



TECHNICAL MESH AND PROCESS BELTS

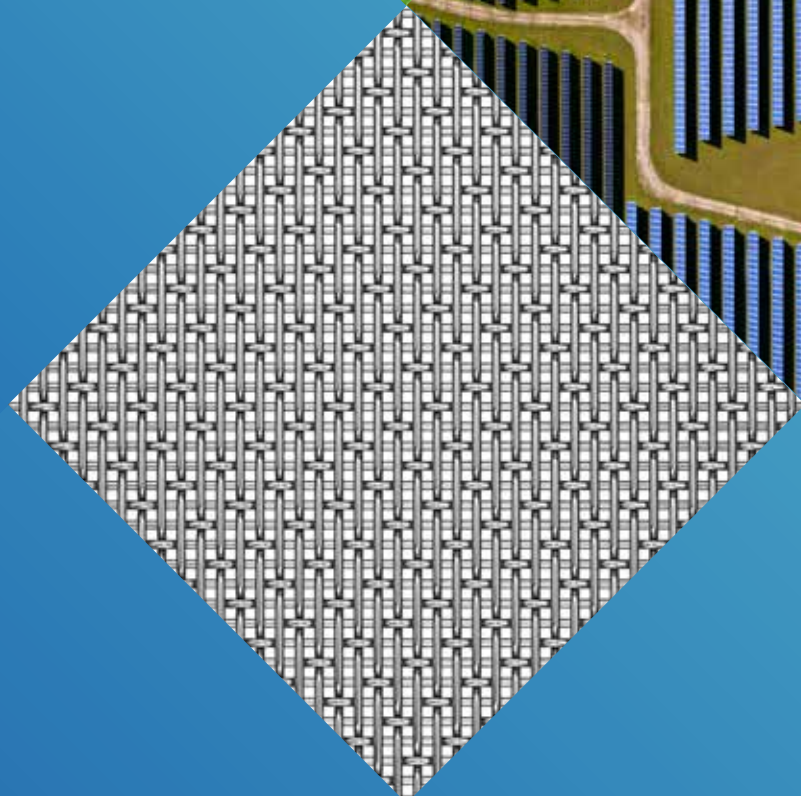
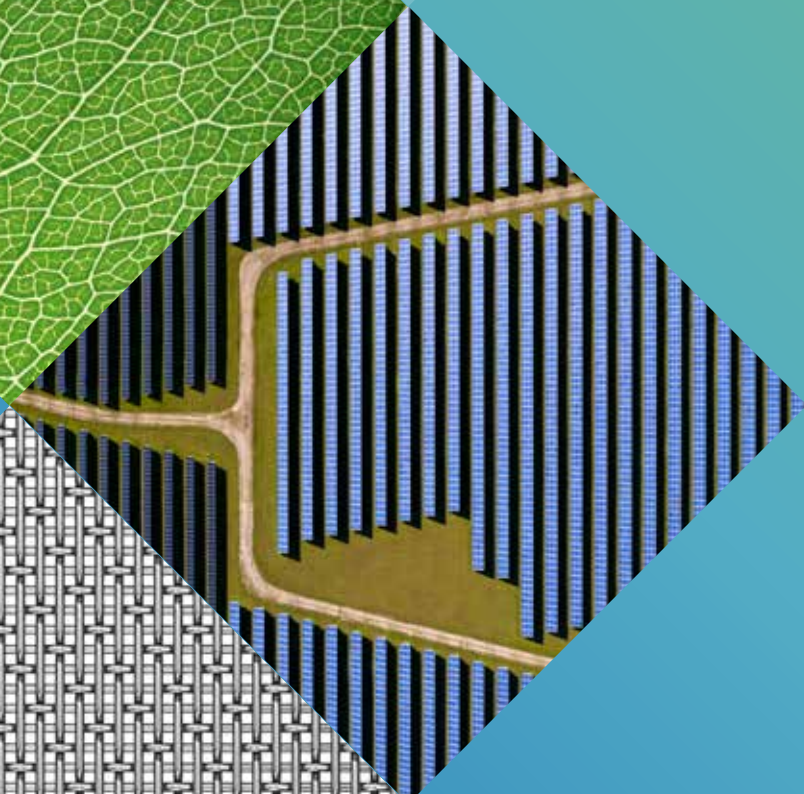
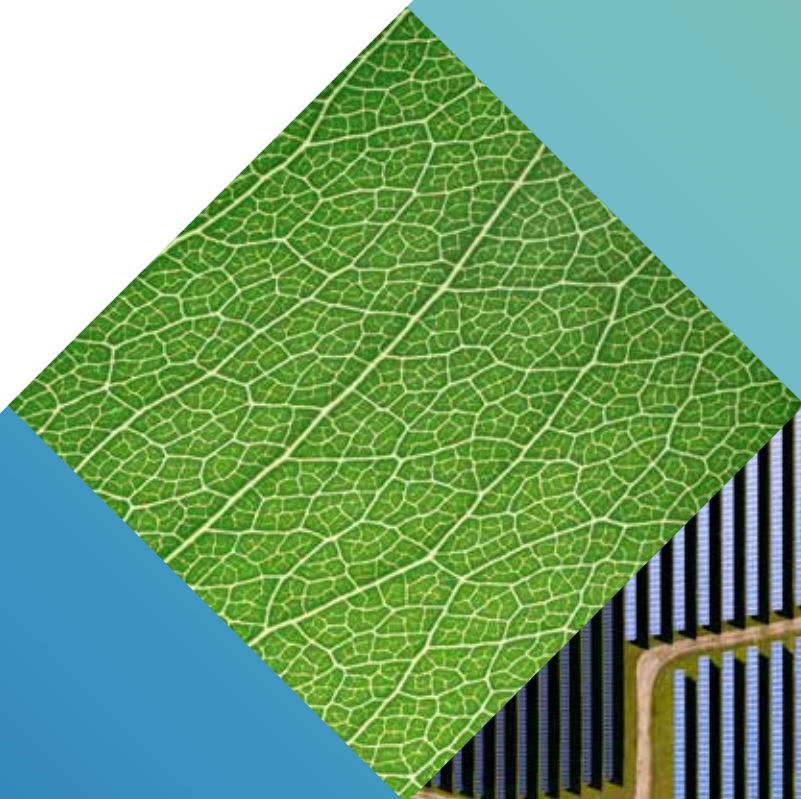
TECHNICAL MESH SOLUTIONS **FOR THE ENERGY SECTOR**

FOR A HEALTHIER, CLEANER, SAFER WORLD

EXPERTISE FOR SUSTAINABILITY

MESH SOLUTIONS

FROM THE
TECHNOLOGICAL
LEADER



Customized innovations

GKD stands as the global technological leader in cutting-edge industrial weave and filtration solutions made from metal wire, synthetic wire, and technical fibers – for all industrial applications. With innovative weaving technologies and the latest material simulation methods, we produce efficient technical weaves, semi-finished products, components, and filter equipment that are optimally matched to diverse mechanical process engineering needs. GKD offers technical mesh solutions for a broad spectrum of applications, including energy production, transport, storage, and use.

We support the sustainable transformation of industry with our deep expertise in optimizing already established technologies. Customers benefit from tailor-made solutions, hands-on consulting, and global service partnerships. GKD continuously pioneers new applications through advanced manufacturing technology and process expertise. We use our fabrics and meshes to create highly efficient systems, equipment, and components that integrate seamlessly into customer processes across industries. With IATF and ISO certifications, our customers can rely on certified quality worldwide.

Commitment to sustainability

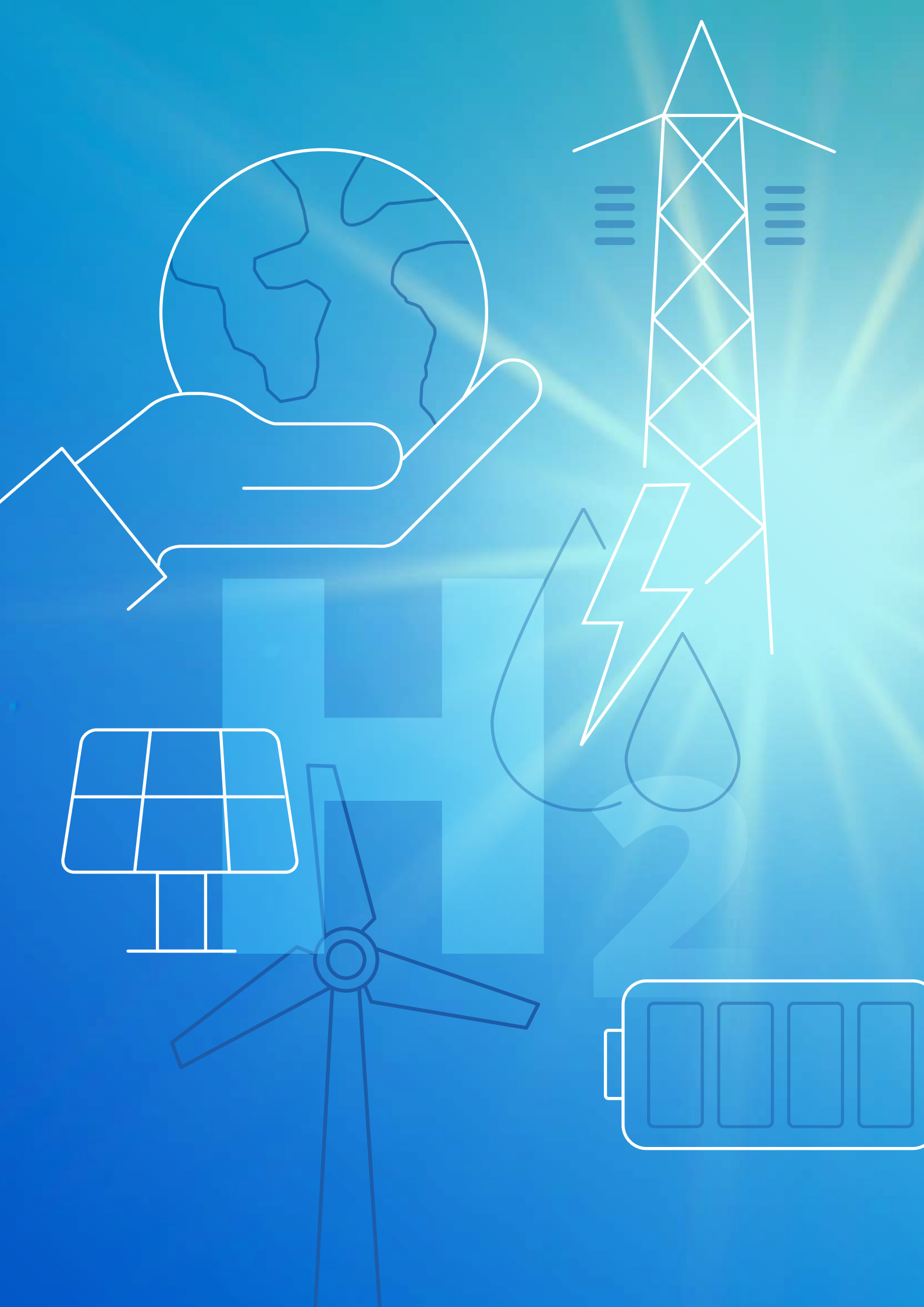
At GKD, we believe companies must strive to give back more to society, the environment, and the economy than they take. That's why we embrace and actively implement the net-positive concept, bringing a new strategic dimension to GKD's in-nate responsibility as a family business.

To expedite and accelerate transformation processes globally, GKD focuses on global requirements such as CO2 reduction, alternative drive technologies, green hydrogen, and clean water. Working with our in-house and also external R&D

departments, we develop solutions that align progress and growth with sustainability goals.

We also streamline our production processes and ensure compliance with statutory CSRD requirements. Committed to social responsibility at every GKD location, we uphold ethical standards within the company and in dealings with customers and partners. Through our sustainability strategy, GKD pursues one corporate vision worldwide: **FOR A HEALTHIER, CLEANER, SAFER WORLD.**





CLEAN AND SAFE – SOLUTIONS FOR ENERGY SOURCES

Our world demands **energy**. Humanity consumes more and more energy each year. Therefore, it is imperative to support and advance the energy transition. Additionally, it's crucial to manage transitional energy sources and fossil fuels – on which we still rely – as sustainably, efficiently, and resource-effectively as possible. GKD's metal mesh solutions ensure energy is used safely and sustainably the over long term. We excel in reliably reproducing our product solutions, many of which hold patents, and we maintain high methodological expertise across a broad spectrum of applications.

You can find GKD's metal mesh solutions at various stages of energy generation, usage, storage, and transport. Our metal meshes play critical roles in handling hydrogen, crude oil production, wind turbine operations, hot gas filtration, and the drying

of biomass and wood. They screen control systems from electromagnetic interference and enhance the performance of electrolyzers. The meshes serve as electrodes, strike protection, filters, flame guards, regenerators, and much more.

GKD's extensive experience across diverse industries and application areas fosters synergies that highlight the company's advanced technological expertise. This foundation enables us to continually develop solutions tailored to new customer and industry-specific requirements.

With our road expertise and comprehensive solution portfolio within the energy sector, GKD supports customers across the globe in making our world healthier, cleaner, and safer.

HYDROGEN

MESH FOR ELECTROLYSIS



Benefits

- ◆ Highly efficient and durable electrodes for both anode and cathode
- ◆ Highly scalable and customizable production
- ◆ Ease of use
- ◆ Production widths of up to two meters
- ◆ Established supply chains
- ◆ Partner network (coating / elastic elements)

Sustainable efficiency for the energy sector

Hydrogen is increasingly becoming a viable alternative to fossil fuels. For the various production methods, including alkaline electrolysis (AEL), PEM electrolysis, AEM electrolysis, and high-temperature electrolysis (SOE), technical weaves are used as electrode material, gas distributors, spacers, contact materials, and current distributors. While GKD meshes are optimized for AEL, they are versatile enough for use in other electrolyzers. They improve the efficiency of both the hydrogen evolution reaction (HER) and the oxygen evolution reaction (OER) and can be customized to meet specific customer needs. This also involves specifying mesh structure and material properties. In collaboration with our partners, we further enhance the exceptional properties of nickel mesh thanks to the clever integration of coating technologies. This innovation enables increased mesh surface area and catalyst application. Electrode packages, including elastic elements are available.

GKD is committed to ongoing research not only to refine existing technologies, but also to develop new and improved solutions or electrode materials and processing.



COMBINED HEAT AND POWER

MESH FOR STIRLING TECHNOLOGIES

Key element for **thermodynamics**

Stirling engines are perfectly suited for sustainable energy sources. These thermodynamic machines convert heat – from sources like solar energy or biomass combustion – into mechanical energy. Operating on a closed-circuit, these engines cycle a working gas that expands and contracts with temperature differences. A critical component of this technology is the regenerator, made using specialized wire mesh. Customizing porosity and overall design to the requirements of each unique machine is crucial for increasing the efficiency of regenerators.

GKD specializes in the field of regenerators and delivers customized mesh solutions that meet the customer's unique thermodynamic and geometric specifications. Key quality features include precise preassembly and carefully controlled mesh porosity. Our services range from custom production and prototype development to series production, including solutions for applications in the high kilowatt range.



Benefits

- ◆ Regenerators and disc assemblies made from stainless steel mesh
- ◆ Sintered regenerators
- ◆ Regenerators with housing
- ◆ Reproducible series and one-off production
- ◆ Special developments for high-temperature ranges in the regenerators

RENEWABLE ENERGY

MESH FOR COMPOSITE MATERIALS



Benefits

- ◆ Highly qualified copper or bronze meshes
- ◆ Adaptable by adjusting area density and drapability
- ◆ Proven reliability in the aviation industry
- ◆ Available in rolls up to two meters wide or in customized dimensions and geometries

Safety for wind energy

Wind turbines are growing larger and becoming increasingly efficient. With this size increase come larger blade diameters, which in turn raise the mechanical demands on these blades. Manufacturers are therefore relying more and more on carbon fiber components, which offer greater strength than conventional fiber-reinforced composites.

Carbon fiber components require robust strike protection. GKD's lightning strike protection meshes, made from copper or bronze, are well known in the aviation industry for their reliability and also meet all necessary standards for wind turbines. Depending on individual requirements, GKD meshes vary in area density and drapability, ensuring optimal integration into the design of wind turbine blades.



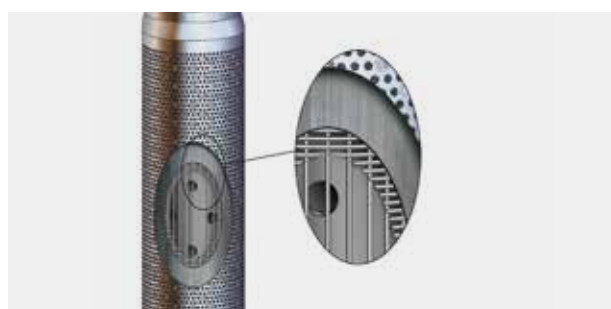
FOSSIL ENERGY

MESH FOR SANDSCREENS

For improved performance

Impurities in the form of particulates present significant challenges in oil and gas extraction, causing equipment wear, deteriorating raw material, and posing safety risks. GKD offers customized solutions for these issues. Our product portfolio includes RTDW meshes, twilled dutch weave meshes (TDW) and plain weave meshes (PDW), all designed for extreme conditions. These meshes are particularly rugged and reliable. Each metal mesh is thoroughly cleaned and then undergoes a 100% camera inspection. Optional heat treatment in accordance with API Spec 6A is available to meet the specific demands of the oil and gas industry. Additionally, our metal meshes can be treated with a unique abrasion-resistant coating applied to further extend service life and improve efficiency.

Our advanced sandscreens improve service life, performance, and flow rates without compromising the filter system's integrity. Solutions from GKD thus enhance production efficiency and safety. Committed to quality and customer satisfaction, GKD ensures you receive the ideal products for your specific requirements.



Benefits

- ◆ Wear-resistant coating
- ◆ Extends service life
- ◆ Increases flow rates
- ◆ Does not compromise the integrity of the filter system
- ◆ Increases production capacity

FOSSIL / NUCLEAR ENERGY

MESH FOR COOLING WATER-TREATMENT



Benefits

- ◆ Efficiently removes hard particles and biological components
- ◆ Fine filtration rates
- ◆ Compatible with various filter systems
- ◆ Extends service life
- ◆ Custom-developed of filtration solutions to meet specific needs

Optimum cleaning for long-term use

Preparing cooling water for industrial installations and power plants from natural sources such as rivers, lakes, or reservoirs poses significant challenges. Conventional filter systems often struggle with varying loads of hard particles and biological components, especially when fine filtration rates are required.

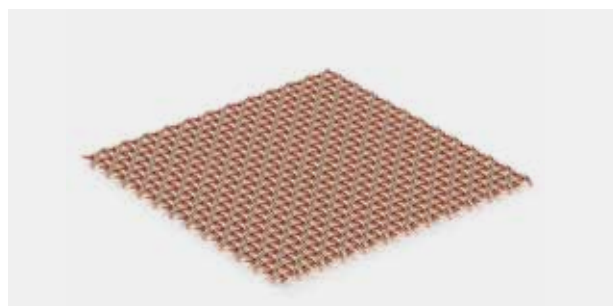
To extend service life while maintaining effective filtration, GKD designs distinct meshes that offer improved performance and include backflushing capability. We leverage our expertise and experience to provide tailored solutions that meet all specifications for filtration rates, mesh types, surface treatment, cleanability, and system integration.

MESH FOR EMI SHIELDING

Effective protection and optical transparency

As digitalization and networking expand, electro-magnetic interference (EMI) is becoming a crucial safety concern for electronic installations and control systems. GKD provides advanced wire mesh that shields against electromagnetic waves.

Using state-of-the-art production technology and high-quality materials, these meshes not only shield from external electromagnetic influences, but also maintain the transparency of glass in optical components. Tailored to meet the specific optical and electrotechnical needs of our customers, these meshes are also ideal for lightweight, porous shielding applications in non-conductive housings, conduits, or walls, ensuring effective EMI protection without significant weight increase. The designs maintain their flexibility, adapting to various needs.



Benefits

- ◆ Highly effective shielding
- ◆ Optically transparent
- ◆ Lightweight and flexible
- ◆ Customizable to customer requirements

HYDROGEN

MESH FOR COOLING AND FILTRATION



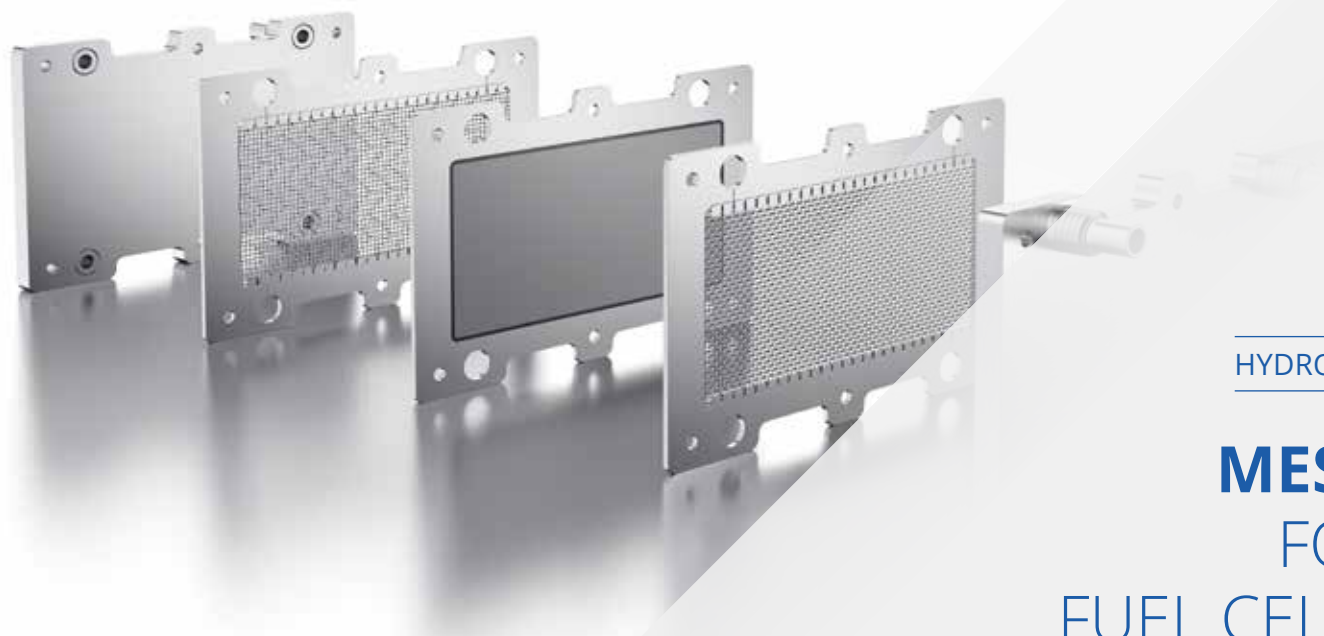
Benefits

- ◆ Versatile applications for Stirling coolers
- ◆ Specialized mesh produced from non-ferrous metal and stainless steel
- ◆ Singular, manufacturer-specific designs
- ◆ Ready-for-installation components

Secure solutions for storage and transport

Hydrogen must be transportable and storable safely to be a viable energy source everywhere. GKD offers filtration solutions that are specifically designed for hydrogen transport – from liquid hydrogen tanker trucks to pipelines and high-pressure pipe trailers.

Stirling coolers, used to cool hydrogen, rely on the regenerator as a key efficiency component. GKD crafts screens and regenerators to meet specific porosity and size standards. Our comprehensive manufacturing capabilities range from mesh production through to sintered regenerators for series production. For Stirling coolers, GKD manufactures specialized meshes from bronze, copper, and stainless steel for OEMs and custom designs.



HYDROGEN

MESH FOR FUEL CELLS

Components that make the difference

Fuel cells are used as an electrical energy source in cars, aircraft, and ships. Technical weaves from GKD, used as electrode material, maximize efficiency in power generation. These wire meshes are suitable for various fuel cell types, including solid oxide fuel cells (SOFC). Their porosity, conductivity, and shape enable diverse applications within fuel cells, such as power distributors on the anode side (H_2 electrode) and as contact media. Their high degree of homogeneity improves the gas diffusion layer.

They also optimize electrode collectors and the catalyst/electrolyte substrate. The distinctive smooth surface structure of our technical weaves ensures an optimal electrical connection of the diaphragm. They can also withstand bending forces without losing contact with active materials. To offer protection from contamination of pipes and components, GKD meshes are also used as filters in pipes carrying hydrogen.

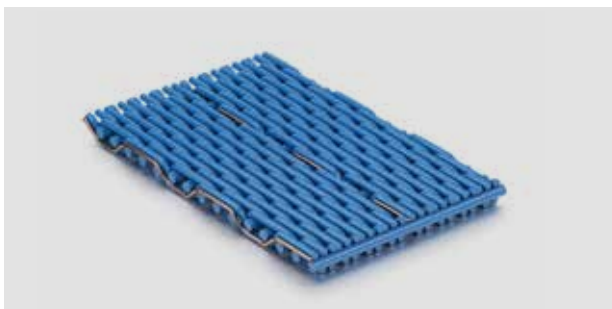


Benefits

- ◆ Conductive
- ◆ Porous
- ◆ Highly scalable
- ◆ More efficient gas flow
- ◆ Ease of use
- ◆ Established supply chains

RENEWABLE ENERGY

BELTS FOR WOOD AND BIOMASS DRYING



Benefits

- ◆ Specialized weave structure
- ◆ Relatively closed surface
- ◆ Excellent filter characteristics
- ◆ High air permeability
- ◆ Thermally prepared for temperatures of up to 130 °C
- ◆ Satisfies the ATEX standard
- ◆ Available in sizes of up to 200 x 8 m

The benchmark for low-temperature dryers

Wood shavings, digestates, or biomass must be dried before they can be processed further. The revolving drive belt 5065 with CONDUCTO® technology has set new standards for so-called low-temperature dryers and secured a strong market presence. Its unique weave structure combines a relatively closed surface with high air permeability, leading to superior drying results and reduced dust emissions.

The drive belt 5065 with CONDUCTO® technology is effective up to a 130 °C operating temperature. Bronze wires interwoven in the running direction permanently prevent electrostatic charges as per the ATEX standard. This easy-to-clean process belt is exclusively used by leading global equipment manufacturers worldwide in all industry-standard low-temperature dryers. GKD offers this belt in widths of up to eight meters and lengths of up to 200 meters.

INDUSTRY

MESH FOR GASES CON- TAMINATED BY DUST

Particle separation for industrial processes

Dust-laden exhaust gases are prevalent in numerous industrial processes, including waste incineration, biomass gasification, as well as both glass and cement production. These gases negatively impact human health and the environment. Efficient dust separation at high temperatures allows for reuse of process gases or energy in other systems within the facility. GKD offers hot gas filtration solutions using custom-designed wire meshes and combination media. Our highly porous TRIMETRIC mesh is specifically engineered to tackle the challenges of high-temperature filtration.

These high-performance meshes not only provide efficient particle separation, but also facilitate the return and recovery of products and substances in high-temperature processes without significantly increasing energy consumption. The metallic structure of our dust filtration elements eliminates the risk of ignition from static electricity and quickly dissipates thermal energy in areas at risk of fire from flying sparks.



Benefits

- ◆ High mechanical stability
- ◆ Can be used at up to 600 °C
- ◆ Corrosion-resistant materials
- ◆ No electrostatic charge
- ◆ Fully recyclable

HYDROGEN

MESH FOR HYDROGEN REFUELING



Benefits

- ◆ Exceptionally stable
- ◆ Temperature-resistant
- ◆ High filter fineness
- ◆ Corrosion-resistant and crack-resistant materials

Secure handling for e-fuels and hydrogen

Refueling with hydrogen presents several challenges relating to purity, flammability, pressure, and temperature management. GKD offers robust filtration solutions, such as mesh laminates, that effectively retain solid particles and therefore provide cleanly filtered hydrogen. Cone-shaped mesh configurations in the hydrogen tank nozzle represent one product variant that meets stringent requirements for pipe pressure and filter fineness.

GKD's filtration meshes are tailored specifically for the filtration of hydrogen in gaseous or liquid state, as well as e-fuels that are synthesized from hydrogen. Our deep understanding of the operating conditions of these fuels and extensive experience in protecting internal combustion engines, turbines, and compressors allow us to offer superior protection. Our filters efficiently remove impurities, protecting critical components from damage and ensuring the system integrity.



HYDROGEN

MESH FOR GAS BURNERS

Protection and optimization of heating systems

As sustainable energy sources become more influential, efficient heating systems for residential buildings and industrial sites are absolutely essential in order to reduce greenhouse gas emissions and drive forward the energy transition. GKD's hybrid solutions for hydrogen burners make a vital contribution to this effort. Our wire mesh not only protects against flame flashbacks into the supply line but also enhances heating performance with its homogeneous pore structure, ensuring even heat distribution. As they are temperature-resistant and corrosion-resistant to hydrogen-air mixes, meshes from GKD are exceptionally durable.

The precision of mesh pores is the key to using hydrogen in a way that is both efficient and environmentally friendly. We select our materials based on technical specifications and experience from similar projects. Additionally, our multi-layer pressed mesh parts are proved in explosion protection in the field of electric mobility and the chemical industry.

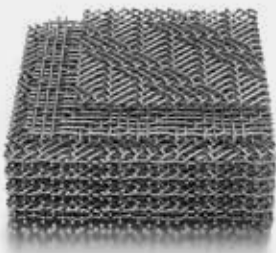


Benefits

- ◆ Optimal heat distribution
- ◆ High and uniform pore stability
- ◆ Protection from flame flashbacks
- ◆ Temperature-resistant
- ◆ Corrosion-resistant

HEAT PUMP

MESH FOR THERMOACOUSTICS



Benefits

- ◆ Optimized efficiency for thermoacoustic heat pumps
- ◆ Highly porous
- ◆ Flexibly adaptable
- ◆ Custom, machine-specific design
- ◆ Turnkey components

Tailor-made components

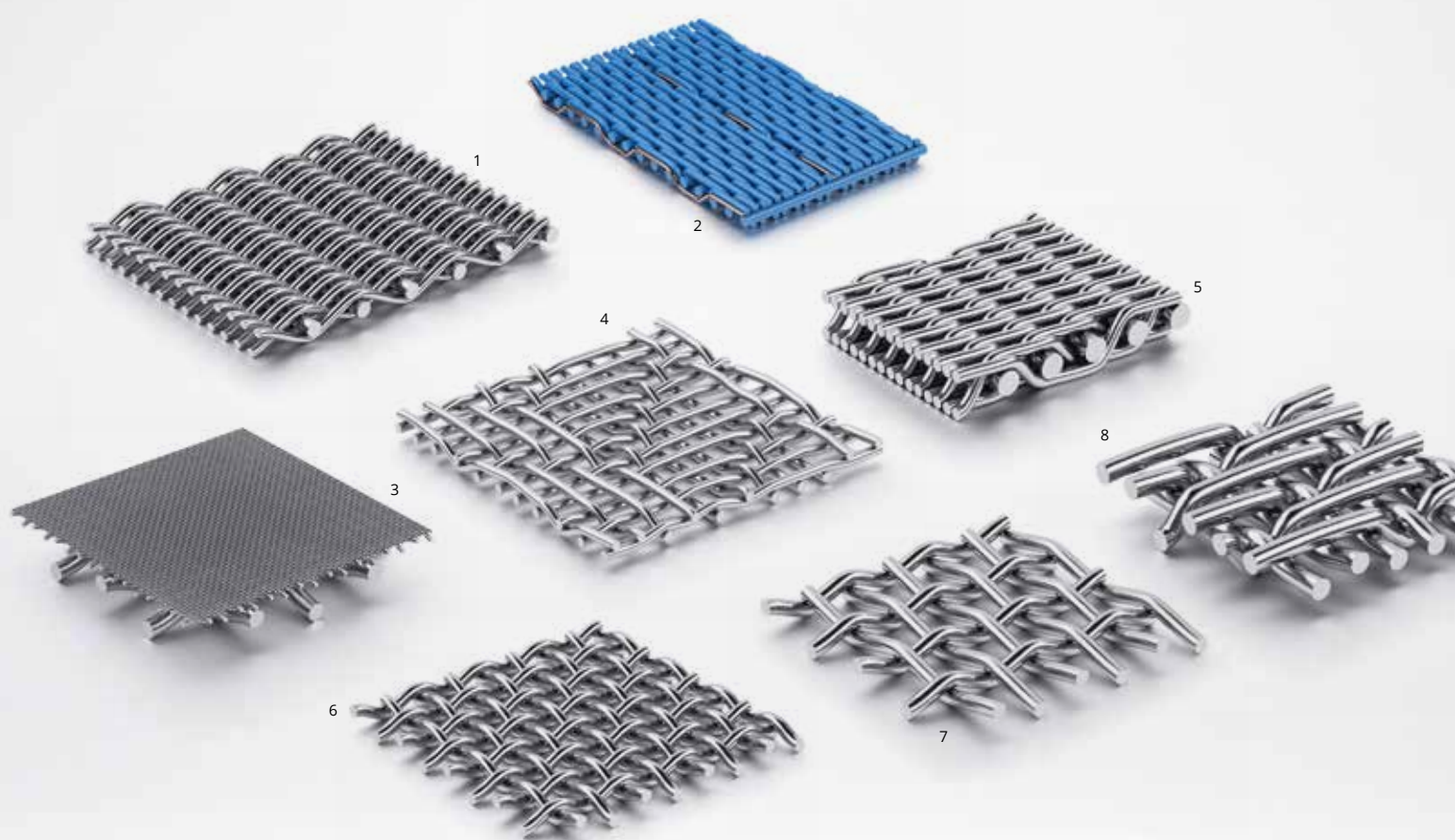
Thermoacoustic heat pumps offer a sustainable solution for low-emission heating and cooling. As is the case with similar thermodynamic system concepts, the efficiency of this kind of heat pump largely depends on the quality of the regenerators used. GKD's regenerators improve the performance of thermoacoustic heat pumps, precisely matched to the individual requirements of each specific machine, thanks in part to the high porosity of the VOLUMETRIC mesh.

Our expertise enables us to develop customized regenerators for heat pumps, engineered to the exact requirements of the respective application. Our process encompasses planning and development up to production-ready design, complete with finished components ready for installation.

- 1 Plain dutch weave (PDW)
- 2 Drive belt 5065 with CONDUCTO® technology
- 3 Gekuplate mesh laminates
- 4 VOLUMETRIC mesh
- 5 Twilled dutch weave (TDW)
- 6 Square mesh
- 7 Oblong weave
- 8 5-heddle Atlas weave (Tela)

MESH SOLUTIONS

OPTIMIZED FOR ENERGY APPLICATIONS



Different industries have unique requirements for mesh types, bonding forms, and materials used. Some of these are standardized and described in DIN ISO 9044 or ASTM E2016 and ASTM E2814. Alongside this, GKD also develops new meshes together with customers to ensure optimum results meeting their detailed requirements, such as pore size, open screen surface, retention rate, flow rates, porosity, bubble point and tensile strength. Understanding which material best suits specific

applications and processing capabilities is extremely important. For hydrogen production applications, for example, nickel and nickel-based alloys are most commonly used, such as Crofer 22 H - UNS S44535 (DIN 1.4760), Ni 99.6% - S44535 (DIN 2.4060), and Duranickel. Other alloys (for example stainless steel, copper, aluminum, precious metals) as well as raw steel and titanium are possible depending on the specific chemical requirements.

PRODUCTION

HIGHEST STANDARDS



Benefits

- ◆ Process and needs analysis with material simulation tools (GeoDict/ OpenFOAM)
- ◆ Consultation on material selection
- ◆ Application optimization and customized component design
- ◆ Ongoing analysis and development
- ◆ Cutting-edge manufacturing methods and top production standards
- ◆ Certified know-how with decades of expertise

From weaving to finishing

Weaving, cutting, cleaning, rolling, punching, finishing, and much more. With the latest looms and manufacturing machines, GKD produces the full range of industrial meshes and systems made of metal, synthetics, and technical fibers. Always leading with the unique requirements of customers in mind.

Adopting a step-by-step approach, we first analyze the demands on the material and the type of application, and then optimize processes and services for greater efficiency and sustainability in production.

This eye for detail, many years of development excellence and process expertise as well as our consistent cost-benefit orientation are what make GKD a sought-after partner around the world. Products from GKD are manufactured to the highest standards – all the way up to production in line with clean room standards.



Guaranteed and **certified quality**

GKD is not just great at production. In fact, we thoroughly inspect all of our meshes and associated components in our own laboratory, as the quality products from GKD need to precisely match the client's desired specifications. That's why our physical and technical laboratory conducts tests in the following areas:

- ◆ Product development
- ◆ Initial sample inspection
- ◆ Inspection in the event of damage
- ◆ Inspection in the event of a complaint
- ◆ Customer-specific testing
- ◆ Quality assurance during the production process

The focus of all testing projects is on providing value for the customer. Our laboratory experts have the best material and testing expertise, work with the latest laboratory technology, and network constantly with other professionals in the fields of inspection technology and science. They monitor the entire life-cycle of GKD products.

◆ **Testing procedures (selection):**

- Mechanical and physical testing
- Chemical testing
- Quality-assurance mesh testing



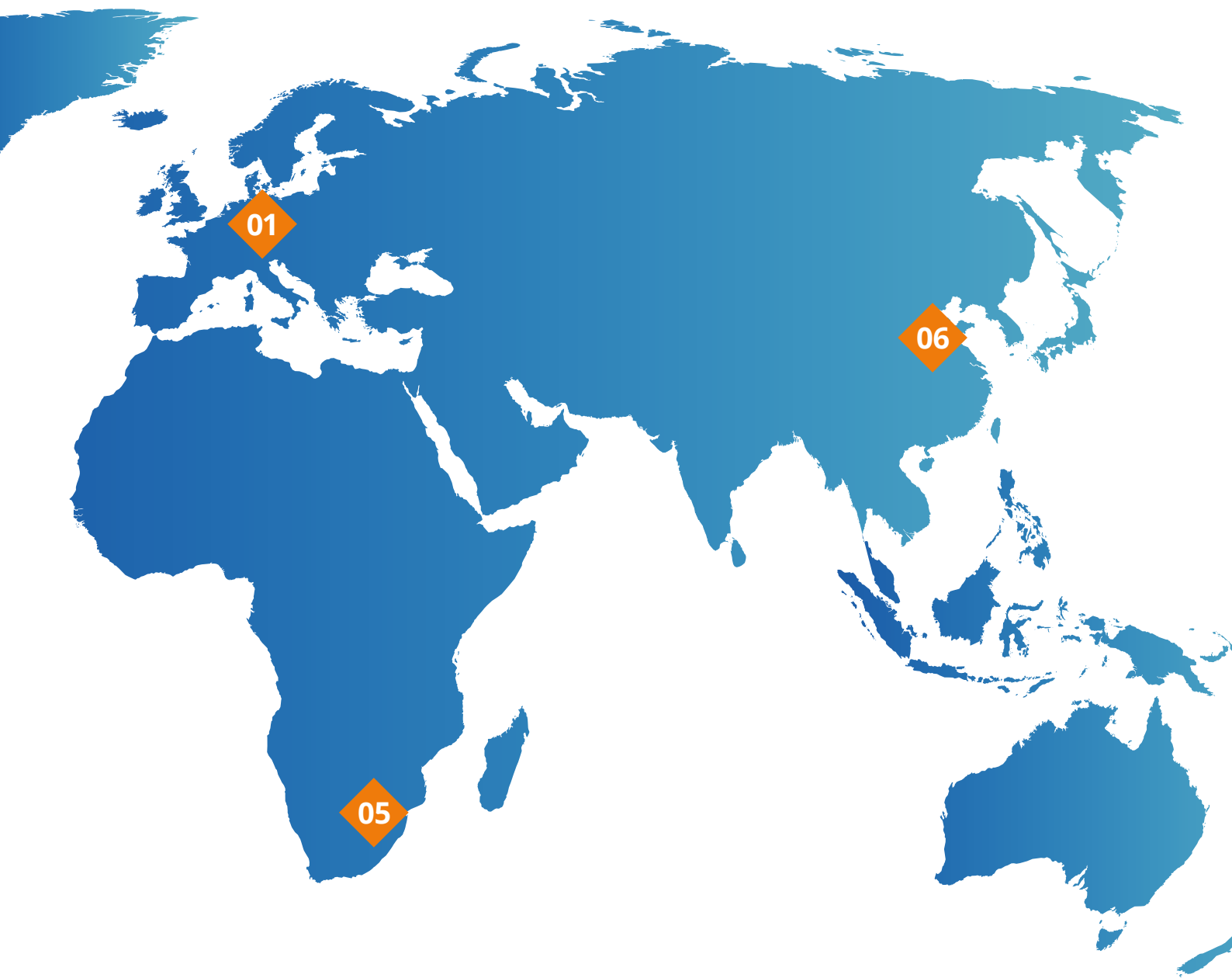
INTERNATIONAL

GLOBALIZED SUPPLY CHAINS AND MANUFACTURING

With more than 800 employees worldwide, the GKD Group is a leading international technology and service company. The company's headquarters are located in Düren, Germany. GKD also operates sites in the USA, Chile, South Africa and China. Sales offices in France and Spain as well as worldwide representatives ensure that we are close to the customer all over the world. Our understanding of service includes developing individual solutions for every single customer. GKD produces around the world but relies locally on short distances. Globalized supply chains and production platforms ensure delivery reliability, enabling us to respond promptly and flexibly to customer needs. Thanks to precise logistics, the use of recycled materials, resource-efficient production processes, and the development of solutions that help customers achieve their sustainability goals, GKD is expediting the sustainable transformation in keeping with our own guiding principle:



FOR A HEALTHIER, CLEANER, SAFER WORLD



- 01 **GKD Germany** Düren
- 02 **GKD USA** Cambridge (MD)
- 03 **GKD USA** Star City (AR)
- 04 **GKD LatAm** Santiago de Chile
- 05 **GKD South Africa** Johannesburg
- 06 **GKD China** Qufu

GKD – Gebr. Kufferath AG

Metallweberstraße 46
52353 Düren
Germany

T +49 2421 803 0
F +49 2421 803 211
industrialmesh@gkd-group.com
gkd-group.com

GKD-USA, INC.

825 Chesapeake Drive
Cambridge, MD 21613
USA
T +1 410 221 0542
usa.industrial@gkd-group.com
gkd-group.com

GKD LatAm SA

José Joaquín Aguirre Luco 1455
8590677 Huechuraba
Santiago
Chile
T +56 2 2929 7158
latam@gkd-group.com
gkd-group.com

GKD Africa (PTY) LTD.

18 Fiat Street
Aureus
1759 Randfontein
South Africa
T +27 11 412 4770
gkdrsa@gkd-group.com
gkd-group.com

GKD (Qufu) Ind. Technologies Co., Ltd.

West end of Changchun Road
West Economic Development Zone
Qufu, Jining, Shandong Province, 273100
P.R.China
T +86 537 4530568
M +86 130 5126 8223
china@gkd-group.com
gkd-group.com

GKD Nordic

Remnavägen 45
641 35 Katrineholm
Sweden
T +46 70 6801233
nordic@gkd-group.com
gkd-group.com

GKD France

Office Croisilles (near Paris)
28210 Croisilles
France
T +33 672 18 40 75
france@gkd-group.com
gkd-group.com