MULTIFUNCTIONAL, DURABLE, EFFICIENT.

Lightweight technologies.
“We have redefined lightweight engineering. And we are continuing to provide crucial impetus.”

Philipp Ruez,
Director Global Business Development
ElringKlinger as an innovation driver. Emissions reduction, alternative drive technologies, lightweight engineering concepts, optimization of combustion engines: the automobile industry is undergoing transformation. The agenda for the future has been clearly defined. Lightweight engineering is one of the key technologies for increasing the range of electric vehicles and lowering the fuel consumption and CO₂ emissions of diesel and petrol engines. With our intelligent lightweight solutions we are thoroughly committed to finding answers to tomorrow’s questions. And to give you the key components for your success.

Shaping the future. With ElringKlinger.

More than a supplier: highly skilled partner, acknowledged mobility specialist, innovative visionary for all types of drive system.

>10,000 EMPLOYEES AS PARTNERS.

We are a powerful and reliable development partner and series supplier to our customers. At the same time, we are pioneers and trusted companions – from the initial idea through to the finished product. More than 10,000 employees at 44 sites around the globe are committed to developing and producing high-tech solutions that are truly compelling.

>140 YEARS AT THE LEADING EDGE.

Nothing beats experience blended with inventive spirit. ElringKlinger excels in both areas. In 1879, Paul Lechler established a trading company for technical products, thus laying the foundations for what was later to become ElringKlinger AG. Now operating as a global player, we provide future-proof solutions in a wide range of product categories and for all types of drive system. We are also demonstrating our exceptional abilities in other areas of industry. Among our key strengths are maintaining a close dialogue with customers, pursuing truly groundbreaking ideas, and tackling any challenges that may stand in the way of progress. And it has been this way for 140 years.

>12 KEY FIELDS OF EXPERTISE.

ElringKlinger as an innovation driver. Emissions reduction, alternative drive technologies, lightweight engineering concepts, optimization of combustion engines: the automobile industry is undergoing transformation. The agenda for the future has been clearly defined. Lightweight engineering is one of the key technologies for increasing the range of electric vehicles and lowering the fuel consumption and CO₂ emissions of diesel and petrol engines. With our intelligent lightweight solutions we are thoroughly committed to finding answers to tomorrow’s questions. And to give you the key components for your success.

OUR PORTFOLIO. FOR YOUR SUCCESS.

- Battery technology
- Fuel cell technology
- Electric drive units
- E-mobility components
- Lightweight and elastomer technology
- Sealing systems
- Cylinder-head gaskets
- Shielding systems
- Components from high-performance plastics
- Tooling technology
- Engine development services
- Aftermarket

PARTNER. PIONEER. INNOVATION DRIVER.

More than a supplier: highly skilled partner, acknowledged mobility specialist, innovative visionary for all types of drive system.
HIGH-PERFORMANCE PLASTIC PARTS FOR PASSENGER AND COMMERCIAL VEHICLES.

Strong parts, lightweight design.

Improved safety, more comfort, better handling. Modern vehicles have a lot to offer. Intelligent lightweight design is necessary to ensure that these extra features and performance options do not drive up vehicle weight.

FUNCTIONAL INTEGRATION: QUALITY AND SYSTEMS COMPETENCE COMBINED.

For ElringKlinger, intelligent lightweight design means more than simply reducing weight. We use lighter materials – glass-fiber reinforced plastics, thermoplastics, thermosetting plastics, organo sheet materials (continuous fiber-reinforced or fabric-reinforced thermoplastics) and metallic materials such as aluminum – in combination with the latest production processes. With additional design optimizations, more functions can be integrated into one component and the overall number of parts is reduced. This saves not only on weight and materials, but also on development times and costs.

INTELLIGENT LIGHTWEIGHT DESIGN FROM ELRINGKLINGER.

The benefits to you at a glance:
+ Reduced material use
+ Greater cost-effectiveness
+ Integration of numerous functions
+ Functional testing of the entire module
+ Better NVH characteristics
+ Design freedom
+ Shorter development times
+ Reliable, easy assembly
+ Recyclability
+ Resource efficiency
DEVELOPMENT AND PRODUCTION COMPETENCE.

All under one roof.

From research and development through series production to just-in-time delivery of components ready for installation, our integrated approach generates synergies that pay off and help you move forward.

QUALITY AND COMPETENCE.
FROM THE IDEA THROUGH TO THE SERIES PRODUCT.

PRODUCT DEVELOPMENT/MATERIALS COMPETENCE
- Multi-material components (e.g. plastic, aluminum, organo sheet material)
- In-house material laboratories

PROCESS DEVELOPMENT/PRODUCTION PROCESSES
- Plastic injection molding technology (JoinMelt, MuCell™)
- Hybrid technology
- Pressing and forming technology
- Connecting and joining technology

TOOL COMPETENCE
- In-house toolmaking for forming and injection molding tools
- Prototype and series tools

PRODUCTION COMPETENCE
- From prototype construction (technical center) to series production
- From small to large series production
- From manual to fully automated production

INVESTMENT IN THE FUTURE.

ElringKlinger is also a major partner in publicly funded research and development projects:

HIGHKO RESEARCH PROJECT
(CONCEPT STUDY FOR A HIGHLY INTEGRATED REAR SECTION OF BATTERY ELECTRIC VEHICLES)
Together with Porsche AG and other project partners, ElringKlinger is developing a modular, lightweight and highly integrated rear section concept for battery operated vehicles. ElringKlinger’s focus is on the development of thermoplastic, fiber-reinforced plastic hybrid structural components, intended to accommodate higher energy absorptions in the same space, and the integration of a wide range of functions. ElringKlinger is also handling tool development, toolmaking and prototype production at its in-house technology center.
PROCESS AND TOOLING COMPETENCE.

Expertise down to the fibers.

Achieving complex geometries. Implementing technically challenging product solutions. The ElringKlinger competence center for mold and tool construction reflects our system expertise in the areas of plastics processing (injection molding tools, press tools) and processing of composite fiber materials. And it makes even complicated things easy for you.
360° SERVICES SPECTRUM.

One-stop shop: product design, toolmaking and sampling, measurement and optimization with optical 3D measurement technology, including all necessary welding processes and assembly work.

360° TOOLS SPECTRUM.

• Injection molds for production of plastic parts with a shot weight of 20g to 120kg
• Highly polished tools for glazing applications
• Core melting process
• Tools for processing organo sheet materials
• SMC and GMT press molds (hot pressing processes)
• Press tools
• GIT and WIT tools
• Hybrid tools for different material combinations
• 2-component tools

360° MATERIALS SPECTRUM.

The optimal, application-specific choice of materials and exactly the right component design ensure maximum functionality, safety and service life. Even under extreme environmental and usage conditions.

GOOD TO KNOW:

Whether it is oil pans, intake air pipes, cylinder head cover modules for sports cars or plastic parts for use in battery operated vehicles, ElringKlinger has a unique production cell at its Lenningen site that can manufacture small series with maximum flexibility on the zero defects principle. This uses the latest camera technology and flexible robot systems. The system can be programmed for a wide range of components, including all plastics welding processes.

GOOD TO KNOW:

ElringKlinger’s comprehensive materials expertise is based not least on our decades of experience in plastics processing.
The new metal is made of plastic.

As strong and durable as metal. Fast and reproducible in production. Our product solutions made of continuous fiber-reinforced thermoplastics are used wherever weight must be saved in structural and energy-absorbing components.

REACHING THE OBJECTIVE - IN TWO PHASES.

The thermoplastic composite material (organo sheet, tape) is pre-cut. Before the injection molding process, the component is heated in an oven and transferred into the injection molding tool. The component is fixed with the aid of protruding retaining pins and then formed. The injection molding process begins and functional elements are injected. Finally the tool is opened and the component is demolded.

THERMOPLASTICS COMPOSITE HYBRID PROCESS.

1. The composite material is heated in the oven
2. The composite material is transferred into the injection molding tool
3. With protruding retaining pins or leading pins, the component is fixed in the injection molding tool
4. Handling is removed and the injection molding tool is closed
5. Forming of the thermoplastic composite material in the injection molding tool
6. Plastic is injected
7. The injection molding tool is opened
8. Component is demolded
PRODUCT EXAMPLE
DOOR MODULE.

The door module carrier is mounted to the vehicle’s door frame. Functional elements are attached to it such as the window winder and the locking system.

In the manufacture of the door module carrier, extremely lightweight and extremely stable fiber composite materials – known as organo sheets – are formed and plastic elements for additional component functions are injected in a single process step.

ADVANTAGES:

+ Weight reduction
+ Better NVH characteristics
+ Improved mechanical properties

ADVANTAGES OF THERMOPLASTICS COMPOSITE HYBRID TECHNOLOGY:

+ Short cycle times
+ Downstream welding and gluing processes possible
+ Various material combinations possible (fabric, unidirectional fibers; carbon, glass, aramid or steel fibers; PA, PP, ABS or PC and other thermoplastics)
PRESSING AND FORMING TECHNOLOGY.

Lightweight materials for heavy tasks.

Efficient, quiet and light: by combining different composite materials, innovative components can be obtained for acoustic shielding and for use in areas with high strength and rigidity requirements.

COST-EFFECTIVE AND WEIGHT-OPTIMIZED SOLUTIONS.

Whether you require acoustic encapsulation or flow-optimized covering, variants for off-road vehicles or penetration protection for batteries, our material and process competence in pressing and forming technology enables us to develop solutions for a wide range of requirements. New applications such as upper shells and covers for large underfloor storage systems for battery operated vehicles can thus be designed cost-effectively and with the optimal weight. The combinations of different materials offer advantages in particular with regard to crashes and bollard collisions. The thermoplastics material composite rebounds completely and protects the battery system reliably from the next damage event.

CONTINUOUS FIBER-REINFORCED THERMOPLASTICS.

Composite material made from carbon or glass fibers embedded in a thermoplastic matrix, such as organo sheets and unidirectional continuous fiber tapes (UD).

ADVANTAGES:
+ High degree of strength and rigidity thanks to multilayer combinations of materials with both low density and low wall thickness
+ High thermal and acoustic insulation
+ High impact resistance

AREAS OF APPLICATION:
Plastic components with increased demands, for example underfloor shielding for battery-operated vehicles.

LWRT (LOW WEIGHT REINFORCED THERMOPLASTICS).

Composite material consisting of a thermoplastic, glass-fiber reinforced core, covered on both sides with acoustic fleece and/or aluminum foil.

ADVANTAGES:
+ Very good acoustic shielding properties at low specific weight
+ Water and oil-resistant, flame-retardant material
+ Satisfies different temperature requirements within the component
+ Additional aerodynamic functions can be integrated

AREAS OF APPLICATION:
Plastic components for special acoustic absorption and damping requirements, for example engine floors and underfloor areas, trunk covers and wheel arch liners.
ADVANTAGES:
+ Very good acoustic shielding properties at low specific weight
+ Creation of complex shapes with no further rework
+ Particularly suitable in combination with other thermoplastic materials for reinforcing specific parts of components
+ Water and oil-resistant, flame-retardant material
+ Satisfies different temperature requirements within the component
+ Additional aerodynamic functions can be integrated

AREAS OF APPLICATION:
Plastic components for special strength and crash behaviour requirements, for example in underfloor areas, engine compartments, front ends or vehicle backs.

GMT (GLASS MAT-REINFORCED THERMOPLASTICS).
Composite material consisting of a glass fiber mat and/or long glass fibers which are impregnated with thermoplastic.

ELROCOUSTIC® FOAMS.
Polyester, polyurethane or duroplast systems covered on both sides with acoustic fleece and/or aluminum foil are normally used for foams.

ADVANTAGES:
+ Very good acoustic properties at low specific weight
+ High thermal and acoustic insulation
+ Water and oil-resistant, flame-retardant material
+ Good impact damping with very good elasticity

AREAS OF APPLICATION:
Acoustic absorption and damping components, for example for roof linings, interior side panels, engine compartments and replacement wheel arches.

ELROCOUSTIC® NON-WOVEN.
Composite material made of natural, mineral or fleece fibers, with or without matrix material.

ADVANTAGES:
+ High noise reduction at close range to the noise source and also for environmental noises
+ No noise created itself, even with direct contact
+ High thermal and acoustic insulation
+ Low specific weight

AREAS OF APPLICATION:
Noise-damping components for e.g. engine insulation, engine encapsulation, subfloors, wheel arch liners and trunks.
HYDROFORM HYBRID TECHNOLOGY.

The best of both worlds.

For the production of structural components, known as polymer metal hybrids (PMH), ElringKlinger uses a combination tool that brings together internal high-pressure forming of metal and plastics injection molding in just one process step.

PLASTIC MEETS METAL.

In the IHPF process, a thin-walled metal tube is inserted automatically into the mold. When the mold halves are closed, the interior of the tube is filled with a liquid and subjected to high pressure, which gives it its precise final shape. The highly integrated injection molding process (e.g. overmolding of metallic elements) then begins in the same tool cavity. Here, plastic is injected into the mold and solidifies in the cavity and around the deformed tube. The hybrid component is then removed automatically and finished in the subsequent processing steps.

INTERNAL HIGH-PRESSURE FORMING (IHPF)

1. Semi-finished products are inserted into the mold
2. Mold is closed, IHPF medium is pressed into a metallic tube
3. Internal high pressure gives the tube its final shape

INJECTION MOLDING PROCESS

4. Injection molding process starts, tube is overmolded
5. Change of hydroforming with air pressure
6. Mold is opened, hydroformed hybrid component can be removed
Cockpit cross-car beams from ElringKlinger combine maximum functionality with minimum weight. The support structure accommodates instrument panel, steering column, heating and ventilation modules, airbags, glove box, center console and other elements and connects them securely to the chassis.

**ADVANTAGES:**

+ **Outstanding performance-to-weight ratio**
  In comparison to existing technologies such as welded metal structures, HFH parts offer outstanding crash properties and high rigidity with low weight.

+ **Load-path based design**
  In addition, metal components made of magnesium, aluminum or steel sheet can be inserted in areas under heavy load.

+ **Functional integration**
  The plastic injection molding process facilitates very easy integration of additional functions, such as local fixing points.

**ADVANTAGES OF HYDROFORM HYBRID TECHNOLOGY:**

+ Short cycle times and high degree of automation

+ No rework required

+ High process stability and reproducibility

+ Global standards in the production of HFH parts

+ Many years of experience with HFH technology
PLASTICS INJECTION MOLDING AND ELASTOMER TECHNOLOGY.

Classics with a future.

Long established: our high-performance plastic components can withstand heavy mechanical loads and can be developed as ready-to-fit modules, including sealing and fixing elements.

A TRIED AND TESTED PROCESS, STILL IN DEMAND.

When the tool is closed, the molten plastic is injected into the mold under high pressure. In order to compensate for volume shrinkage, holding pressure is applied to enable a material flow. Through the subsequent cooling process of the tool, the component becomes dimensionally stable. Finally the tool is openend and the component is removed.

PRODUCT EXAMPLE
ENGINE, GEARBOX AND POWER UNIT MOUNTS.

As a specialist in plastic injection molding, ElringKlinger is also taking a step further with engine, transmission and power unit mounts, replacing the metal materials used previously with glass fiber-reinforced thermoplastics. Thanks to the use of glass fiber-reinforced polyamide, the components have significant advantages over traditional aluminum designs. The improved acoustics, greater heat insulation and weight advantage speak for themselves. Better heat protection, for example for the motor bearing, also increases service life.

ADVANTAGES:
+ Weight reduction
+ Multi functional integration
+ Potential cost savings
+ Better NVH characteristics
+ Less thermal conduction
+ Higher dimensional accuracy
+ High process stability and reproducibility
+ Decades of experience in thermoplastic processing, including for large parts with sealing functions
SEALING TECHNOLOGY USING ELASTOMERS.

In addition to traditional plastic injection molding, ElringKlinger also offers various elastomer sealing solutions in conjunction with plastics components or as individual seals. Based on application-specific materials developed in-house, customized elastomer and metal-elastomer seals can be developed and manufactured for a wide range of possible uses. All elastomer materials are developed in our own material laboratories.

The latest tool and process technology allows cost-effective global production of the seals. These are already in use in electric drive units, gearboxes, combustion engines and in a wide range of high-pressure applications, and guarantee lifelong, reliable sealing of components from one another.

ADVANTAGES:

- Different material combinations to suit the application and the medium to be sealed
- High tolerance balancing with simultaneous robust sealing compared to other sealing technologies

PRODUCT EXAMPLE
METAL-ELASTOMER SEAL IN PUZZLE DESIGN.

ElringKlinger offers an effective sealing solution for large flanges such as those on battery housings with its puzzle design seal. The individual parts can be quickly and simply inserted into each other, with simultaneous pre-positioning using elastomer pins, so that they can be adapted to any geometry with rapid assembly and low space requirements.