

HKO

Textiles for fire and flame

- Automotive
- Aluminium industry
- Chemical industry
- Power stations
- Glass industry
- steelworks
- Industrial furnaces
- Tiled stoves
- Shipyards
- Bricks Clinker Ceramics
- Protective clothing

Automotive applications

Textiles for fire and flame

cars	*motorcycles*	*busses*	*trucks*
⇨ exhaust systems	⇨ exhaust systems	⇨ exhaust systems	⇨ exhaust systems
⇨ tank systems		⇨ Engine area	

Exhaust Systems

Textiles for fire and flame

- ⇨ 1. Catalytic converter
- ⇨ 2. Manifold
- ⇨ 3. Exhaust Tube
- ⇨ 4. Diesel Suitfilter
- ⇨ 5. Muffler
- ⇨ 6. Heatshields

Products for Catalytic Converters

Textiles for fire and flame

Product	Variant	Reason
cone insulation	*Hakotherm® -1200-felt in various thicknesses & densities (needle mat/stitch-bonded felt)*	*manifold demands, insulation healthy harmlessness, vibration, pulsation and temperature resistance*
protection against erosion (monolith)	*Silicatex®-webbings, tempered or untempered*	*point of view: tempered: expensive, but shrinking < 7% untempered: low-priced, but shrinking >/= 12 %*
converter insulation	*Hakotherm® -1200-felt in various thicknesses & densities*	*manifold demands, insulation healthy harmlessness, vibration, pulsation and temperature resistance*

Products for Manifolds/Exhaust Tubes

Textiles for fire and flame

Product	Variant	Reason
insulation	*Hakotherm®-1200-felt in Various thicknesses & densities (needle mat/stitch-bonded felt)*	*manifold demands, insulation healthy harmlessness, vibration, pulsation and temperature resistance*

Products for Diesel Suitfilter

Textiles for fire and flame

Product	Variant	Reason
filteration material	*Hakotherm®-1200-yarn*	*Knitting of ‚donut-rings‘ made of tempered yarns*

Products for Mufflers

Textiles for fire and flame

Product	Variant	Reason
acoustic material	*Hakotherm®-1200-felt and - stuffing fibres* *Thermo-E-glass-stuffing fibres, needle mat and frottee-yarns*	*you can choose between stuffing fibres, felt or needle mat* *especially for racing*

Products for Heatshields

Textiles for fire and flame

Product	Variant	Reason
sandwich insulation	*Thermo-E-Glass-needle mat*	*technical insulation with the following demands:* ⇨ *insulation* ⇨ *acoustic* ⇨ *sound* ⇨ *vibration* ⇨ *trash*

Products for Tank Systems

Textiles for fire and flame

Product	Variant	Reason
tank insulation	*Thermo-E-Glass-needle mat*	*technical insulation with the following demands:* ⇨ *insulation* ⇨ *acoustic* ⇨ *sound* ⇨ *vibration* ⇨ *trash*

Products for Turbo Charger

Textiles for fire and flame

Product	Variant	Reason
insulation	*Hakotherm®-1200-felt in various thicknesses & densities (needle mat/stitch-bonded felt)*	*manifold demands, insulation healthy harmlessness, vibration, pulsation and temperature resistance*

Power stations

Textiles for fire and flame

⇨ coal power stations

⇨ nuclear power stations

⇨ gas oil stations

Applications in coal power stations

Textiles for fire and flame




- ⇨ welding protection
- ⇨ coal mill linings
- ⇨ conveyor belts for ash removal installations
- ⇨ turbine insulations

Products in coal power stations

Textiles for fire and flame

- ***Welding protection fabrics***

  Typical fabrics for repair works are e.g..:

  - ***TG 660 G1; TG 1000-HT 90; TG 1000 „Alufix“ (on one or on both sides);***
  - ***TG 1000-FH 1000; Silicatherm® fabrics; TG 430 with aluminium foil on one side***

These fabrics are used to protect surrounding parts/installations from sparks or welding beads

- ***Coal mill linings***

  Typical packings are e.g.:

  - ***Thermo-E-glass packing, graphited outside***
  - ***Silontex® packings; alternatively with FH-1000 coating***

Decisive for the very type of packing are extent of raise of temperature and the mechanical stress caused by the large doors.

- ***Conveyor belts for ash removal installations***

  Hakamid-350 pneumatic belt with air permeability allowed for air conduits

The air permeability is necessary to produce insulating „air cushions“ between belt and ash.

⇨**Turbine insulation**

Ready-made mould mattress made from glass fabric with glass mat filling

Insulations in power stations

Textiles for fire and flame

Turbine insulation

Pre-ready-made mattresses and cushions

- *easy mounting and dismounting*
- *very good sound insulation properties*

Insulation of pipelines & fittings

Pre-ready-made mattresses and cushions

- *easy mounting and dismounting*
- *very good sound insulation properties*

- *Fabric shell made from sturdy glass fabrics such as TG 650-HTM 600 or TG 660 V4A-G1*
- *glass needle mat filling*
  - *vibration-proof*
  - *non-combustible*
  - *good thermal conductivity, therefore space-saving*

Applications in nuclear power stations

Textiles for fire and flame

- ***Welding protection fabric***
  - ***Typical fabrics for repair works are e.g.:***
    - ***TG 660 G1-CA; TG 430 with aluminium foil on one side***

These fabrics are used to protect surrounding parts/installations from sparks and welding beads.

⇨**Insulation of pipelines & fittings**

⇨***Ready-made mould mattresses made from glass fabric (mostly TG 660-V4A-G1) with fibre mat filling***

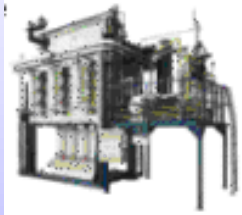
Here often a low content of soluble chloride ions as per KWU standard is required.

Industrial kiln

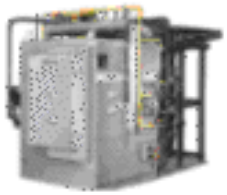
Textiles for fire and flame

⇨ Fire door rope gaskets

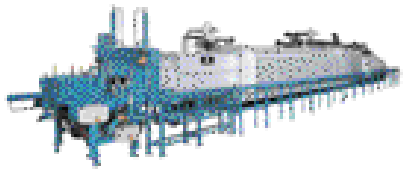
Top-hat kiln



Chamber kiln



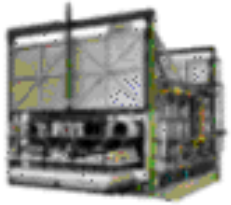
Pusher-type kiln



⇨ furnace vessel packings

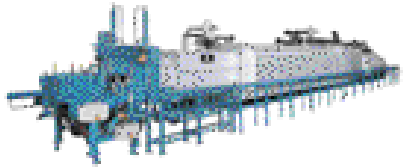
Tunnel kiln with car conveyance

Shuttle kiln



⇨ insulations for continuous kiln

Pusher-type kiln



Tunnel kiln with car conveyance

Products for industrial furnaces

Textiles for fire and flame

Fire door linings

- **Ropes, packings, tapes**
  - material choice (depending on temperature): Thermo-E glass, Silontex®, Hakotherm®-1200
  - types and dimensions depending on the construction of the furnace
- **„Flag“ profiles, „welt“ profiles**
  - ready-made single and double profiles;
  - fabric shell & filling depending on temperature and construction of furnace

Furnace vessel linings

- **Hose packings**
  - fibre mat stripes braided with calcium silicate yarn
  - soft & adaptable
  - abrasion-proof & temperature-resistant

Continuous furnace insulations

- **Curtains made from fabric stripes**
  - ready-made fabrics (glass, calcium silicate, silicate)

Bricks – clinker - ceramics

Textiles for fire and flame

Furnace insulations

- ⇨packings & tapes acc. to temperature
  - ⇨E-glass up to 550°C
  - ⇨Silontex® up to 750°C
  - ⇨silicate up to 1000°C

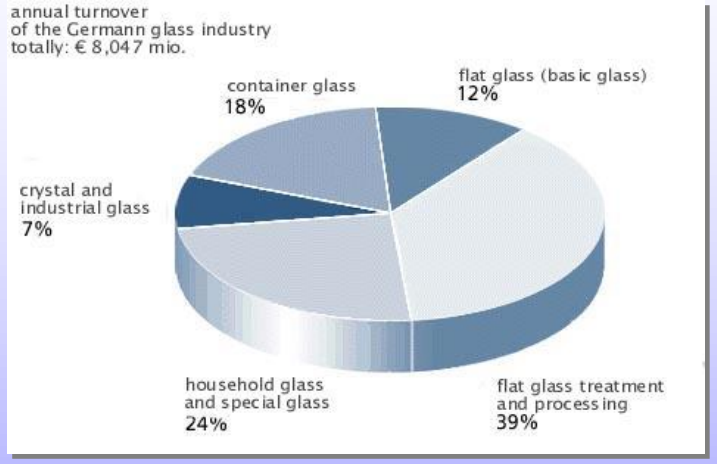
Furnace vessel insulations

- ⇨Hose packings
  - ⇨Resistant to abrasion & temperature
  - ⇨Economy-priced
  - ⇨Soft & adaptable

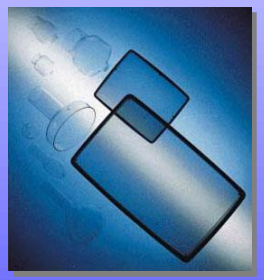
Glass

Textiles for fire and flame

- ⇨ Container glass
- ⇨ Flat glass
- ⇨ Special glass
- ⇨ Treatment and processing
- ⇨ Crystal glass







Applications – container glass

Textiles for fire and flame

Insulation of tongs

Deposition of hot parts

PPE – personal protective equipment

Tapes and hoses
- ⇨Hakamid-350
- ⇨Silontex®

Fabrics
- ⇨glass fabrics
- ⇨Silicatherm® fabrics

Gloves
- ⇨Hakamid-350 mittens
  - ⇨heat-resistant
  - ⇨frayproof

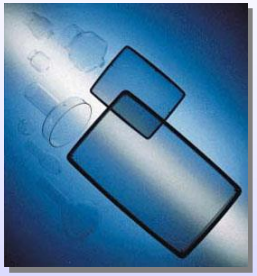
Applications – flat glass

Textiles for fire and flame

Conveyor rollers / conveyor belts	**Tape** ⇨ Hakamid-350 ⇨ Silontex®
Cullet trap	**Hakamid-350 tape** ⇨ frayproof ⇨ abrasion-proof
Intermediate layer	**Flat glass fabric** ⇨ glass fabric with special brushed-up surface
PPE – personal protective equipment	**Gloves** ⇨ Hakamid-350 mittens ⇨ heat-resistant ⇨ frayproof

Applications – special glass

Textiles for fire and flame



Conveyor rollers / conveyor belts

Tape
- ⇨Hakamid-350
- ⇨Silontex®

Take out vacuum pads

Multi-layer ready-made airtight textile disc
- ⇨for taking out e. g. TV glass

Deposition of hot parts

Fabric
- ⇨glass fabric
- ⇨Silicatherm® fabric

PPE – personal protective equipment

Gloves
- ⇨Hakamid-350 mittens
  - ⇨heat-resistant
  - ⇨frayproof

Applications – glass treatment and processing

Textiles for fire and flame

Insulation of tongs

Deposition of hot parts

PPE – personal protective equipment

Tape and hose
- ⇨Hakamid-350
- ⇨Silontex®

Fabric
- ⇨glass fabric
- ⇨Silicatherm® fabric

Gloves
- ⇨Hakamid-350 mittens
  - ⇨heat-resistant
  - ⇨frayproof

Applications – crystal and household glass

Textiles for fire and flame

Insulation of tongs

Deposition of hot parts

PPE – personal protective equipment

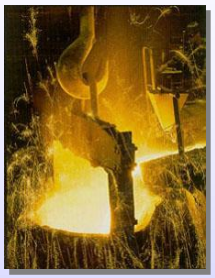
Tape and hose
- ⇨Hakamid-350
- ⇨Silontex®

Fabric
- ⇨glass fabric
- ⇨Silicatherm® fabric

Gloves
- ⇨Hakamid-350 mittens
  - ⇨heat-resistant
  - ⇨frayproof

Steelworks

Textiles for fire and flame


- ⇨ Coking plant
- ⇨ Blast furnace
- ⇨ Hot strip
- ⇨ Foundry
- ⇨ Hardening shop



Applications in the coking plant

Textiles for fire and flame

Coking plant – chamber door packings

Silontex® hose packing

- ⇨*frayproof*
- ⇨*mouldable*
- ⇨*relatively economy-priced*

Hakotherm®-1200 packing

- ⇨*optimum sealing*
- ⇨*low ignition loss*
- ⇨*low emission rate*
- ⇨*relatively expensive*

Applications at the blast furnace

Textiles for fire and flame

Fabrics for thermal protection

Protection from radiant heat & steel splashes

- ***TG 430 aluminium foil on one side;***
- ***TG 660 G1; TG 1000-HT 90; TG 1000 with „Alufix“ on one or on both sides;***
- ***TG 1000-FH 1000; Silicatherm®***

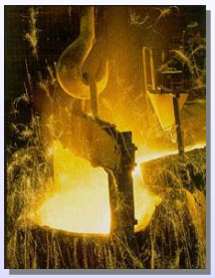
PPE – personal protective equipment

Gloves / aprons / bonnets

- ***⇨heat-resistant***
- ***⇨sturdy***
- ***⇨laminated with aluminium foil for heat reflection***

Applications in the foundry

Textiles for fire and flame



Fabrics for thermal protection	**Protection from radiant heat & steel splashes** **TG 430 with aluminium sheet on one side;** **TG 660 G1; TG 1000-HT 90; TG 1000 with „Alufix“ on one or both sides;** **TG 1000-FH 1000; Silicatherm®**
Cable protection	**Protection from radiant heat & steel splashes** **⇨tapes made from glass fabric HT 90,** **⇨tapes made from Silicatherm®** **⇨hoses made from Silontex®**
Insulating boards	**Hakoplan-1100 board** **⇨deposition of hot parts** **⇨heat shield**
PEE – personal protective equipment	**Gloves / aprons / bonnest** **⇨heat-resistant** **⇨sturdy** **⇨laminated with alumimium for heat reflection**

Applications at the hot strip

Textiles for fire and flame

Covering fabrics

TG 810 with aluminium sheet on one side
- ⇨ ***to minimize the loss of heat of the slabs during transport***

PPE – personal protective equipment

Gloves / aprons / bonnets
- ⇨ ***heat-resistant***
- ⇨ ***sturdy***
- ⇨ ***laminated with aluminium for heat reflection***

Applications in the hardening shop

Textiles for fire and flame

Insulating boards	***Hakoplan-1100 boards*** ⇨ ***deposition of hot parts*** ⇨ ***heat shield***
Furnace door packings	***Sealing of hardening & nitriding furnaces*** ⇨ ***packing*** ⇨ ***Silontex®*** ⇨ ***glass packing, graphited outside*** ⇨ ***hose packing*** ***depending on the type of furnace***
PPE – personal protective equipment	***Gloves / aprons / bonnets*** ⇨ ***heat-resistant*** ⇨ ***sturdy*** ⇨ ***laminated with aluminium for heat reflection***

Aluminium industry

Textiles for fire and flame




- ⇨ Production of liquid aluminium
- ⇨ Conveyor crucible packings
- ⇨ Foundry

Aluminium foundries

Textiles for fire and flame

Delivery as
⇨*liquid aluminium in crucibles*

Delivery as
⇨*solid pigs / bars*

solid aluminium molten in furnaces

liquid aluminium is filtered before the casting

⇨*filtering fabrics made from glass or silicate fibres*
⇨*ready-made filtering baskets as per customers' requests*
⇨*different mesh sizes*

Aluminium production

Textiles for fire and flame

Melting

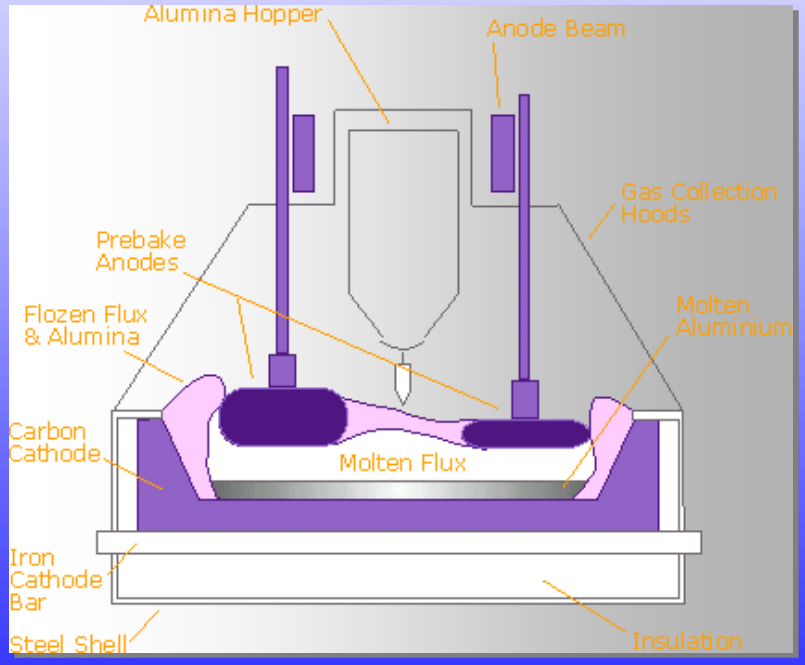
Aluminium is produced from raw materials (aluminium earth) by means of electrolysis

or

by recycling of used aluminium

When melting aluminimum (scrap) in furnaces, furnace packings are used

Elektrolysis



Crucible packings

Textiles for fire and flame

After the electrolysis/melting liquid aluminium is filled into crucibles and taken to foundries

Conveyor crucible packings

Silontex® packing *„Silontex®-ALUseal“*

- ⇨ *square, rectangular or round*
- ⇨ *hard or soft*

Thermo-E-glass filament packing

- ⇨ *graphited throughout*
- ⇨ *airtight*

The choice of the very type of packing depends on the customers‘ requests

Tiled stoves

Textiles for fire and flame

- ⇨ **Furnace door rope gaskets**
- ⇨ **Wall insulations**

Products in tiled stoves

Textiles for fire and flame

Twisted ropes made from E-glass or silicate
- ⇨white or black (optics)

Knitted or woven Thermo-E-glass tapes
- ⇨white or black (optics)
- ⇨raw or self-adhesive (mounting aid)

Sealing profiles
- ⇨white or black (optics)
- ⇨raw or self-adhesive (mounting aid)
- ⇨dimensions as per customers‘ requests

Insulating parts made from
- ⇨Beuhko®-Therm mats

Shipyards

Textiles for fire and flame

- ⇨Welding protection
- ⇨Covering fabrics
- ⇨Insulation of engine and exhaust system

Covering fabrics in shipbuilding

Textiles for fire and flame

Covering fabrics in shipbuilding

As surface finish on rockwool instead of sheeting

- ⇨*low weight*
- ⇨*improved protection of persons because of low heat transfer coefficient*

- ⇨*Thermo-E-glass filament fabrics*
- ⇨*mostly one side with PU (overpaintable)*
- ⇨*non-combustible*
- ⇨*with licence for shipbuilding*
- ⇨*TG 430 G1; TG 660 G1*

Welding protection

Textiles for fire and flame

Welding protection

For protection from sparks and welding breads

- ⇨*TG 430 G1 or TG 660 G1*
- ⇨*TG 1000 with aluminium sheet on one side*
- ⇨*Silicatherm® fabrics*

Insulation of engines & exhaust systems

Textiles for fire and flame

Insulation of motors and exhaust

Pre-ready-made mattresses and cushions

- ⇨easy mounting and dismounting
- ⇨very good sound absorption properties

- ⇨fabric shell made from sturdy glass fabric such as TG 650 HTM 600 or TG 660 V4A-G1
- ⇨glass needle mat filling
  - ⇨vibration-proof
  - ⇨non-combustible
  - ⇨good thermal conductivity, thus space-saving

Chemical industry

Textiles for fire and flame




- ⇨ **Insulations / insulating cushions**
- ⇨ **Gaskets**
- ⇨ **Welding protection**

Insulations in chemical industry

Textiles for fire and flame

High-temperature insulation

Insulation of pipelines, fittings, containers to maintain high processing temperatures

Insulation of pipelines, fittings and containers to protect these from high temperatures in order to maintain low processing temperatures

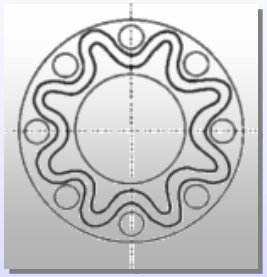
Preventive fire protection

Insulation of pipelines, fittings and containers to protect these from high temperatures in order to avoid an ignition of the media

- *glass, Hakotherm®-1200 tapes*
- *ready-made mattresses / pipeline sheetings / caps*
  - *shells made from coated glass fabrics*
    - *with PTFE – static / antistatic*
    - *silicone on one/on both sides*
    - *PU on one/on both sides*

Gaskets in chemical industry

Textiles for fire and flame



High-temperature gaskets	***glass, Hakotherm®-1200 tapes, ropes, packings are used at furnaces or as insertion e. g. in corrugated gaskets***
	Barlan®, Hakoplan-1100 sheets or stamped parts
High-pressure gaskets	***Klinger-Sil®, novapress®, novaphit®, Selecta®, PTFE, Hakosil-3500 sheets or stamped parts***
	PTFE universal sealing tape

Welding protection in chemical industry

Textiles for fire and flame

Preventive fire protection

Welding protection

For protection from sparks and welding beads
- ⇨Silicatherm® fabric
- ⇨TG 1000 „Alufix“ on both sides

For protection from sparks and welding beads
- ⇨Silicatherm® fabric
- ⇨TG 1000 „Alufix“ on both sides

Ready-made products / clothing

HKO

Textiles for fire and flame





Manufacturing of insulating cushions and mattresses

- shells made from E-glass and Silicatherm® fabrics
- fillings made from fibre mats

PPE – personal protective equipment

- gloves, protective clothing
- made from Hakamid-350 fabric
- made from E-glass fabric

Welding protection curtains

- made from E-glass fabric
- made from calcium silicate fabric
- made from Silicatherm® fabric

Fire doors / gates

- made from E-glass fabric TG 660 V4A-G1

Fabric expansion joints

- made from E-glass fabrics