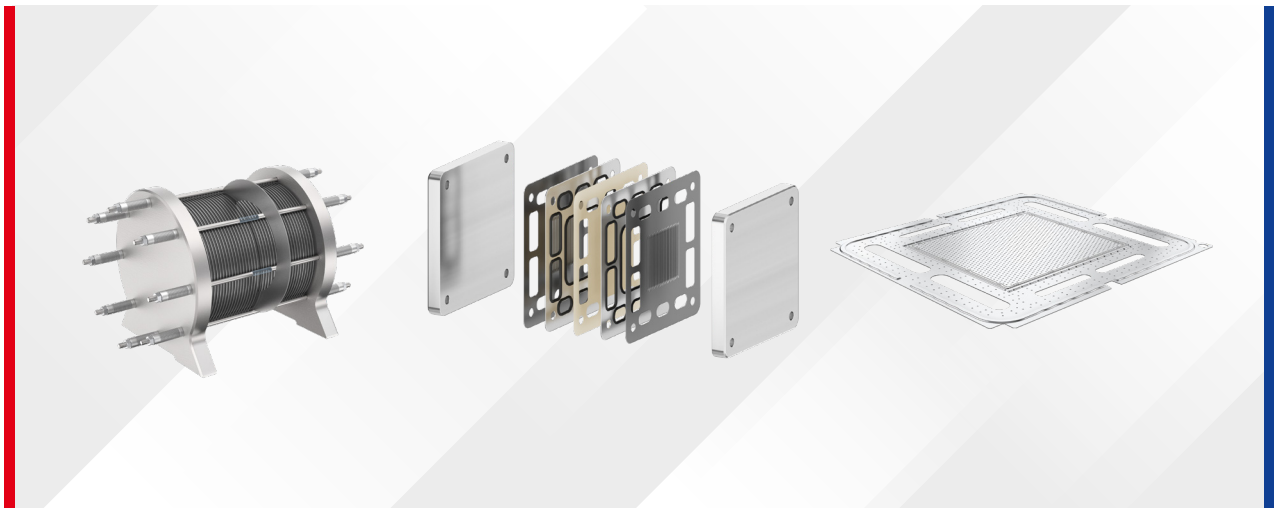


EXPERIENCE MOBILITY

COMPONENTS FOR ELECTROLYZERS.

PLASTIC COMPONENTS. BIPOLAR PLATES. SEALING TECHNOLOGY.

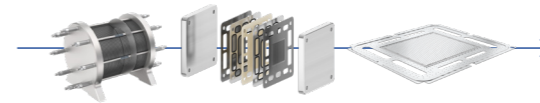


SYSTEM PARTNER. PROBLEM SOLVER. PIONEER.

SHAPING THE FUTURE WITH ELRINGKLINGER.

For us, system expertise means being a pioneer, creating space for development, and achieving our goals more quickly. Our product solutions along the hydrogen value chain are based on our decades of experience in stamping, embossing, forming and coating metal, plastic injection molding and sealing technology, our own elastomer material development and the processing of high-performance plastics.

YEARS LEADING THE WAY



145

Nothing can replace experience combined with innovative spirit. ElringKlinger has plenty of both. In 1879, Paul Lechler founded a trading company for technical products, which later became ElringKlinger AG. Today, we are a global player offering future-proof solutions in numerous product areas, not just in the automotive sector. We also demonstrate our strengths in other industrial sectors. Our customers benefit from ElringKlinger's combined materials, engineering, and manufacturing expertise. Thinking ahead, developing solutions, being the first to break new ground, taking responsibility. This is what sets us apart – and has done so for 145 years.



9,500

EMPLOYEES AS PARTNERS

Energy transition, digitalization, new forms of mobility and climate protection: the transformation process is in full swing in all sectors of the economy. The agenda for the future is clear. We are also working every day to play our part and push the limits of what is possible. With our products along the entire hydrogen value chain, we make a contribution to a sustainable hydrogen economy. Together with our customers, we are already finding answers today to the questions of the future. And successfully drive forward innovation.

For our customers, we are a strong and reliable development partner and series suppliers with unique expertise. We are pioneer and companion. From the idea to the finished product. ElringKlinger impresses with highest quality, reliability and performance. Around 9,500 employees are committed to achieving this at more than 40 sites worldwide.

GROWING DYNAMICALLY

COMPONENTS FOR ELEKTROLYZERS. EXPERTISE FOR THE CHANGE.

The ramp-up of the hydrogen economy confronts market players with a variety of questions regarding feasibility, cost efficiency and, last but not least, implementation.

ElringKlinger has also been active in the field of fuel cells for around 20 years and bundled its activities in a joint venture with OPmobility in 2021: EKPO Fuel Cell Technologies was founded.

The basis for this is our unique material expertise, our comprehensive know-how in the areas of development, high-precision metal processing and coating processes.

We offer our customers bipolar plates and other components as well as sealing solutions along the entire hydrogen value chain. The basis for this is our unique expertise in stamping, embossing, forming and coating metal, plastic injection molding and sealing technology, our own elastomer material development and the processing of high-performance plastics.



What moves the world also moves us: if hydrogen is produced from renewable electricity, completely emission-free mobility can be realized. With our components for electrolysis stacks and sealing technologies along the entire hydrogen value chain, we are part of making our future more environmentally friendly.

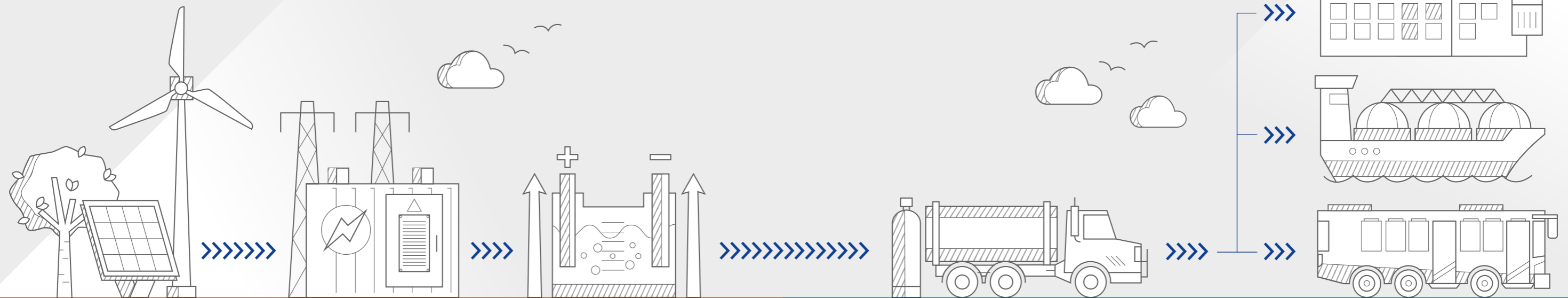
HYDROGEN ON THE RISE

EXPERTISE IS OUR CORE.

Always questioning the tried and tested, refusing to settle for standards that have been achieved.

This has always been a hallmark of ElringKlinger. This is where we apply our unique expertise in materials, engineering, processes, and manufacturing methods. Today, we offer pioneering product solutions along the entire hydrogen value chain. In addition to customized large-scale sealing systems made of high-performance plastics or composite materials for alkaline or PEM electrolysis cells, our product portfolio includes bipolar plates with and without integrated seals, as well as specially developed metal or plastic elastomer sealing solutions.

ELRINGKLINGER PRODUCTS ARE
USED THROUGHOUT
THE ENTIRE HYDROGEN VALUE CHAIN.



RENEWABLE ENERGY GENERATION

GETTING ELECTRICITY TO THE ELECTROLYZER

CELL COMPONENTS FOR ELEKTROLYZERS

- + Large-scale cell gaskets for alkaline electrolysis in dimensions up to 3,000 mm
- + Insulation parts
- + Pipes and tubes for alkaline electrolysis
- + Bipolar plates/ cell components with and without integrated gasket
- + Elastomer/ metal-elastomer and plastic-elastomer sealing systems for alkaline and PEM electrolysis stacks

DISTRIBUTION AND STORAGE OF HYDROGEN

- + Bellows for compensators
- + Pipes and tubes for alkaline and PEM-electrolysis
- + Heat shrink tubings as protective coating
- + Diaphragms for actuators and pumps
- + Spring energized seals for high-pressure sealing
- + Laminated pistons for dry-running compressors
- + V-packings for high-pressure valves
- + Piston rings

NET-ZERO-EMISSIONS

As a globally positioned, independent supplier, ElringKlinger is a strong and reliable partner to the automotive industry – we offer innovative product solutions for all types of drive systems and thus contribute to sustainable mobility.

In the field of e-mobility, we do not only rely on fuel cells but also on our battery technology. Our lightweight construction concepts reduce the overall vehicle weight.

For mobile and stationary applications, our subsidiary EKPO Fuel Cell Technologies GmbH offers bipolar plates/ cell components for electrolysis stacks as well as PEM fuel cell stack modules.

HIGH-PERFORMANCE PLASTICS

INNOVATIVE DEVELOPMENT PARTNER.

With product solutions made from high-performance plastics such as PTFE compounds, Moldflon®-PTFE, PEEK, PPS and many others, ElingKlinger Engineered Plastics combines state-of-the-art production technologies with decades of experience.

MOVING AHEAD WITH MAXIMUM PERFORMANCE AND INNOVATIVE DYNAMICS

The development of a sustainable hydrogen economy brings with it many challenges. Technological requirements are increasing, costs must be optimized, and development and production processes must be designed efficiently.

ElingKlinger Engineered Plastics, a leader in technology and system partner for the automotive industry, develops custom-made, innovative engineering solutions from high-performance plastics, such as PTFE, PTFE compounds, and PEEK, as well as thermoplastic material Moldflon®, which enables new, economical methods.

Our engineering solutions are in series production millions of times and are convincing under the toughest conditions in many applications and industrial sectors. They withstand high temperatures, pressures, friction, aggressive media, chemicals, and many other types of stress to an outstanding degree. And they open up new design freedom for innovative, functional and cost-optimized solutions for your hydrogen application.

This is how our sealings and structural components set the standard. For more than 50 years. Highly efficient. Economical. Technological. In processing and application. Worldwide.

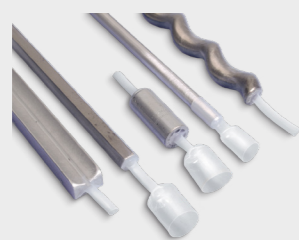
LARGE-SCALE CELL GASKETS IN DIMENSIONS UP TO 3,000 MM



EVERYTHING FROM A SINGLE SOURCE

- + Gaskets and insulation disks or plates in dimensions up to 3,000 mm
- + Insulation parts
- + Corrosion resistant ThermoX™ heat exchangers for tempering of e.g. liquid electrolyte or gas cooling
- + Bellows for compensators
- + Pipes and tubes for alkaline and PEM-electrolysis
- + Heat shrink tubings as protective coating
- + Diaphragms for actuators and pumps
- + Spring energized seals for high-pressure sealing
- + Laminated pistons for dry-running compressors
- + V-packings for high-pressure valves
- + Piston rings

Heat shrink tubings
as protective coating



Diaphragm for actuators
and pumps



Spring energized seal for
high-pressure sealing



Laminated piston for
dry-running compressors



V-packing for
high-pressure valves



Pipes and tubes for
alkaline electrolysis



Corrosion resistant ThermoX™
heat exchangers for tempering
of e.g. liquid electrolyte or
gas cooling



IT'S ALL ABOUT THE SEALING

H₂-ELECTROLYSIS – SOLUTIONS FOR MORE EFFICIENCY.

As the sealing requirements have to be met under a wide range of load conditions, gaskets within the electrolytic cell play a key role in terms of efficiency. In alkaline electrolysis, an aqueous potassium hydroxide solution is used as the current-conducting medium. This places particularly high demands on the sealing material in terms of chemical resistance. This makes PTFE an indispensable material.

As a leading company in the processing of high-performance plastics, ElingKlinger Engineered Plastics not only offers balance-of-plant gaskets in suitable materials and dimensions and in the required quantities, but also specially developed

large-scale electrolysis stack gaskets. In addition, we also offer solutions for hydrogen applications in the fields of compressors and fluid technology.

Cell gaskets for alkaline electrolysis



LARGE-SCALE GASKETS AND INSULATION DISKS IN DIMENSIONS UP TO 3,000 MM

- + suitable for alkaline electrolyzers that are operated under pressure as well as atmospherically
- + large-scale: production in large dimensions from 1,000 to 3,000 mm outer diameter
- + customized, geometry-independent shapes possible
- + everything from a single source: one-piece seals for improved tightness and stability
- + individually defined production process

MAXIMUM PERFORMANCE THROUGH INDIVIDUAL DESIGNS OF THE SEALING COMPONENTS

Our large-scale gaskets for alkaline electrolysis cells are optimally adapted to the individual cell design of our customers and help to increase the performance of the electrolysis stacks.



HIGH EFFICIENCY THANKS TO AN APPLICATION-SPECIFIC, MATERIAL-COMPATIBLE PRODUCT DESIGN IN DIMENSIONS UP TO 3,000 MM.

Individual sealing designs enable good leakage performance, which increases the efficiency of the overall system and improves system safety.



FLEXIBLE MANUFACTURING TECHNOLOGIES FROM PROTOTYPE TO SERIES PRODUCTION.

Decades of experience with product solutions made of high-performance plastics and thermo-plastics, combined with state-of-the-art production technology, enable ElingKlinger Engineered Plastics to flexibly handle customer projects from prototype to series production.



ElingKlinger Engineered Plastics develops individual, specific sealing designs for different requirement profiles – along the entire hydrogen value chain.

Our processes are geared towards both small quantities and prototypes as well as large quantities.

Numerous validated manufacturing processes and our high level of quality and environmental awareness provide all the prerequisites for the implementation of sophisticated solutions and are a central component of our corporate policy, which is reflected in the certifications according to international standards such as IATF 16949, GMP, ISO 14001 and ISO 50001.

Our portfolio includes a wide range of materials and components for PtX-applications – from electrolysis to mobile use. Sustainability and CO₂ reduction are at the heart of our solutions for customers.

FUTURE-PROOF SOLUTIONS – AS SERIES

BIPOLAR PLATES FOR ELECTROLYSIS STACKS.

Automated series processes in the areas of metalworking and plastic injection moulding, state-of-the-art joining and coating technology and experience in the production of PEM fuel cell stacks make us the ideal partner for the industrialization of bipolar plates with or without integrated gaskets.

SYSTEM EXPERTISE GIVES US THE EDGE

As a leading company in the development and large-scale production of fuel cell stacks, EKPO Fuel Cell Technologies makes a significant contribution to the decarbonization of mobile and stationary applications.

We are a full-service-supplier for fuel cell stack modules and components for use in cars, light commercial vehicles, trucks, buses as well as in rail and marine applications.

We use our industrialization expertise to supply stacks and components in series quantities using highly efficient and automated production processes.

Our many years of expertise in the automated production of PEM fuel cells enable us to offer our customers innovative and customized cell components (metallic, elastomer-sealing and plastic), depending on the structure of the PEM electrolysis stack.

We provide additional benefits through our product and process experience from PEM fuel cell development, which flows into the design of these components.

We stand for consistent quality – even in large quantities – and one hundred percent traceability. We fully meet the high-quality requirements demanded in the automotive sector.

All processes and procedures necessary for the products are validated and constantly refined. Development, production engineering and series production are anchored in our DNA and come from a single source at EKPO. This means that innovations can be implemented quickly – and an optimum level of quality can already be achieved at the start of production. Highly flexible, scalable or fully automated production solutions are used, adapted to the respective customer and product requirements.

Essential components for PEM electrolysis stacks and PEM fuel cell stacks: bipolar plates from EKPO Fuel Cell Technologies



BIPOLAR PLATES FOR PEM ELECTROLYZERS

- + compact, robust design – individually tailored to the customer's cell concept
- + innovative tool design and in-house production in cooperation with ElringKlinger
- + robust, highly efficient, innovative, fully automated and interlinked production processes
- + production with high-precision progressive tools
- + experience in coating technology to increase cost efficiency
- + functional plate design right through to series production is developed in conjunction with our customer
- + dimensions between 450 and 4,000 cm² possible
- + own compound development for gaskets

Cell solution concepts for PEM electrolysis stacks: bipolar plates with integrated gasket made by EKPO Fuel Cell Technologies



BIPOLAR PLATE/ CELL COMPONENTS WITH INTEGRATED GASKET

- + robust for high pressures in electrolysis applications
- + bipolar plates with integrated metal or elastomer gasket paired with corresponding support concept in the cell structure
- + XL dimensions possible
- + reliable sealing even with low sealing pressures
- + equalization of high component tolerances
- + three-dimensional shaping
- + cell technology with a corresponding design-to-cost approach
- + highly automatable solution

PRECISE DESIGN OF OUR GASKETS ENSURE LONG SERVICE LIFE OF THE STACKS

Our extensive design expertise in the area of beaded screen printing and elastomer gaskets enables us to design the gaskets precisely for our customers' applications and thus achieve the customer's targets for the performance and service life of the PEM electrolysis stacks.



OPTIMUM DESIGN AND COORDINATION OF ALL PRODUCT FEATURES ENABLES MAXIMUM STACK FUNCTIONALITY.

A good coordination and design of all product features enables maximum functionality of the PEM electrolysis stacks – EKPO Fuel Cell Technologies offers the necessary design know-how.



FAST INDUSTRIALIZATION OF STACKS THROUGH INTELLIGENT INTEGRATION OF SEALING MATERIALS AND BIPOLAR PLATES.

EKPO Fuel Cell Technologies' integrated approach to bipolar plates, specially developed sealing materials and expertise in the field of PEM fuel cells enables our customers to quickly industrialize their electrolysis stacks.

At our headquarters in Dettingen/Erms, Germany, we bundle our development and testing activities in dedicated centers – from laboratory technology and component test benches to the validation of PEM fuel cell stacks. All the necessary testing and validation facilities are combined under one roof. This enables us to offer our customers optimum conditions for breaking new ground and achieving goals faster – even for small series and prototypes.



EiringKlinger has been active in the field of fuel cells for mobile and stationary applications for around 20 years. The first series project started back in 2008, and we are also using this wealth of experience for the development and production of bipolar plates for PEM electrolysis stacks. Our bipolar plates/ cell components for PEM electrolysis stacks meet the highest demands in terms of robustness, functionality and performance.

FOR HIGHLY STRESSED COMPONENTS

ELASTOMER/ METAL-ELASTOMER AND PLASTIC-ELASTOMER SEALING SYSTEMS.

We want to create scope for our customers to achieve their goals more quickly and drive forward the development of a sustainable hydrogen economy. That's why we always have the entire system in mind and use of our know-how and innovative strength to realize optimal product solutions.

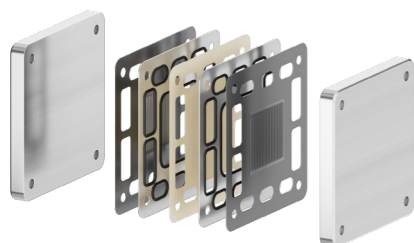
Whether with or without a carrier material, all three gasket designs stand for optimum functional reliability and efficiency. The special feature: ElingKlinger develops the elastomer materials used itself.

THE RIGHT MATERIAL FOR EVERY APPLICATION

Metal-elastomer gaskets are used for highly stressed components such as electrolysis stacks. They consist of a metal carrier with vulcanized elastomer profiles. The elastomer materials used are developed in-house by ElingKlinger and tailored to the respective requirements.

Thanks to state-of-the-art process and injection molding technologies, different materials can be joined to a metal or plastic carrier. Thanks to our many years of experience in plastic injection molding, we can also use this expertise for the production of plastic carriers for plastic elastomer sealing systems. This makes it possible to use the optimum material for every application.

Metal-elastomer gaskets ideal for automated stack assembly



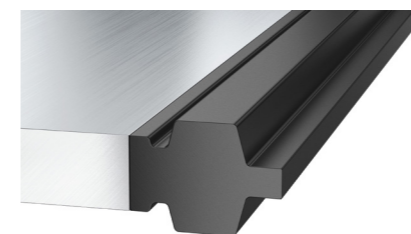
METAL-ELASTOMER SEALING SYSTEMS

- + e.g. bipolar plates with integrated gaskets or sealing of individual cell levels
- + XL dimensions possible
- + for components in high-pressure applications
- + reliable sealing even with low sealing pressures
- + equalization of high component tolerances
- + three-dimensional shaping
- + reduction of screw force and number of screws
- + elastomer materials developed in-house by ElingKlinger

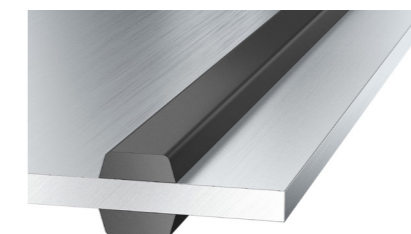
ADVANTAGES OF ELASTOMER/ METAL-ELASTOMER AND PLASTIC-ELASTOMER SEALING SYSTEMS

- + reliable sealing against high pressures with low sealing forces
- + compensation of high component tolerances
- + three-dimensional shaping
- + fully automatic assembly
- + different material combinations possible

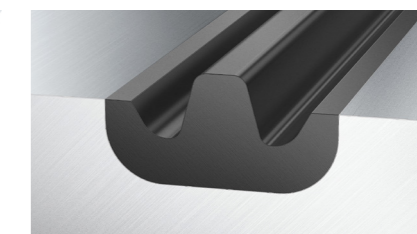
Block profile molded on the front



Sealing lip molded onto the carrier



Sealing lip integrated in plastic carrier



GOOD TO KNOW

The group of per- and polyfluoroalkyl substances (PFAS) comprises several thousand industrial chemicals used in a wide variety of industrial processes and products. However, in addition to their diverse and sometimes unique technical benefits, PFAS have undisputed harmful effects on nature, the environment and health. For this reason, the European Chemicals Agency (ECHA) has proposed to extensive restrictions on the production, use and supply of PFAS in 2023.

Thanks to our decades of experience in the field of sealing technology, ElingKlinger is already developing replacement materials and alternative materials that are used in the PEM fuel cell stacks of EKPO Fuel Cell Technologies, among others.

PLEASE DO NOT HESITATE TO CONTACT US!

BUNDLED KNOW-HOW

MOVING FORWARD TOGETHER.

Short development cycles, the complex interaction of all components, and exacting demand in terms of cost-effectiveness and sustainability make an integrated approach essential. This is an important factor for ElingKlinger's success, as everything from initial concept to finished product comes from a single source.

Our core competences include stamping, embossing, forming and coating metal, plastic injection molding, sealing technology, our own elastomer material development and the processing of high-performance plastics. We are also able to combine a large number of different components into a single assembly with high process reliability. Another core competence is tooling technology, as we design and manufacture a large proportion of the tools we use ourselves in our in-house tool shop.

For us, system expertise means being a pioneer, creating space for development, and achieving our goals more quickly.

This enables us to offer our customers individual product solutions that contribute to the development of a sustainable hydrogen economy.



OUR PORTFOLIO FOR YOUR SUCCESS:

- + Gaskets and insulation disks in dimensions up to 3,000 mm
- + Bipolar plates/ cell components with or without integrated gasket
- + Elastomer/ metal-elastomer and plastic-elastomer sealing systems for alkaline and PEM electrolysis stacks
- + Pipes and tubes for alkaline and PEM-electrolysis
- + Insulation parts
- + Heat shrink tubings as protective coating
- + Diaphragm for actuators and pumps
- + Spring energized seal for high-pressure sealing
- + Laminated piston for dry-running compressors
- + V-packing for high-pressure valves
- + Piston rings
- + Bellows for compensators
- + Corrosion resistant ThermoX™ heat exchangers for tempering of e.g. liquid electrolyte or gas cooling

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