

# FORE

The automotive industry is undergoing a period of great change, with an increasing focus on alternative drive technologies. While there are still relatively few electric cars on the roads, demand is growing slowly but surely. ElringKlinger has prepared itself with considerable foresight in anticipation of current and future industry requirements. Indeed, the company is one of just a few automotive suppliers to have already established a strong portfolio of innovative solutions covering every type of vehicle drive – the combustion engine, hybrid systems, and all-electric solutions.

# SIGHT

# 30%

of all new vehicles in Europe should be equipped with an electric or other alternative drive system by the year 2030 according to EU Commission plans. The figure for 2017 was less than 6 %.

The trend towards sustainable mobility is already growing stronger, as shown by the number of new car registrations in the EU. At 852,933, the total for 2017 was up 40 % on the previous year.

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# CONVENTIONAL COMBUSTION ENGINE

## ENGINE PRODUCTS



Cylinder-head gaskets are crucial to the safe and cost-efficient operation of combustion engines, preventing any leakage of combustion gases, engine coolant, or oil. ElringKlinger has the right sealing system for every type of engine and for both cars and commercial vehicles.

### PORTFOLIO

- Cylinder-head gaskets
- Sealing systems
- Thermal and acoustic shielding systems
- Lightweight plastic assemblies
- Deep-drawn and topographic housing assemblies
- Plastic components
- Development services



ElringKlinger is the world's leading supplier of cylinder-head gaskets.

## TRANSMISSION PRODUCTS



ElringKlinger supplies efficient and customized gasket solutions for vehicle engines, gearboxes, exhaust systems, and auxiliary units such as compressors and pumps. The materials and designs are perfectly adapted to meet specific operating conditions.

### PORTFOLIO

- Sealing systems
- Thermal and acoustic shielding systems
- Lightweight plastic assemblies
- Deep-drawn and topographic housing assemblies
- Plastic components



ElringKlinger's sealing portfolio covers transmission, engine, and exhaust applications.

## EXHAUST TRACT PRODUCTS



As a result of engine encapsulation, compact assemblies, minimal air circulation, catalyst technology, and exhaust turbochargers, the temperature in the engine compartment, vehicle underbody, and exhaust system can be very high. Manufacturers also have to meet rigorous acoustic shielding requirements, both outside the vehicle and inside. ElringKlinger offers outstanding product solutions for every operating scenario.

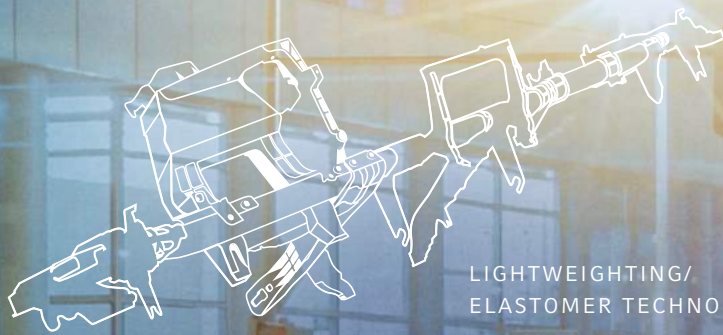
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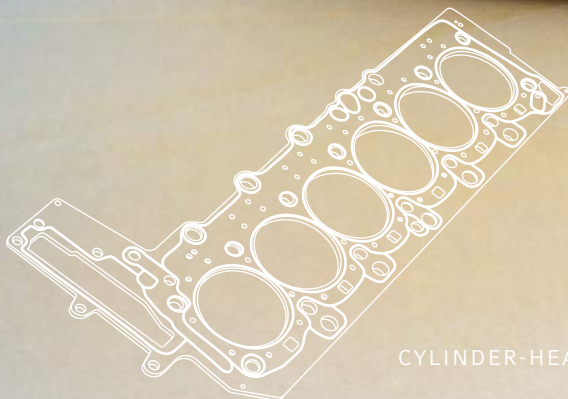


ElringKlinger produces thermal and acoustic shielding systems.





LIGHTWEIGHTING/  
ELASTOMER TECHNOLOGY

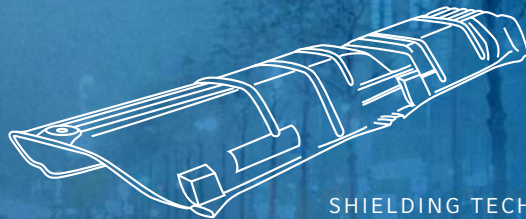


CYLINDER-HEAD GASKETS

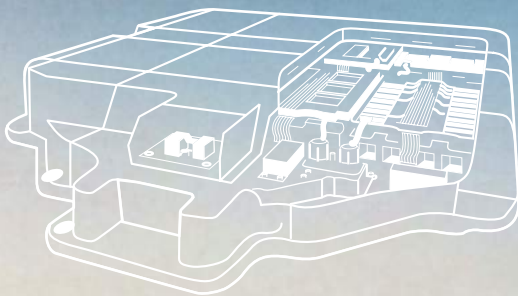




SPECIALTY GASKETS



SHIELDING TECHNOLOGY



E-MOBILITY

# ALTERNATIVE DRIVE TECHNOLOGIES

## BATTERY COMPONENTS AND SYSTEMS



Efficient energy storage is crucial to the viability of electric vehicles. ElringKlinger has already scaled up its output of components for lithium-ion batteries (e.g., cell contact systems and module connectors) to series production level. In cooperation with its partners, the Group can also produce complete battery modules and systems as well as energy storage units.

### PORTFOLIO

- Battery modules and energy storage units
- Battery components
  - Cell housings/connectors/contact systems
  - Module connectors
  - Plastic battery enclosures
  - Pressure-equalizing elements
- Development and testing
- Prototyping and production



ElringKlinger integrates customer-specific components into its battery modules as a complete solution.

## FUEL CELL COMPONENTS AND STACKS



The great advantage of vehicles equipped with a fuel cell drive is their range. ElringKlinger has developed some very effective solutions in the area of fuel cell technology. Besides making its own stacks, for example, the company has patented several designs for metallic bipolar plates and plastic media modules that greatly simplify the fuel cell system.

### PORTFOLIO

- PEM fuel cells
  - PEMFC stacks
  - Metallic bipolar plates
  - End and media modules
  - Casings
- Development and testing
- Prototyping and production



In addition to its wide range of components, ElringKlinger also offers complete fuel cell stacks.

## POWERTRAIN MODULES AND SYSTEMS



In 2017, ElringKlinger established a strategic partnership with the engineering firm hofer in order to expand its electromobility business. hofer is widely recognized as a specialist in electric drive technology. Thanks to this additional know-how, ElringKlinger can now offer a wider range of products to help its customers bring their innovative drive concepts to the production stage.

### PORTFOLIO

- System integration
- E-machines
- Power management electronics
- Control software
- Transmission
- Thermal management/cooling
- Safety concepts



ElringKlinger and hofer work together to produce electric drive units at small-scale series production level.





#### ELRINGKLINGER IS ACTIVELY HELPING TO SHAPE THE FUTURE OF ELECTROMOBILITY:

At its factory in Dettingen/Erms, the company has been making innovative cell contact systems and module connectors for various hybrid and battery-powered electric cars at series production level since 2011.

The automotive industry is currently in the throes of technological upheaval. Although demand for combustion engines is likely to increase in the short term and only start falling gradually from around 2021, the focus of both manufacturers and end customers is increasingly turning to alternative drive concepts that are designed to offer sustainable forms of mobility. Hybrid designs, which bring together a combustion engine and an electric drive, are viewed by industry experts merely as a bridging technology on the way towards fully electric vehicles. At present, the two main contenders for the drive system of the future are based on the battery and the fuel cell. Each offers certain inherent advantages. While battery-powered vehicles may have the edge in larger towns and cities where recharging points are more widely available, cars equipped with a fuel cell drive have a greater range, i.e., they can cover greater distances. ElringKlinger is right up there at the cutting edge. Having laid the foundations some years ago, the Group is now well prepared for the impending shift from combustion engines to alternative drive systems.

ElringKlinger's roots lie in sealing technology. The company produced its first gaskets way back in 1914, and to this day ElringKlinger has remained the world's leading supplier of cylinder-head gaskets. For this reason, the company is often seen as a traditional gasket maker. Today, however, there is a lot more to its portfolio. Over the years, always with an eye to the future, ElringKlinger has added many new products to its range. Alongside the company's traditional core business – sealing and shielding systems for engines, gearboxes, and exhausts – ElringKlinger has focused increasingly on lightweight construction as part of its wider strategy. This is regarded as a key technology within the automotive industry. Replacing metal components with lighter materials made of plastic or aluminum offers substantial benefits. In a vehicle with a combustion engine, lighter components translate into lower CO<sub>2</sub> emissions, while in an electric car they increase the range. ElringKlinger has built up years of experience in the field of lightweight construction

and supplies lightweight plastic components for both the vehicle body and the powertrain. All ElringKlinger products combine maximum functionality with minimal weight. What's more, the company's structural bodywork components can be used with any vehicle regardless of the drive system.

Another crucial element of the company's forward-looking portfolio is electromobility. ElringKlinger began to position itself in a range of technologies when they were still in their infancy. The company started working on fuel cell systems as long ago as 1999, and just a few years later it diversified into battery technology. In developing customized product solutions for the electromobility market, ElringKlinger was able to draw on its core expertise in the fields of metal forming, plastic injection molding, joining and coating technology, and automated assembly as well as on the skills of its in-house tooling facility. Besides individual components, ElringKlinger now offers complete low-temperature fuel cell stacks. Turning to battery technology, ElringKlinger began making various components for lithium-ion batteries at series production level some years ago, e.g., cell contact systems and module connectors. In cooperation with its partners, the company can also supply complete battery modules and systems as well as energy storage units. Furthermore, thanks to ElringKlinger's strategic purchase of a stake in the engineering firm hofer (Nürtingen, Germany), which specializes in electric drive technology, it has been able to greatly expand its e-mobility portfolio. As a result, the Group can now rightly boast proven expertise in the development and manufacture of alternative drive systems.

This revolution in vehicle drive technology involves far-reaching changes – for the automotive industry as a whole and for ElringKlinger of course. Having embraced a forward-looking strategy of concentrating on functional components, lightweight construction, and electromobility, the Group is transforming itself proactively from a mere component supplier to a provider of complete vehicle systems.



# ElringKlinger's product portfolio – designed for the future

PRESENT

FUTURE

PRODUCT PORTFOLIO

CYLINDER-HEAD  
GASKETS

SPECIALTY GASKETS

SHIELDING TECHNOLOGY

LIGHTWEIGHTING/  
ELASTOMER TECHNOLOGY

E-MOBILITY

Cylinder-Head  
GasketsSealing  
SystemsAcoustic  
Shielding  
SystemsThermal  
Shielding  
SystemsLightweight  
Plastic  
Components  
for the  
DrivetrainLightweight  
Plastic  
Components  
for Car BodyBattery  
Components/  
ModulesFuel Cell  
Components/  
StacksElectric  
Drive UnitFUNCTIONAL  
COMPONENTSLIGHT-  
WEIGHTING

E-MOBILITY

STRATEGIC AREAS