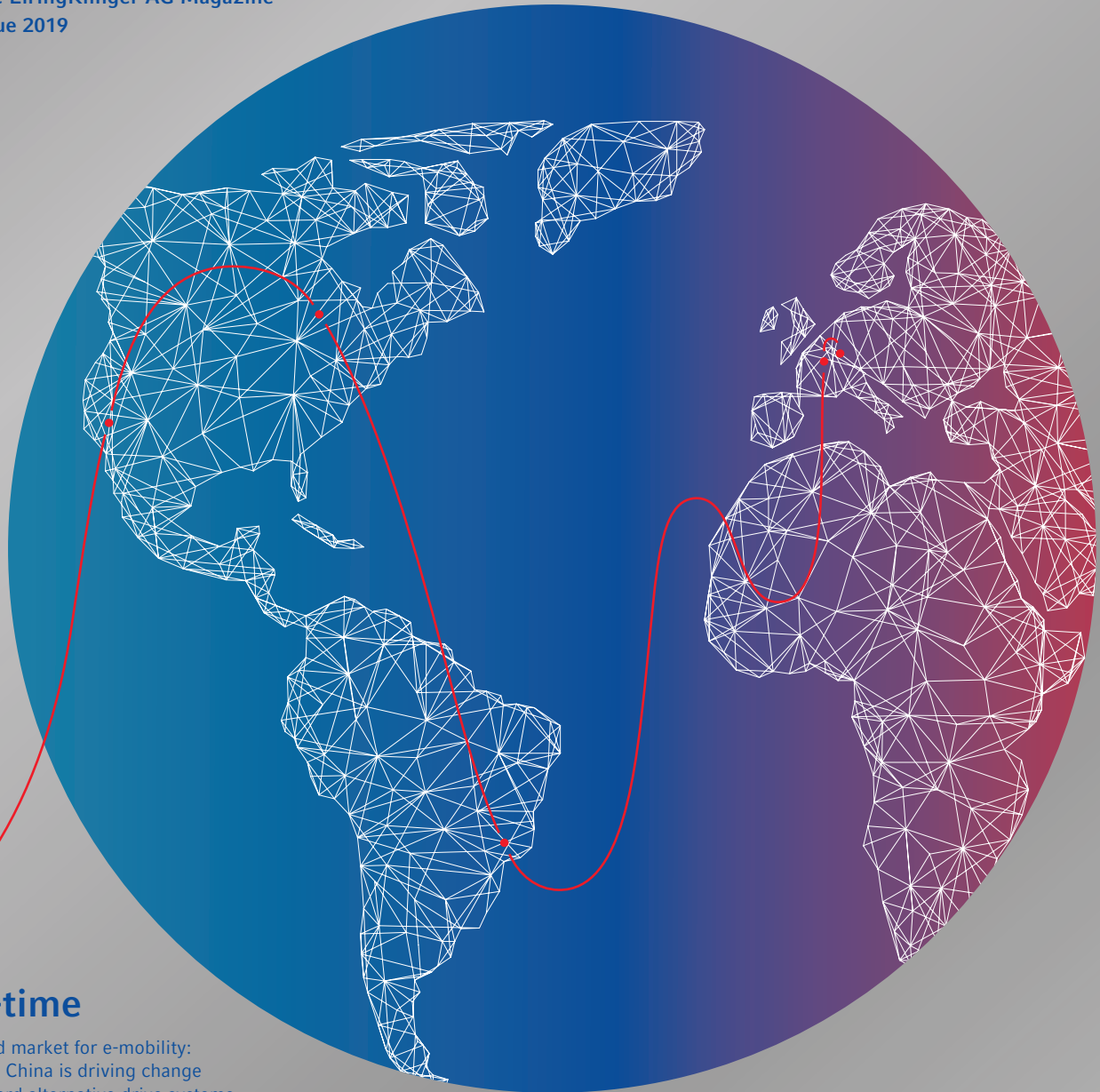


pulse

The ElringKlinger AG Magazine
Issue 2019



E-time

Lead market for e-mobility:
how China is driving change
toward alternative drive systems

Free trade

CEO interview on globalization:
Dr. Stefan Wolf in conversation with
Dr. Nicola Leibinger-Kammüller

New mobility

Insights into next-generation mobility:
ElringKlinger in Silicon Valley

ElringKlinger – Facts & Figures

EXPERIENCE MOBILITY – DRIVE THE FUTURE.

ElringKlinger is actively working on new technologies and innovative solutions to help shape the world of mobility – today and well into the future.

SALES REVENUE

1,699 EUR million

were generated by ElringKlinger in fiscal year 2018.

HUMAN RESOURCES

10,429

employees were working for ElringKlinger all over the world as of December 31, 2018.

MARKETS

3/4

of ElringKlinger's revenue is generated outside of Germany. Around 40 percent is attributable to the NAFTA and Asia-Pacific regions.

GROUP HEADQUARTERS

48°30'43" N, 9°21'45" E

ElringKlinger's corporate headquarters are located in Dettingen/Erms, approx. 40 kilometers south of Stuttgart.

GLOBAL PRESENCE

45 Sites

ElringKlinger is represented worldwide, covering all the major automotive markets and located in close proximity to its customers.

INTERNATIONAL SPIRIT

Approx. **60%**

of ElringKlinger's workforce is employed beyond the borders of Germany. This team shares a common ambition: to shape the future of automotive technology.

SOCIAL MEDIA

ElringKlinger

Follow ElringKlinger on the social media networks of Facebook, Twitter, Xing, and YouTube (Elring – Das Original).

As an independent and globally positioned supplier, ElringKlinger is a powerful and reliable partner to the automotive industry. Be it passenger car or commercial vehicle, equipped with an optimized combustion engine, with hybrid technology, or with an all-electric motor – we offer innovative solutions for all types of drive system. In doing so, we are making a committed contribution to sustainable mobility.

Our lightweighting concepts help to reduce the overall weight of vehicles. As a result, vehicles powered by combustion engines consume less fuel and emit less CO₂, while those equipped with alternative propulsion systems benefit from an extended range. Developing cutting-edge battery and fuel cell technology as well as electric drive units, we were among the frontrunners when it came to positioning ourselves as a specialist in the field of e-mobility.

At the same time, we are committed to evolving our sealing technology for a wide range of applications. Our shielding systems are designed to ensure high-end temperature and acoustics management throughout the vehicle. Dynamic precision parts developed by ElringKlinger can be used in all types of drive system.

Additionally, the Group's portfolio includes engineering services, tooling technology, and products made of high-performance plastics, which are also marketed to industries beyond the automotive sector. These efforts are supported by a dedicated workforce of more than 10,000 people at 45 ElringKlinger Group locations around the globe.

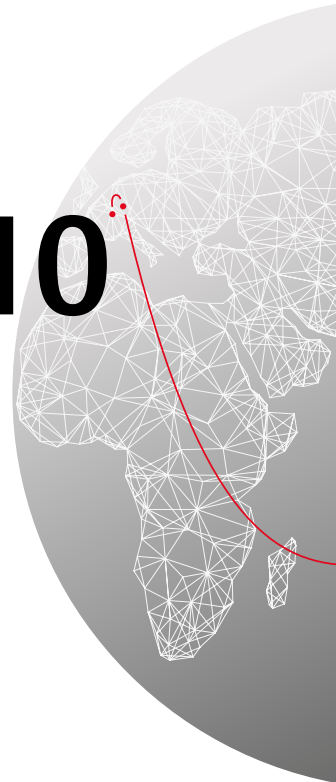
Dear Reader,

The world is in a state of flux – politically, economically, and ecologically. Single-handed action can be short-sighted, as everything has a global dimension. This also applies to the automotive sector. The wind of change sweeping through this industry is being felt everywhere – and mobility as we know it will be transformed completely. Worldwide. ElringKlinger is determined to play an active role in this transition – and we have the skills to do so.

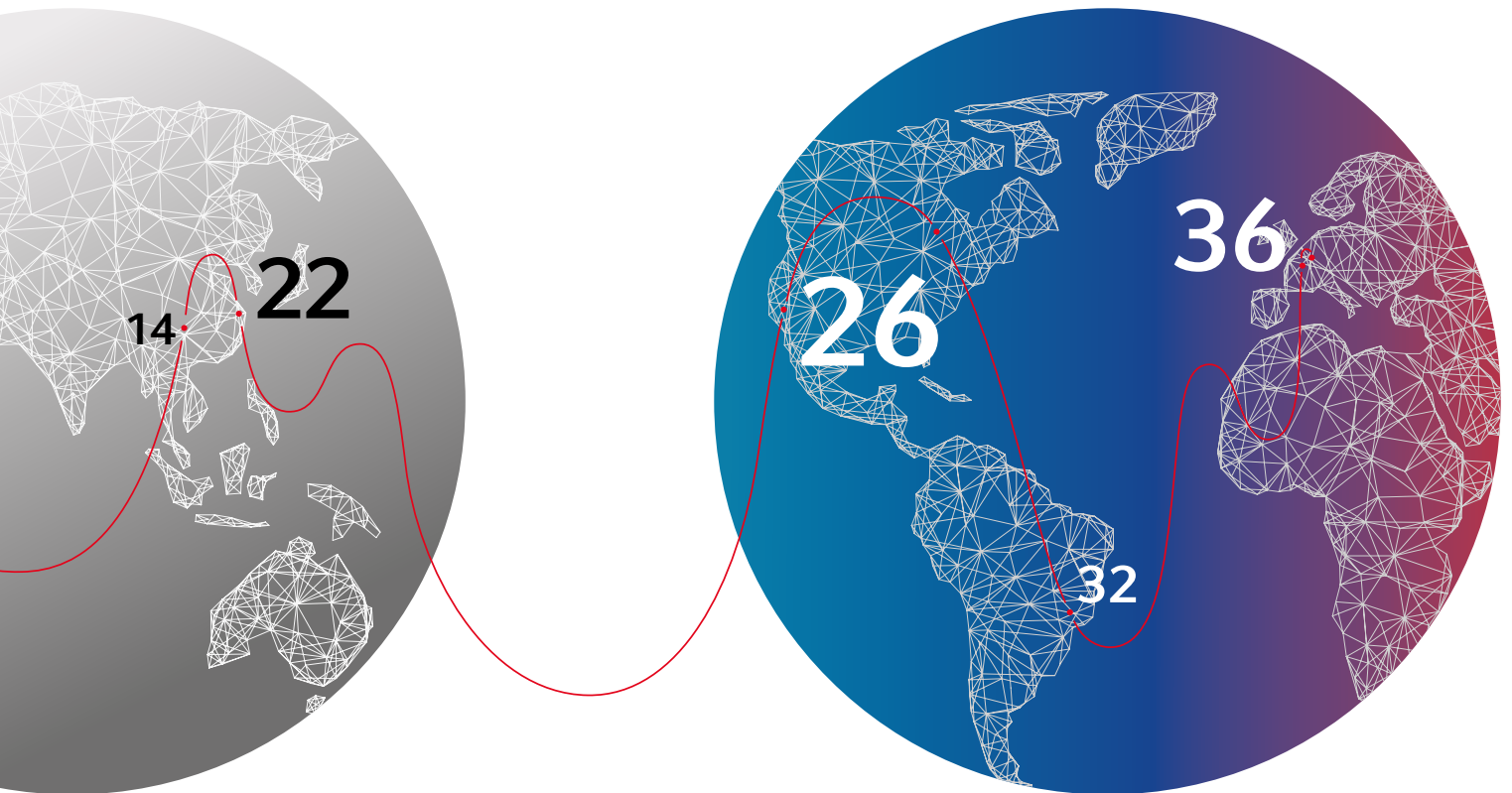
This edition of pulse takes you on a journey into the world of ElringKlinger. We take a closer look at our key markets and explain how our global presence, our strengths as an innovator, and our technological expertise are helping us in our efforts to drive this rapid change on the back of a cutting-edge product portfolio.

We invite you to travel with us on the following pages.

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Dr. Stefan Wolf,
CEO of ElringKlinger AG



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Focusing on the aftermarket: two ElringKlinger sales experts discuss business in the US and China as key markets of the future.

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36 Precision work

Innovation begins with the input material. Products supplied by ElringKlinger Kunststofftechnik are indispensable for many sectors.

WHAT DRIVES US

Small numbers, big impact: around the globe strict emission standards necessitate a change of direction in the automotive sector toward alternative drive concepts. ElringKlinger is helping to shape the mobility of the future – worldwide.

European Union 2030

-37.5%

Europe as a pacesetter: the world's strictest CO₂ limits of 95 g/km in the year 2021 are to be reduced by a further 37.5 % by 2030. ElringKlinger is developing innovative solutions aimed at meeting this target, the focus being on lighter and more efficient vehicles. This applies to both conventional combustion engines and alternative drive systems.



USA 2025

99 g CO₂/km average fleet emissions


In the United States, California ranks not only as the largest car market but also, above all, as a pioneer when it comes to climate protection. In Silicon Valley, the emphasis is on connectivity, digitalization, and the creation of next-generation mobility concepts ("New mobility"). ElringKlinger has its finger on the pulse: in Fremont, the fourth site operated by the Group in the United States, lightweight structural components based on polymer/metal hybrid engineering have been rolling off the assembly line since 2017 – for a new vehicle generation.



China 2020

117 g CO₂/km average fleet emissions

China is looking to establish itself as a leading technology nation and has embraced low-emission drive systems in pursuit of this goal. Its CO₂ limits are based on Western standards. ElringKlinger has production plants at three sites in China, covering everything from gaskets and shielding systems to lightweight structural parts. It also offers components and systems for alternative drive concepts, such as batteries and fuel cells.



Brazil 2017

-12%

Time passes differently in Brazil: the pace of transformation is slower, with car owners still relying heavily on ethanol as a source of fuel. Despite this situation, the emerging economy has its sights set on European emission targets: by 2017 car manufacturers had to improve the average fuel consumption of their vehicles by 12% compared to 2012. Operating from its plant in Piracicaba, ElringKlinger supplies components to many vehicle manufacturers. In addition, it serves South America's largest market for spare parts.

FREE

TRADE



German automotive suppliers and mechanical engineering firms have long derived the majority of their revenue from foreign markets. However, crucial aspects for exporting companies like free trade and globalization are increasingly coming under pressure in many countries. Dr. Stefan Wolf, CEO of ElringKlinger, discusses how to respond to this trend with TRUMPF family entrepreneur Dr. Nicola Leibinger-Kammüller.

📍 – Stuttgart, Germany

ELRINGKLINGER GENERATES THREE-QUARTERS OF ITS REVENUE OUTSIDE GERMANY AND TRUMPF AS MUCH AS FOUR-FIFTHS. SO HOW IMPORTANT ARE YOUR ORIGINS TO YOU NOW?

LEIBINGER-KAMMÜLLER — Our headquarters in Ditzingen still form the nucleus of the TRUMPF Group. As a family-run company, we feel committed to both the local community and to Germany as an industrial location.

WOLF — We have a similar attitude. Even though we are now an exchange-listed company, we espouse the values of a family company. What's more, our entire unit responsible for fundamental R&D is based at our corporate headquarters in Dettingen/Erms – as part of our commitment to Germany and our origins.

LEIBINGER — For TRUMPF, too, our headquarters are also our most important development center worldwide, probably for the same reason as ElringKlinger. We have excellently trained staff here, not just engi-

neers and physicists, but also highly qualified professionals and technicians.

WOLF — That's right. Any successful globalization needs an anchor point or strong launch pad for developing its international sites. That process began for ElringKlinger back in the 1960s. It is also the right way to ensure our core values are put into practice at each of our locations abroad.

LEIBINGER — Respect for and fairness in dealing with one another are the values we seek to practice all over the world. We are guided by the Ten Commandments, even though that presents new challenges for us every day.

WOLF — For us, honesty and reliability are of crucial importance. That kind of culture is the only way for people to address problems openly and find shared solutions.

LEIBINGER — Reliability is extremely important, in crisis situations in particular. That applies to the



The CUBE restaurant of the Stuttgart Art Museum was the venue for this interview.

employer too. In the last great crisis of 2009, we didn't cut a single job – anywhere in the world.

WHAT ROLE DOES TECHNOLOGICAL EDGE HAVE IN INTERNATIONAL MARKETS?

WOLF — Technological edge is quite crucial in the competitive international marketplace. The entire process of globalization within the automotive sector wasn't cost but rather market-driven. The investment decisions of manufacturers who increasingly chose to shift their production abroad had a significant part to play in that trend. Their suppliers followed them, since they naturally wanted to be close to their customers. However, it is important to maintain Germany's position as a technology leader. We have to translate our success with the combustion engine into success with the drive systems of the future, i. e., batteries and fuel cells. Much more needs to be invested here in new technologies – and that includes the federal government.

LEIBINGER — But one-sided subsidizing doesn't work either, as is evident from the solar sector. I would just be happy if the government were to spare us some of the senseless bureaucracy. We have the necessary innovative strength to make technological advances ourselves. Just as in the past, when my father realized laser technology could become a threat

to classic metalworking; he made a tactical decision to ensure we had the best lasers to use on our tool machinery.

WOLF — It was a similar motivation that prompted us 20 years ago to start work on fuel cells and begin developing electric drives eleven years ago. Back then, we still generated 95 percent of our revenue with internal combustion engines. But that market will undergo a gradual decline from 2021/22 onwards. So we made a conscious decision to expand our portfolio at an early stage to include alternative drive systems and build up the necessary know-how. One example of this is bipolar plates for fuel cells, production of which is not fundamentally different to that of cylinder-head gaskets for internal combustion engines. Fuel cell technology has great potential, and we intend to help shape this market.

WHERE DO YOU CURRENTLY SEE THE MOST EXCITING MARKETS FOR YOUR COMPANY AND YOUR BRANCH OF INDUSTRY?

WOLF — For us, the focus is clearly on Asia. The vehicle markets in Europe and the United States are already saturated. The Chinese market is already well developed too and is currently in the process of regrouping. But other Asian markets like Malaysia, the Philippines, and Thailand offer considerable growth potential in some areas, to some extent

also due to the increasing emergence of a middle class there. In those countries, the car is a status symbol of newly acquired prosperity.

LEIBINGER — And wherever people are buying cars, you can expect microwave ovens and cash machines to be bought and sold too. Manufacturers of such appliances and machinery will have to process sheet metal – making them potential customers for us. So we also have the Asian markets in our sights. But Germany remains important to us too; it is still our biggest single market.

WE ARE EXPERIENCING AN INCREASING TREND TOWARDS POLITICAL AND ECONOMIC ISOLATION. HOW MUCH DOES THIS AFFECT YOU?

LEIBINGER — So far, our American business is going well, even though steel prices have risen slightly. We are more concerned at the moment about the United Kingdom, where we manufacture fiber lasers that are primarily exported to China. Some of the components required for our laser production come from abroad – and have been hoarded for months now.

WOLF — We, on the other hand, are significantly affected by US protectionism. As an example, we source steel produced in the United States for our cylinder-head gaskets, which we then process in Georgia.



» **P**rotectionism on the part of individual nations simply has no place in today's global economy.«

Dr. Stefan Wolf, CEO of ElringKlinger AG



» **W**e need a united Europe if we are to hold our own in international competition with America and China. «

Dr. Nicola Leibinger-Kammüller,
CEO of TRUMPF GmbH + Co. KG

But because the kind of raw materials needed to produce high-quality stainless steel are not available in the US and have to be imported from China, the associated customs duties have now led to a 25 percent increase in the price of steel. That is absurd! Protectionism simply has no place in today's global economy.

LEIBINGER — And it is not just about the prices. The barriers that form in people's minds are even worse than the economic repercussions of protectionism. We are incredibly lucky to have freedom of movement within Europe. That helps us maintain peace on the continent as well. And some would have us give all that up again? No matter what, we also urgently need a united Europe if we are to hold our own in international competition with America and China.

WOLF — It was and is the intention of the European Union that we all grow closer together. The common market and common currency were to be followed by political union. But, at the moment, we are heading in the wrong direction. If that doesn't change, we will be overtaken by the US on the left and by China

on the right. We have to make it clear to people that we can only preserve our prosperity in the globally competitive marketplace if we pull together in Europe rather than drift apart.

WHAT IS YOUR PERSONAL VISION OF GLOBALIZATION IN THE YEAR 2029?

LEIBINGER — I am hoping for a strong, reformed Europe, free trade worldwide, and open borders – plus technical solutions to effectively and sustainably combat climate change. As far as our company is concerned: TRUMPF will have grown considerably in 2029 and become much stronger in Asia.

WOLF — ElringKlinger will also have a stronger position in Asia by then. The transformation process in electric mobility will have made further strides. Efficient drive technologies and autonomous cars will have made the breakthrough in some parts of the world. In addition, digital connectivity will continue to change the world.

JOHANNES WINTERHAGEN LED THE CONVERSATION.

DR. PHIL. NICOLA LEIBINGER-KAMMÜLLER

Internationality is quite literally something Dr. Nicola Leibinger-Kammüller was born with. She came into the world in 1959 in Ohio, USA, when her father Berthold Leibinger had been living there for several years. Having completed degree courses in German, English, and Japanese studies, she joined the family company in 1985. In 2005, she took over as CEO of TRUMPF GmbH + Co. KG, the management company of the TRUMPF Group. As an entrepreneur, she is active not only in social and cultural organizations but also a member of several Supervisory Boards, including those of Siemens and Axel Springer.





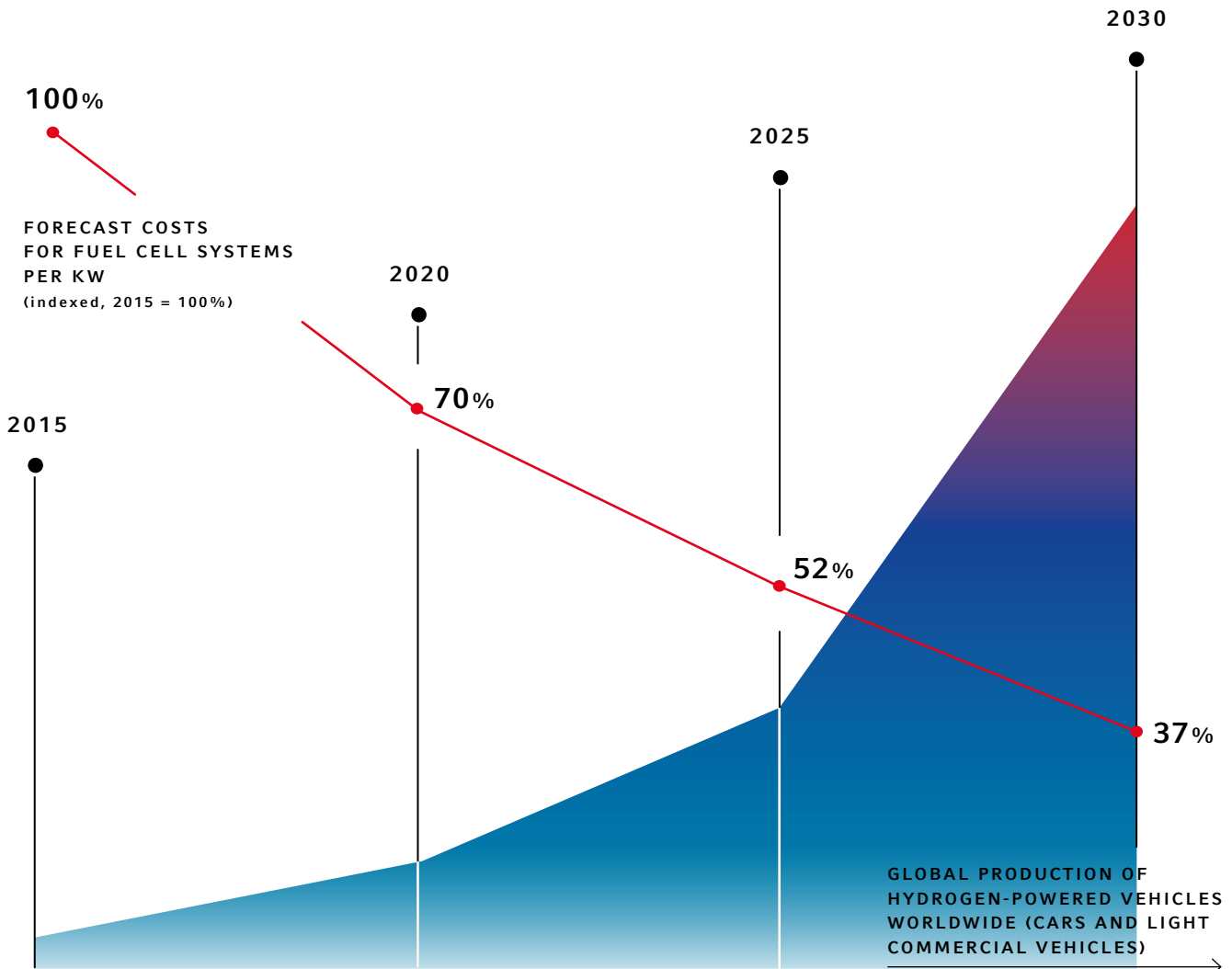
E M I T E



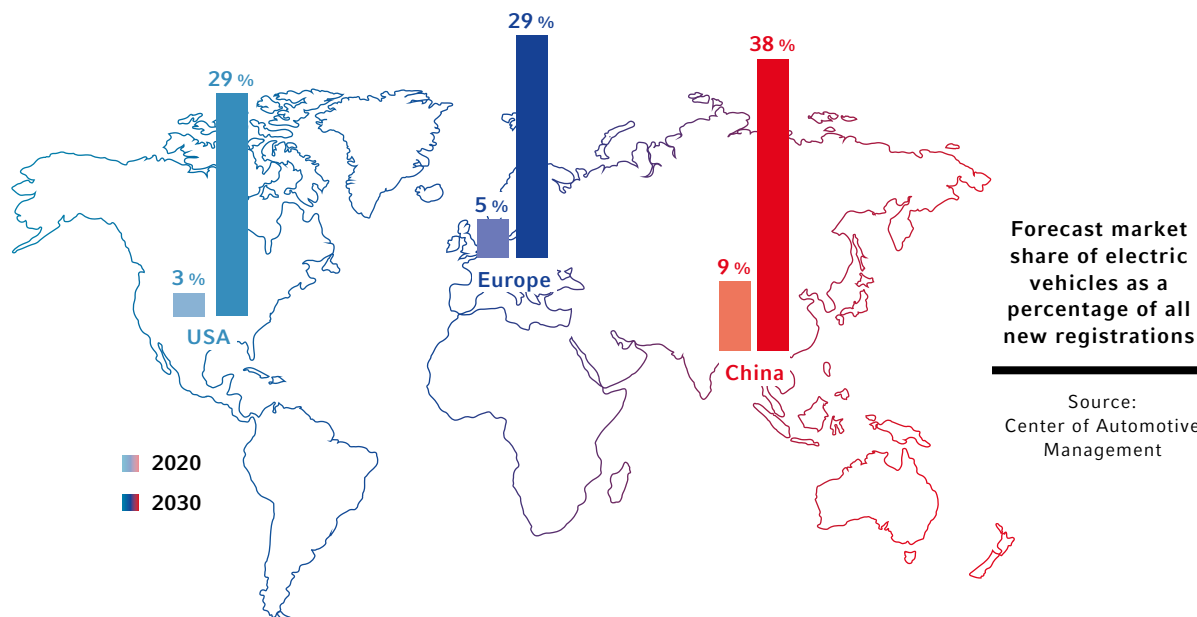
China leads the way in e-mobility. Nowhere else will you find so many electric cars on the road. However, batteries are not the only new technology shaping the future within the world's biggest vehicle market. The fuel cell is also emerging as a strong contender, and lightweight construction plays a crucial role in both technologies. Having established an early foothold in China, ElringKlinger is now striving to increase its market share in the alternative drive sector.

500k renminbi

The Chinese government subsidizes purchases of new hydrogen-powered buses to the tune of around 500,000 renminbi per vehicle. That's around EUR 60,000. The equivalent subsidy for a new hydrogen car is EUR 25,000. As production numbers increase over the coming years, experts are predicting that the cost of a fuel cell system will fall significantly.



Source: PWC Autofacts, The International Council on Clean Transportation (ICCT)



Hardly any other country in the world has developed as rapidly as China. Today, the People's Republic has a population of more than 1.4 billion. Its total economic output for 2018 is likely to exceed USD 14 trillion. In megacities such as Chongqing, Shanghai, and Tianjin, mighty skyscrapers point heavenwards and neon-lit billboards line endlessly congested streets. Those who can afford to drive, do so – despite the fact that city traffic regularly comes to a standstill during rush hour. As well as the biggest automobile market in the world, China is now also the leading market for alternative drive systems. When it comes to e-mobility, the country has its foot right down on the throttle, driven not only by a determination to establish itself at the forefront of new technology but also by the pressing need to cut air pollution. Over 40% of all the electric vehicles produced around the world are destined for China. Worldwide, 17 of the 25 cities with the highest concentration of electric cars are in China. In Shanghai alone, there are more than 160,000 – over 5% of the entire global fleet of electric vehicles.

The figures are no coincidence. China was one of the first countries to recognize the potential of electrification to shape the future of mobility. The Chinese government wants to transform the country – once viewed as the workshop of the world – into a high-tech superpower. To this end, it has launched a new industrial strategy under the slogan “Made in China 2025,” with the goal of leading the world in ten key sectors of the “future economy.” The strategy defines automotive systems as a core technology. The focus of attention here is on low-emission drives.

“The Chinese government is investing massively in efforts to promote alternative drive technologies,” explains Humphrey Chen, General Manager at ElringKlinger in China. “Generous incentives are available to encourage people to buy electric vehicles.” If you buy a car with an alternative drive, you are eligible for a subsidy, depending on the car's range, of between 22,000 Chinese renminbi (CNY) for plug-in hybrids (around EUR 2,700) and CNY 50,000 (around EUR 6,000) for pure electrics. New cars with fuel cell drives qualify for an even bigger subsidy – up to CNY 200,000 (around EUR 25,000). The incentive for commercial vehicles is higher still because they are more expensive – CNY 100,000 (around EUR 12,000) for battery-electric trucks and an impressive CNY 500,000 (around EUR 60,000) for hydrogen-powered trucks. In addition to providing a subsidy to new buyers, the administration offers a host of other ben-

efits for electric vehicle drivers. In many cities, they are granted an immediate registration certificate. In some cases, you might have to wait months to register a car with a standard combustion engine. What's more, in many places, you can park your electric car free of charge, and the recharging infrastructure is being expanded rapidly.

The government is setting an example, too. In many cities, public officials are required to use an electric vehicle. In Shanghai, for example, 50% of all new official vehicles must be equipped with an electric drive. The requirement in Beijing is even higher at 100%. In the capital, all new taxis and car-sharing vehicles must be pure electrics, the goal being to convert the entire fleet by 2022. But the government is not stopping there. It recently set a legal minimum quota for electric cars. Manufacturers will have to meet a minimum target for the proportion of alternative drive vehicles they produce and sell. The quota for 2019 is 10%, rising to 12% from 2020.

386_k

electric buses are on China's roads.

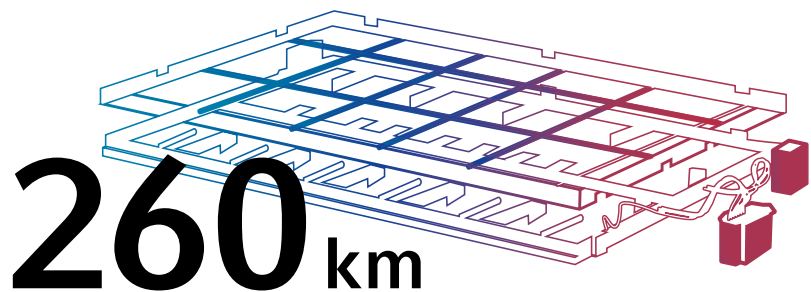
China is clearly the biggest e-mobility market in the world and is likely to remain so for some time to come. The country's own vehicle manufacturers – in a dominant position with a market share of around 90% – are gearing up to meet the demand for new forms of mobility.

ElringKlinger established its first operations in China over 25 years ago, and since then the company has forged good relationships with local producers. Around a quarter of its EUR 170 million revenue in the country comes from Chinese customers alone. Dirk Schneider is VP Sales Asia-Pacific at ElringKlinger: "Some of the major Chinese producers such as BAIC and Chang'an have said they intend to stop making combustion engines in 2025 and from then on sell only electric cars. The government has openly considered an official ban on combustion

engines, although as yet there are no specific plans to do so." The e-mobility boom has thrown up some new names in the industry and is changing the entire landscape in which competitors operate. In China alone, there are over fifty start-ups keen to penetrate the market with new electric models.

From a supplier perspective, if you want to survive in this new world of electric mobility, you need to position yourself now with a global profile. As a leading innova-

tor and technology provider, ElringKlinger understands that perfectly. The company began series production of cell contact systems for the lithium-ion batteries used in electric cars as long ago as 2012. The first customer was a German premium car maker with a pure electric vehicle. "Since then, our client base has grown and now includes other vehicle manufacturers and suppliers," explains Armin Diez, who holds the position of Vice President E-Mobility and New Business Areas for battery and fuel cell applications.



is the average range of a battery-powered electric car. The capacity of the battery to store energy efficiently is a crucial factor in determining the vehicle's range. For lithium-ion batteries, ElringKlinger supplies a range of products such as cell connectors and housings as well as complete battery systems.

» **A**s far as the e-mobility market is concerned, China is where the action is. The determination and government commitment here are simply outstanding.«

Armin Diez, Vice President E-Mobility and New Business Areas

For those applications where battery drive systems cannot deliver the necessary range or specified recharging times, China, similar to its neighbor Japan, is keen to adopt fuel cell technology. Large-scale production of fuel cell systems is to be achieved by 2020. At present, the focus is on commercial vehicles, such as buses, where the infrastructure is relatively simple. Although fuel cell production costs remain very high, experts are predicting a significant fall over the coming years. There are plans to run hydrogen-powered buses as part of a high-impact promotional campaign during the 2022 Winter

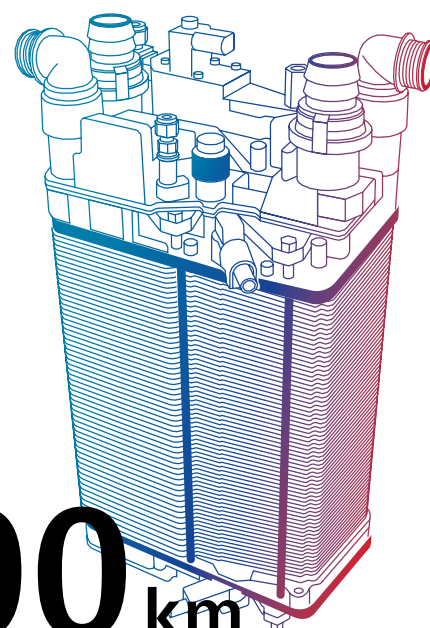
Olympics in Beijing. The government also wants to see no fewer than one million fuel cell vehicles on the country's roads by 2030. In early 2018, the Chinese Minister for Industry and Information Technology, Miao Wei, former head of the country's second-biggest car maker Dongfeng before entering politics, announced his intention to provide further incentives for fuel cell vehicles and infrastructure. One example of government investment in this field is the construction of a "hydrogen city" in Jinan in eastern China to accelerate the development of fuel cell vehicles.



An employee at the new ElringKlinger plant in Chongqing checks a door module. Lightweight construction has a major role to play in the field of e-mobility.

As such, China – once an emerging-market itself – is now playing a key role in defining the future shape of mobility. Armin Diez believes the country offers outstanding prospects for ElringKlinger’s fuel cell business: “More than two-thirds of our current fuel cell development projects involve Chinese partners.” The company began research and development work in this field nearly twenty years ago and since then has built up an extensive portfolio of products. “Our value chain is

very deep-rooted, and we make some key components such as bipolar plates and plastic media modules ourselves,” he explains. “That means we can supply complete fuel cell stacks, modules, and systems.” Demand is very strong, especially from China, and to meet it, ElringKlinger recently set up an applications and engineering center at its existing Chinese plant in Suzhou. The first fuel cell application testing stations are expected to begin operation here very soon.



> **500** km

is the range achieved by vehicles equipped with a fuel cell drive. ElringKlinger’s portfolio includes market-ready components such as bipolar plates and complete fuel cell systems.



30 million

– the population of
Chongqing, a megacity
in Western China.

Besides batteries and fuel cells, one other technology has a crucial role to play in shaping the future of mobility – lightweight construction. Logically, a lighter vehicle will use less fuel and have a greater range. For this reason, lightweight engineering methods are seen as paving the way for electromobility and are consequently an important strategic factor in the development of ElringKlinger's portfolio. The company made its first venture into the structural lightweighting market in 2015 with its hybrid-technology cockpit cross-car beams and front-end carriers. Compared with traditional all-metal components, ElringKlinger's aluminum-plastic solution offers weight savings of up to 40 %. The first major order was soon followed by a second. Today, cockpit cross-car beams roll off the series production line in Canada, the USA, and China.

Klaus Bendl, Vice President Lightweighting/Elastomer Technology, is responsible among other things for the lightweight solutions business. He believes the new hybrid technology can be used for many other applications in addition to the cockpit cross-car beam. "The number of development projects we are working on in the field of lightweighting has shot up over the last few years," he observes. "We think there is a lot of potential there – even among those new automobile manufacturers that are not yet part of our customer base." In this context, the Chinese market is naturally a key target.

To harness the full potential of that market, ElringKlinger has built up an extensive production network in the country spanning three sites – Changchun in the north, Suzhou in the east, and (very recently) Chongqing in the south-west.

Located in the country's interior, roughly 1,600 km from Shanghai, Chongqing is western China's main industrial hub. Several well-known car makers are based there. In 2017, over three million vehicles were produced in Chongqing alone. ElringKlinger began operating its own factory there in 2018. The new site was established to produce lightweight structural components, especially door module carriers made of organo sheets for use in the compact class vehicle of a global car maker. Once the organo sheets have been formed, the next step in the process is to injection-mold a series of plastic elements onto the structure to provide additional component functions. Organo sheets are quite unlike traditional metal sheets. Very light yet extremely sturdy, these fiber-reinforced composites are much more durable and rigid than conventional plastics. As in the case of hybrid technology, this technique can potentially be adapted to other applications such as seat pans, battery mountings, and trunk recesses. It is also possible that ElringKlinger will set up a new factory in Asia in the near future to produce lightweight structural components for one of its new generation customers in China.

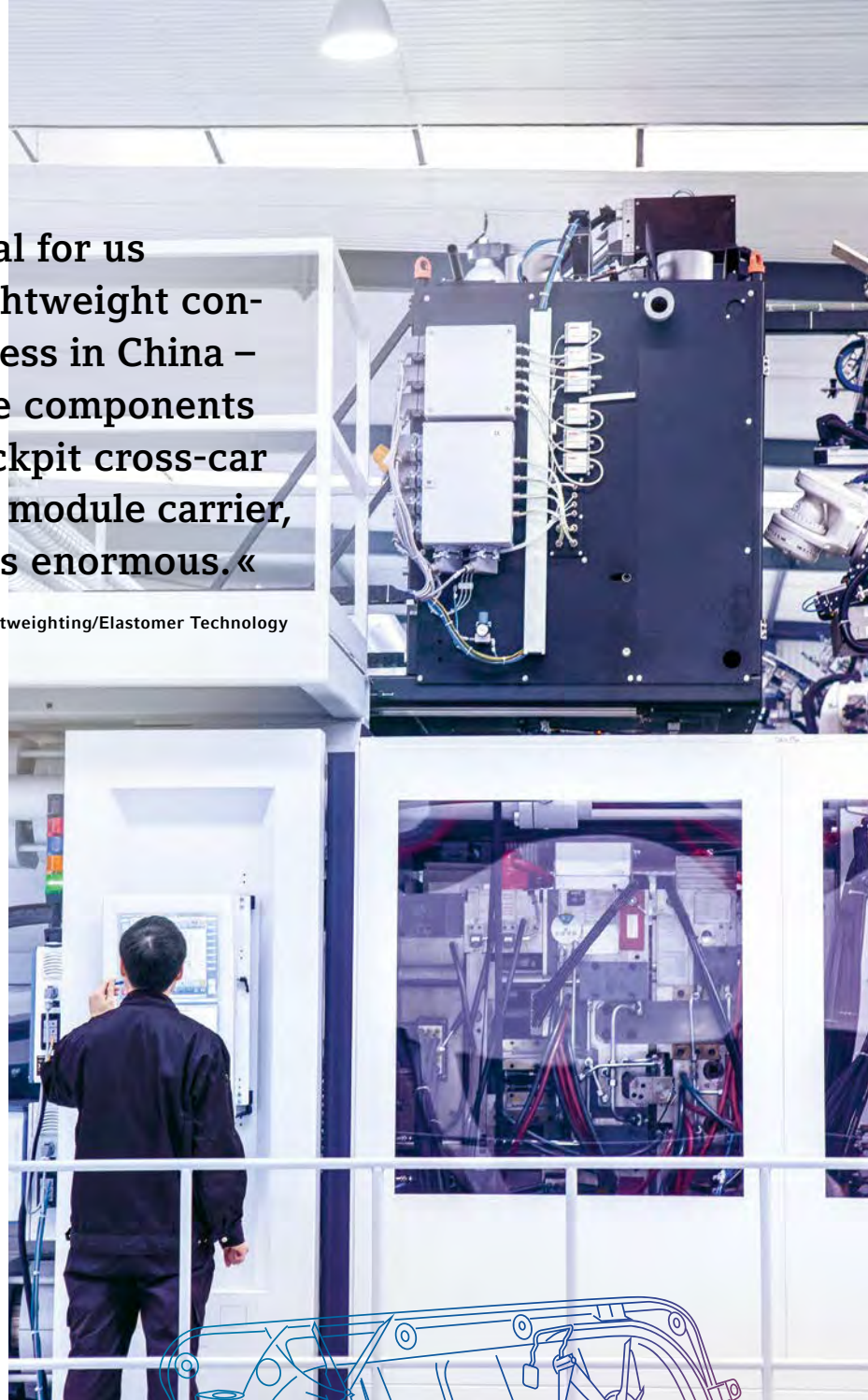
2,500 m²

ElringKlinger's new 2,500+ m² plant in Chongqing produces door module carriers made from organo sheets. At the moment, ElringKlinger has around 30 employees at the site, which is currently being set up. It has an annual capacity of over one million components.

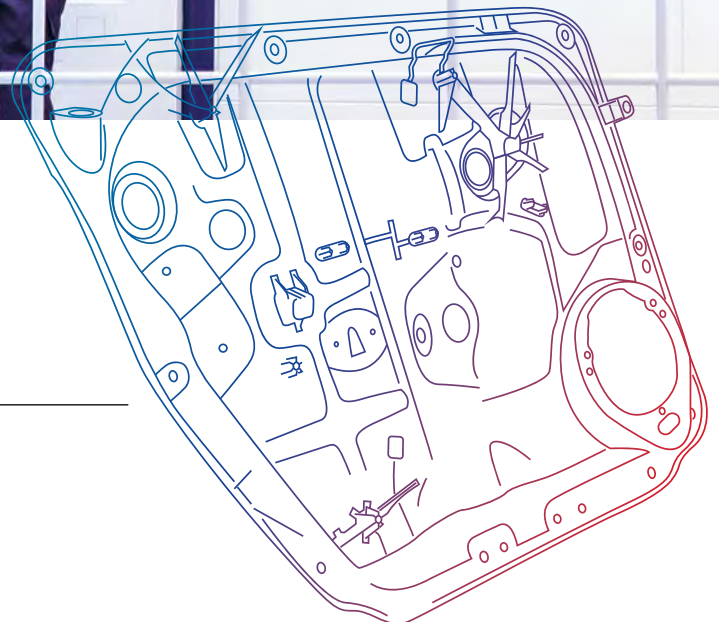
The potential for us to grow our lightweight construction business in China – with innovative components such as the cockpit cross-car beam and door module carrier, for example – is enormous.»

Klaus Bendl, Vice President Lightweighting/Elastomer Technology

There can be no doubt that lightweight construction methods and alternative drive technologies are now well established in the Chinese market, and the country is setting the pace in these areas all over the world. Both also play a key role in ElringKlinger's strategic planning. In 2018, they contributed around 7 % of the Group's total revenue. By 2030, that figure is expected to rise to over 25 %. While this is clearly an ambitious target, it is one that the company is in a good position to achieve – not only in China but all over the world.



The door module carrier is used to attach components such as the window regulator and the locking system.



T R A D E

Under the brand name “Elring – Das Original,” ElringKlinger supplies a wide range of automobile and truck spare parts to retail partners and independent vehicle workshops all over the world. As the two biggest vehicle markets, China and the

Joe Liu

Director Sales China
ElringKlinger China, Ltd.



LIU — Over the last decade, China has become the world's biggest vehicle market, so, in the medium term, we expect to see strong growth in demand for spare parts. It's worth noting, though, that the average age of vehicles in China is just five years at present. Average mileage is also relatively low, so vehicles are not serviced nearly as often as in the USA.

Notwithstanding the tremendous potential for growth, the Chinese aftermarket presents a whole series of challenges for the *Elring* brand. Unlike the OEM segment, where you have just a handful of competitors, the aftermarket is much more diversified, with hundreds of competing firms.

That creates a huge range in terms of both price and product quality. In China, one of the big challenges facing premium aftermarket suppliers such as *Elring* is protecting themselves against counterfeit products and patent violations.

1 What's the current situation in your particular market? What are the specific challenges you face?

Bill Atkinson

Sales Manager USA
ElringKlinger North America, Inc.



ATKINSON — The US vehicle market is dominated by large, powerful engines – in both the automobile and truck sectors. Vehicles tend to run up a lot of miles and also have a very long operating life. As a result, they need frequent servicing, and that's good for us because it creates strong demand for spare parts.

Having said that, it's relatively difficult to break into the North American aftermarket as it's already pretty well developed. *Elring* has to compete against a large number of established and mostly US-based suppliers.

You have to understand the specific features of each market and make sure that you comply with all the strict procedures. Let me give you an example. Our *Elring* product catalog did not comply with the US industry standard, so we had to adapt it before local warehouse distributors would consider our brand. As our most critical element, we understand cataloging to be a continual task going forward.

LIU — We launched our products in China towards the end of 2015. Since then, we have made continuous efforts to establish *Elring* as a recognized brand in the Chinese aftermarket. Our sales and marketing strategy focuses above all on megacities such as Shanghai, where most of the biggest part wholesalers are based.

To attract new retail partners, we emphasize the quality of our sealing components and our wide-ranging expertise in both automobile and truck applications – that’s quite a rare combination among competitors in the Chinese aftermarket. In the medium term, our market objectives are to keep increasing our regional coverage and the annual revenue we generate from our key distributors. In fact, we have already done that in the last few years.

LIU — Although we’ve only been operating in the Chinese market for a relatively short time, we’ve already achieved some important milestones. Thanks to the sales and marketing strategy we adopted, general recognition of *Elring* as a brand has increased enormously in a very short time. One of the key factors has been our presence at Automechanika, the world’s biggest trade show for the automotive aftermarket. We’ve had a booth there every year since 2015. Also, word has quickly got around in the Chinese market of just how good our products are.

That growing product acceptance is reflected in our revenue figures, which just keep going up and up. If we look at it in euros, *Elring* first broke through the seven-digit revenue mark in Asia in 2017, and in 2018 the result was even higher. Our goal now is to maintain this upward trend and consolidate *Elring’s* position in the Chinese aftermarket.

2 What’s your strategy for penetrating the market? What steps have you taken so far?

ATKINSON — To begin with, we focused on developing a sales strategy for the local market. It’s simply a matter of choosing the right sales channels and distributors. We’ve established close ties to a number of national distributors with a large network of contacts to our key target audiences.

In the medium term, we want to increase brand recognition significantly in the US market and keep improving *Elring’s* market share. We plan to achieve this with the help of our connections to key program groups, whose expertise is in final mile selling to the aftermarket service segment. We also have a number of marketing activities in the pipeline to drive home that message. Although *Elring* products are sold all over the world, as far as North America is concerned, only distributors with a focus on European vehicle requirements were familiar with the brand.

We also sharpened our focus on customer relations by assembling a team of *ElringKlinger* associates that will be eager to assist in the growth and success of customers’ business.

3 What milestones have you achieved so far? What are the next steps?

ATKINSON — Adapting our product catalog to US industry standards was the crucial first step that allowed us to enter the market. In the second half of 2018, we started shipping operations at our new aftermarket facility in Fremont, California. The new warehouse has enough capacity to meet demand for the whole West Coast. We’ve also ramped up our trade show activities by exhibiting our products at AAPEX (Automotive Aftermarket Products Expo) in Las Vegas and AWDA (Automotive Warehouse Distributors Association) for direct contact with full service warehouse distributors.

In terms of our ongoing portfolio development, we’re focused on what the market needs so that we can harness whatever potential is out there and boost our sales. We aim to keep expanding our customer base in the USA with a combination of best-in-class products and outstanding service. All these measures are designed to help us achieve our ultimate goal of becoming the USA’s most responsive and supportive supplier of aftermarket sealing products to customers.

New ★ ★ ★ mobility



If you want to be involved in shaping the future of mobility, you need to be at the epicenter of new ideas. So what's happening in California's creative technology hub? A virtual tour of Silicon Valley.

📍 – Fremont, USA



16,000

The number of active start-ups in Silicon Valley in 2017.
That compares with 2,400 in the same year in Berlin.




5 MILLION

Sales of electric vehicles in California are
expected to reach 5 million units by 2030.



1951

The foundations of Silicon Valley as we know
it now were laid in 1951 when Stanford Industrial
Park was built near Stanford University.



Today, Silicon Valley is the embodiment of progress, driven by corporations such as Apple, Google, and Facebook. The high-tech metropolis to the south of San Francisco is one of the most exciting and fastest-booming locations in the world. While Silicon Valley is best known as a global IT hub, in recent years it has attracted more and more firms whose goal is to develop cutting-edge technological solutions not only for computers but also in the field of mobility. That includes autonomous driving sensors, apps that respond to new trends in mobility, and advanced cartographic software. It's not an exaggeration to say that the whole concept of mobility is being reinvented in Silicon Valley. As a leading technology firm and innovator, ElringKlinger has had a base here since 2017 and is actively involved in shaping the future.

If you fly to Silicon Valley from Europe, you get a wonderful view as the aircraft turns south over San Francisco Bay. Look to the right on the horizon, and you'll see Palo Alto opposite Fremont, where ElringKlinger is based. At the head of the bay lies San José. Together, these three cities trace out the magic triangle known all over the world as Silicon Valley.

While you're landing, you can think about how you are going to cover the 32 miles from San Francisco airport to

ElringKlinger's plant in Fremont. By train? There is no train service from the airport. By bus? The bus to Fremont runs from downtown. By taxi? You'd have to spend ages waiting. Why not call a ride-sharing firm? It's quick and very straightforward. Just open the app, enter your destination, and the system will provide you with the plate number for your ride-share driver. In fact, given that the market share of electric vehicles is higher in California than anywhere else in the USA, it's quite possible that you won't even hear the sporty mid-range car with your designated license plate as it pulls up silently alongside you. While you exchange a few words with the driver, your eyes are wandering over the sporty bodywork and the interior. What appears at first sight to be a tablet in the central console turns out to be an integrated multi-function touchpad monitor – the vehicle's brain center – which does the job of the old dashboard instrument panel.

Let's call the driver Jeff. Jeff asks you to confirm your destination: ElringKlinger Silicon Valley in Fremont. After a few miles he says: "As long as the system doesn't report a hold-up, we'll turn left here and take San Mateo Bridge over the bay. Before we get to the bridge, we'll drive through Foster City, which is now home to some innovative pharmaceutical and IT companies." The automotive industry has also moved in and left its mark on the city, he adds. Jeff asks if you have heard of robotaxis: "They are being developed here by a new manufacturer, and it won't

6

The number of autonomous driving levels. At levels 0 to 2, the vehicle and its environment are controlled by the driver. At levels 3 to 5, the vehicle itself has partial or full control.

be long before they go into series production." As far as Jeff is concerned, that is the future of mobility – the next step up from ride-sharing. Using the app, you will be able to order a ride as before, but the vehicle that turns up and takes you to your destination will be equipped with an autonomous driving system. You might even find yourself sharing the ride with other passengers heading in more or less the same direction. "So it'll work like a minibus?" you reply. "That's right," says Jeff. "Only, there won't be a driver, it won't run on a scheduled bus route, and you'll be able to book a ride using your smartphone. Basically, robotaxis bring together the worlds of personal mobility and public transport."



That gets you thinking. Driving without a driver? It's a crazy idea – but an exciting one! Everybody talks about autonomous driving, but up to now it's been no more than a concept. In the near future, however, that theory will become a reality. The first licenses have already been issued, and, in California, the first autonomous vehicles are already on the roads. Rather than sitting at the steering wheel yourself and having to concentrate on your driving, you will be able to chat with other passengers, work, surf the web on your smartphone, or just relax. All those stressful situations that lead to traffic jams and wrong turns will be a thing of the past.

What impact will that have? For one, people will be calmer. There will be no need for all those multi-story car parks in the city, so there will be more space for green areas and new homes. With everything controlled super-efficiently by computers, there will be fewer hold-ups. For commuters, the journey home won't take as long.

All this is no longer science fiction but science fact! However, the new driving systems being developed rely crucially on our ability to process huge volumes of data and control autonomous road traffic. In turn, that demands computer power on an enormous scale. New vehicles are already connected to the Internet and supply all the data they generate to the manufacturer, transforming its role from that of a traditional car maker to one of comprehensive data manager. Besides monitoring your vehicle's current status, the system will evaluate the data it receives on your movements and offer you customized solutions to match your individual mobility needs. Obviously, big data management firms such as Google have been interested in cars for years.

While you are still reflecting on all these changes, Jeff announces that you have arrived in Palo Alto. The city is home to Stanford University, which has provided the spark for a host of business start-ups. It was the construction of Stanford Industrial Park here in 1951 that laid the foundation for Silicon Valley. You might say that Palo Alto and its neighbors Mountain View and Sunnyvale are the birthplace of what we now refer to as Industry 4.0. Companies such as Hewlett-Packard and Google are based here. Intel and AMD are in nearby Santa Clara, and Apple is just a bit further south in Cupertino.

As Jeff turns off Highway 101 in Sunnyvale and picks up Highway 237, he says: "Look over there. That's an Amazon R&D lab. All the established car makers have also set up technology centers in this area – the Americans as well as the Germans and Japanese." The future of mobility is being forged right here.



» The role of manufacturer is changing from that of a traditional car maker to one of comprehensive data manager. Besides monitoring your vehicle's current status, the system will evaluate the data it receives on your movements and offer you customized solutions to match your individual mobility needs. «

Waymo, a subsidiary of Google’s parent company Alphabet, is busy developing fully autonomous driving systems. According to unconfirmed reports, Apple has set up a project called “Titan” to work on its self-driving iCar. Many other car makers will undoubtedly want to break into the market. From where you are standing here in the nerve center of US technology development, that’s an inescapable conclusion. Every one of them is looking for a solution that will define the future of mobility. To achieve that goal, they need to attract the best people. Competition for the smartest brains, the most productive workers, and the best ideas is intense.

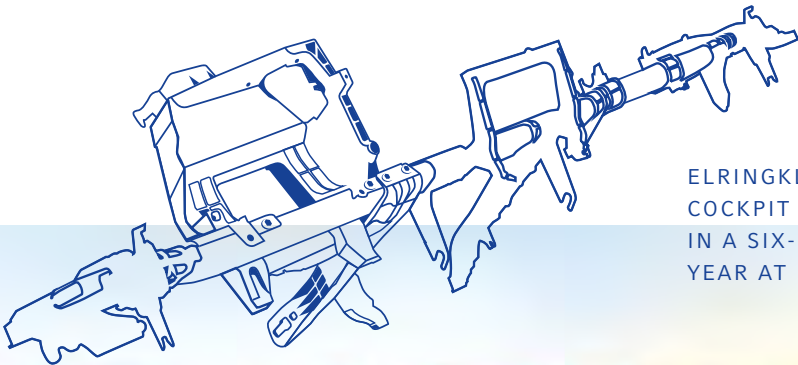
Jeff’s enthusiasm for all things Silicon Valley is unmistakable. He tells you he has already worked for various start-ups and loves their flat hierarchies. The dress code is jeans and a T-shirt, but that’s just for show, he explains. The real secret to their success is flexibility and agility in just about everything they do. You have to think flexibly to start with. If you are part of a flexible team, you have to work fast to overcome new challenges all the time – during the development phase, for example, or in marketing and production scheduling. You share ideas non-stop – over lunch in the trendy café, over a game of pool in the

62

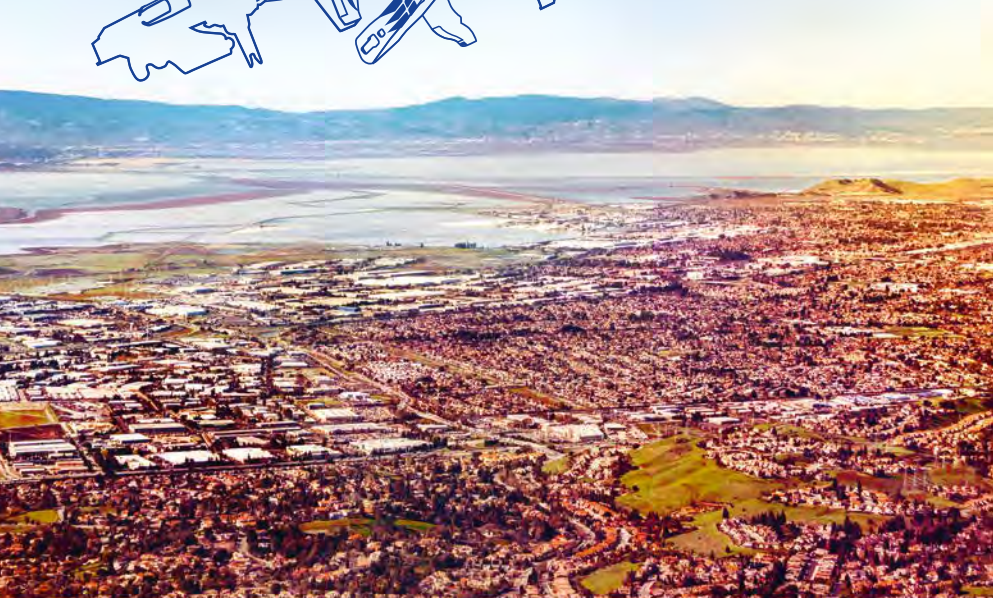
The number of companies in California granted a test license for autonomous vehicles with a driver. Only one is allowed to operate without a driver.

corporate social area later in the afternoon, or while you’re playing basketball on the sports ground in the evening. The table football and lounge sofas are designed to create an atmosphere in which radical new concepts of mobility can emerge and evolve.

So what will the future look like? If robotaxis can break into the market in the cities, car ownership will be less and less important as a means of transport. As for the drive system, it makes sense to run battery-powered vehicles for trips of just a few miles in large urban areas. Given the short distances involved, the vehicle can simply be recharged at various service points. However, that means the power grid will have to be capable of meeting increased demand for electrical energy.



ELRINGKLINGER CAN PRODUCE COCKPIT CROSS-CAR BEAMS IN A SIX-FIGURE NUMBER EVERY YEAR AT ITS PLANT IN FREMONT.



Our Fremont plant is roughly in the center of the picture. ElringKlinger moved in and began operating in 2017, although the company already had a sales office at the site.

A different picture is likely to emerge outside the cities. People travel longer distances, so the vehicle's range is much more important. That's where fuel cells come in. This solution is completely CO₂ neutral as long as the energy used to separate the hydrogen comes from the sun or the wind. What's more, compared with battery-powered vehicles, it doesn't depend on supplies of relatively scarce materials. The materials needed to make bipolar plates and membranes can be sourced without difficulty. Unlike batteries, there is no need for an entirely new decentralized charging infrastructure. You just need to retrofit hydrogen tanks to the existing network of fuel stations. The technology has one other major advantage. In common with petrol and diesel but unlike electricity, hydrogen can be stored relatively easily. Once the energy has been generated, it can be used whenever it's needed. That makes hydrogen the successor to petrol, while the exhaust gases from today's combustion engines will be replaced by – water!

While you are pondering all these thoughts, Jeff announces that you have arrived in Fremont. He drives right up to ElringKlinger's production site on Encyclopedia Circle. Using an innovative technique, the company makes lightweight structural components here for a model of the next generation of automobiles. This product saves weight, improves the vehicle dynamics, and allows manufacturers to integrate numerous functions at minimal cost. It also enhances passive safety and creates new design options. With the help of ElringKlinger's technology, developers can now give full rein to their creativity in their efforts to design the ultimate "feel-good oasis on wheels."

Jeff says goodbye and heads off. The service will be charged automatically to your credit card. You have now completed your virtual journey through the epicenter of the future mobility revolution. But as you open the door to ElringKlinger's Fremont plant, you can see right away that this new world will soon become a reality. Very soon, in fact. And ElringKlinger is part of it.

M

EGATRENDS of future mobility



EFFICIENT DRIVE SYSTEMS

Faced with scarce resources and limits on emissions, we need new vehicle drive systems that can deliver efficient and CO₂-neutral mobility. This is where ElringKlinger's future path lies. We identified this trend early on and responded with a Group-wide focus on battery technology, fuel cell systems, and complete electric drive units.

AUTONOMOUS DRIVING

Cutting-edge software and powerful sensors will take over from human drivers. On-board computer systems are getting better all the time, and vehicles will be capable of learning. Over time, human error as the cause of road accidents will be a thing of the past. We could even see a rapid decline in the number of road accident casualties.

CONNECTIVITY

In order to reduce congestion, all vehicles will be connected to the Internet and form part of a huge network. This will make it possible for road traffic to be managed by computers.

SHARED MOBILITY

Programs are being developed for people with similar mobility needs to ensure that we move around as efficiently as possible. In towns and cities, computer-based ride-sharing services will be an integral part of the public transport landscape.

Ups and downs

The Brazilian automobile market is on the up again. In 2018, sales figures for South America's biggest country by far rose by 14 percent to 2.5 million vehicles. In recent years, however, the country's economic indicators have pointed to something of a rollercoaster ride. Employees of the ElringKlinger plant in Piracicaba explain what motivates them to look ahead with confidence despite this extremely challenging economic environment.



209,425,000

people live in the country that covers roughly half of the area of South America.

43.4 MILLION

cars drive on Brazil's roads.

+14%

2.5 million light vehicles were newly registered in 2018, up year on year by 14%. The market is still 30% below its peak reached in 2013.



The Group company Elring Klunger do Brasil Ltda. in the state of São Paulo has experienced several economic highs and lows since it was founded in 1997. Nevertheless, the company has always managed to stay on the right track, even when faced with challenging environmental conditions such as the severe recession that began in 2014 and persisted for almost three years. This attests not only to a successful approach to management but also to a motivated workforce that is ready to embrace change.

One person who was there from the start is Silene Bellotto, Assistant to the General Manager. She has seen everything from the corporate expansion of the early years to the key milestones – including the first major new-build project at the site in 2004, the launch of the Aftermarket range in 2007, and the start of recent construction work on a factory extension that will provide an additional floor space for production and offices on a new plot of 34.000 square meters. “We are committed, resilient, and persistent,” she says, revealing the characteristically sanguine attitude of her compatriots, even in times of rampant inflation and political uncertainty. When asked what drives her, Silene emphasizes the strong focus on service that colleagues display, both to each other and to business partners: “Our team is very involved in methodology, and the indicator system is an effective yardstick for our daily work.” This is not by chance: the processes of continual improvement within the company help all staff members, including Silene, to develop social and professional expertise day by day. And also vice versa.

Another aspect that has paid dividends in times of economic crisis is the high level of customer proximity displayed by the company’s sales team. After all, maintaining a close, trust-based dialogue is essential in Brazil. Thanks to this, the company’s downturn in revenue has been much less severe than for the market as a whole. During that time, the team also managed to secure important new projects, including an order from a global high-volume manufacturer to produce plastic cam covers on a large scale. Meanwhile, the project is one of the pillars for the current factory expansion.

of new vehicles in Brazil are capable of running on both gasoline and bioethanol.



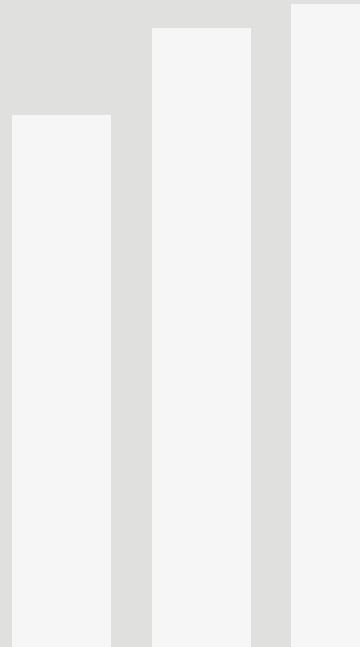
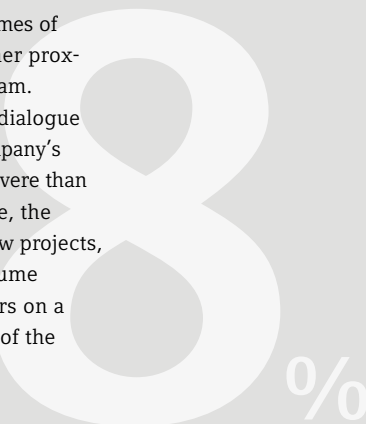
» Being part of a strong and creative team motivates me to enhance my professional and social skills each day.«

Silene Bellotto, Assistant to the General Manager, ElringKlunger Brazil

3.6 MILLION

light vehicles were produced in Brazil in the record-breaking year of 2013.

Ups and downs: Background graphs show the development of Brazil’s light vehicle production from 2007 to 2018





» Good products are only possible with focused and motivated professionals. «

Perci Albergaria, Aftermarket Manager, ElringKlinger Brazil

“Brazil’s vehicle stock stands at 43.4 million. There are 5,928 different models of car and more than 3,000 dealers,” says Perci Albergaria, portraying in numbers the market in which he heads up Aftermarket sales. His work is not made any easier by an economic structure in need of reform in a country whose 27 states all have their own complicated tax systems – all the more reason, he says from experience, for customers to look to factors they can trust: “ElringKlinger is known throughout the market for products that meet the highest quality standards. We also offer exceptional services, and customers appreciate that.” After more than 25 years, Perci knows the business better than almost anyone – and he is convinced there is still much more that can be done. “Raising the profile of the ‘Elring – Das Original’ brand, enhancing qualification levels among the team, and achieving exponential expansion within the rapidly growing spare parts market,” are all realistic goals in his view.

Personnel Manager Juliano Marcelino sees his job from a different perspective: “We want to present our employees with processes and opportunities so that they can develop a goal-driven mentality.” In this he summarizes the measures adopted by the company – especially in difficult times – with a view to promoting what he believes to be the company’s greatest potential: its employees. “We embarked on a transformational process in which staff development was the critical factor. This has involved, for example, training for team leaders as well as the encouragement of innovative thinking to introduce fresh ideas and derive result-oriented activities from them.” Juliano – a great believer in the power that a fully functioning team can develop – duly came up with a staff development model that sets clear targets and accurately documents results. “We apply coaching methods to support the individual development of employees and the way they work together. What matters in particular is their receptiveness to new ideas.”

+30%

After a downturn of around 40 % in the years from 2014 to 2016, car production has recovered by roughly 30 % until 2018.



» What matters in particular is receptiveness to new ideas. «

Juliano Francisco Marcelino, Human Resources Manager, ElringKlinger Brazil

P R E C I S I O N W O R K



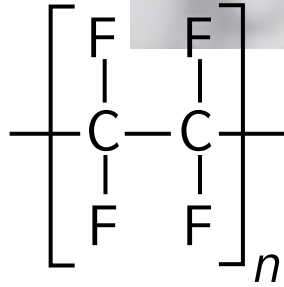
At ElringKlinger, innovation begins with the input material. For instance, by drawing on in-house R&D and using special compounds, polytetrafluoroethylene (PTFE) materials can be perfectly adapted to the needs of medical technology.



Anyone who has successfully wielded a frying pan in the kitchen will be familiar with Teflon®. But most people are unaware that behind the name is a material with a wide range of uses in far more complex areas than home cooking. In fact, polytetrafluoroethylene, or PTFE, the scientific term for Teflon®, can be used continuously at temperatures ranging from -200 °C to +260 °C. Chemically speaking, it is an unbranched, linear, and partially crystalline polymer consisting of fluorine and carbon. By closely surrounding the carbon chain, the fluorine atoms protect it from chemical attacks. The high electronegativity of fluorine ensures high chemical binding energy of approx. 489 kJ/mol within the fluorine-carbon framework, making it extremely inert. In addition, as a result of its low surface tension, PTFE is highly resistant to wetting. It also has almost unlimited UV and weather resistance as well as excellent sliding and friction properties. This is another reason why it is considered physiologically harmless and eminently suitable as a food-contact material.

These characteristics make PTFE a logical choice for a wide range of application areas. ElringKlinger Kunststofftechnik GmbH was quick to recognize the value of this material and has since worked extensively on this and other high-performance fluoropolymer-based plastics. As a result, the subsidiary of the ElringKlinger Group, based in Bietigheim-Bissingen, now offers a broad range of products that extends far beyond the standard solutions offered by the plastics industry. Multi-lumen tubing, rotary shaft seals, memory cuffs, multi-tube heat exchangers, bellows, glide elements, or components for high-frequency antennas are just a few examples of its product portfolio – and development efforts are ongoing.

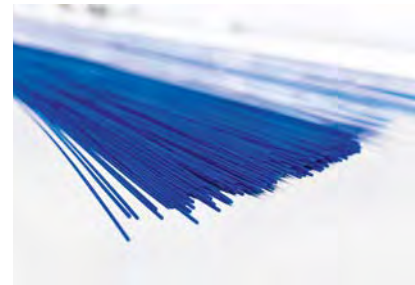
The automotive industry accounts for almost half of the annual revenues of ElringKlinger Kunststofftechnik totaling around 120 million euros. The subsidiary makes almost a third of its annual revenues from mechanical engineering and around 10 % from trade. But medical technology, which currently accounts for about 10 %, is also considered an important strategic growth field in the future, for two reasons. As a result of demographic change, the demand for medical products will continue to rise and PTFE products, with their special properties, meet the ever-growing demand for miniaturization – a megatrend in medical technology.



PTFE is an unbranched, linear, and partially crystalline polymer consisting of fluorine and carbon.



The clean room of ElringKlinger Kunststofftechnik GmbH was commissioned in 2017 and meets ISO Class 8 clean room requirements.





Vertical production within the extruder tower enables longer tubes to be manufactured than via the horizontal production process.

» The ISO 8-compliant clean room, the extruder tower, and ISO 13485 certification are the three tickets that opened the door for us to achieve further growth in the medical technology market. «

Raik Lüder, Co-General Manager of ElringKlinger Kunststofftechnik GmbH

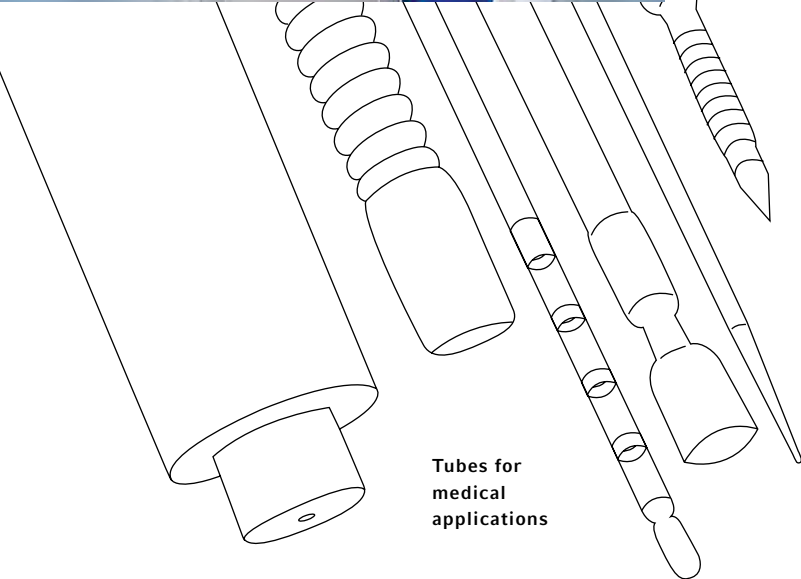
The company recently laid the foundation for future growth: "The expansion of our production space to include a clean room, construction of the extruder tower, and ISO 13485 certification are the three tickets that have opened the door for us to achieve further growth in the medical technology market," says Raik Lüder, one of the company's two General Managers. In the medium term, the aim is to double the company's revenue from this sector.

The new building opened in 2017 certainly offers the means for such growth. It provides 8,000 m² more space, plus a 33m-high five-floor extruder tower enabling vertical production of longer tubes and, last but not least, the unique feature of an ISO 8-compliant clean room. "This means we will have the ability to meet the high expectations of our customers well into the future," adds Lüder. The company has invested a total of 30 million euros in Bietigheim-Bissingen, thereby affirming its commitment to the location.

Clinics and medical practices are already very familiar with the products of the plastics engineering subsidiary, such as the kind of ear ventilation tubes applied in ENT medicine or special plastic tubes

used for diagnosis and therapy in the fields of endoscopy and minimally invasive surgery. Specialists such as gastroenterologists, proctologists, and gynecologists appreciate the precision steering and anti-adhesive properties. There is a growing demand for these special tubes in particular, due to the technological advances being made in this area. The subsidiary currently produces about 1,000 km of endoscopy tubes a year, and the trend is rising.

"This all stems from the material that allows us to offer customized, innovative solutions. PTFE has excellent material properties and can be manufactured with high, micrometer-range precision," says Stefan Schmid. Together with Lüder, he heads this subsidiary as its General Manager. The company has a proven track record spanning more than 50 years. In 1996, the company was incorporated within the ElringKlinger Group. In subsequent years, the product portfolio was consistently expanded and the number of targeted



Tubes for medical applications

» PTFE has excellent material properties and can be manufactured with high, micrometer-range precision. «

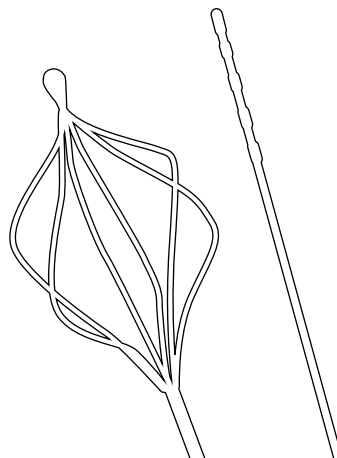
Stefan Schmid, Co-General Manager of ElringKlinger Kunststofftechnik GmbH

sectors progressively extended. These days, ElringKlinger Kunststofftechnik produces 7,000 different products for 4,000 customers worldwide.

The company has also expanded internationally. Since 2012, there has been a production and distribution site in Buford, USA. Before that, in the year 2008, a bold move into China was made and, ever since that time, the company has been successfully developing its business in Asia. "By establishing a site in Qingdao, we created a strategic base for us to tap into the Chinese market," adds Schmid. "And we will be extending it even further in the years ahead." Only recently, the company opened a new state-of-the-art production facility. Besides the NAFTA region, China is the main focus of activities, without of course neglecting the core market of Europe.

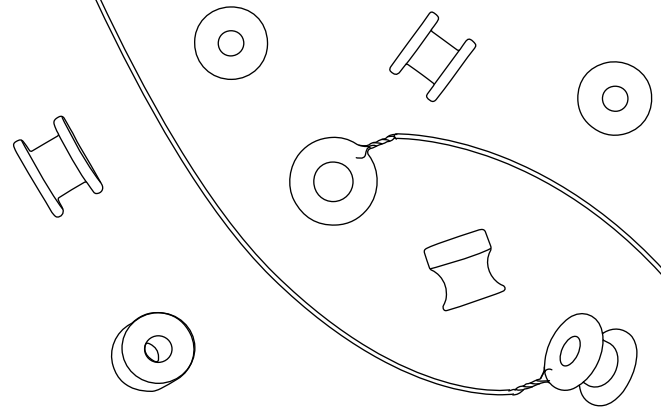
However, the expertise developed by ElringKlinger Kunststofftechnik is by no means limited to the manufacturing process – it is also evident in its prowess when it comes to materials science. The addition of organic and inorganic fillers allows the properties of the end product to be fine-tuned in a targeted manner. For instance, material enriched with graphite and carbon fiber increases the abrasion resistance, while fiberglass reduces the creep tendency of the base material and bismuth carbonate makes tubes used in medical applications visible on the X-ray screen. Precision coloring is also possible. This aspect, which may seem comparatively trivial, can have enormous benefits. The colored markings of certain tubes allow the attending physician to control their precise position during medical interventions.

But PTFE not only meets the precision requirements of medical technology. It also satisfies the demands of other sectors like the chemical and processing industry. Besides high precision, rust protection is an important factor in this field. Cladding with PTFE laminates, foils, or textile layers helps absorb the impact of an aggressive chemical plant environment, which significantly increases the service life of the production plant and substantially reduces the re-



sultant lifecycle costs. The same applies to power plants where corrosion-resistant Hetrakon™ honeycomb elements made out of PTFE are used as heat transfer elements or support plates for packings. Thanks to the multiple flow channels arranged parallel with one another to act as a sedimentation surface, these honeycombs can also be used for water purification purposes.

Extremely high demands on the compatibility of material used in production plants also apply to the foodstuff industry. Many materials soon reach their limitations in this field, but PTFE really plays to its strengths here. For one thing, it ensures the reliability and functionality of tubes and seals while the plant is operating and, for another, it can withstand the high temperatures of the associated cleaning processes, while maintaining the required chemical inertness. ElringKlinger Kunststofftechnik also offers process reliability for food industry customers, thanks to the appropriate GMP certification.



Implants for ENT medicine such as ear ventilation tubes require the highest possible standards of materials and precise execution. PTFE guarantees both.

The same principles that apply to medical technology, plant construction, or the foodstuffs industry also have valuable benefits in other sectors. For instance, PTFE is eminently well suited for tubes used in varnishing machines, for insulation in electrical engineering settings, or for large-scale seals used in oil and gas production – in other words, a broad spectrum of applications and sectors for which ElringKlinger Kunststofftechnik is able to offer the right solutions. And there you have it: PTFE is not only useful as a convenient coating material for frying pans in domestic kitchens. It is an extremely versatile, high-performance plastic with excellent properties.

784

employees work at 7 locations worldwide for the Engineered Plastics segment.

ElringKlinger Kunststofftechnik produces approximately 1,000 km of endoscopy tubes per year.



Did you know that ...

109

... OUR EMPLOYEES CAME UP WITH 109 NEW INVENTIONS IN 2018? AND THAT 80 OF THESE IDEAS WERE THE SUBJECT OF PATENT APPLICATIONS?



... the heaviest injection molding tool at the Fremont site (Silicon Valley/USA) weighs 40 tons? It is used to manufacture cockpit cross-car beams for a new generation of vehicles.

40t

... ElringKlinger Kunststofftechnik GmbH manufactures miniature parts for medical devices with a diameter of less than 1 mm and tolerances of +/- 5 hundredths? Our many years of experience in processing and applications in most branches of industry, combined with a broad range of state-of-the-art machinery, make it possible to manufacture these kinds of miniature parts – along with gaskets measuring 3,000 mm in diameter, in both single-part and mass production.



... the name of our Aftermarket mascot, "Gnirle," is Elring spelled backwards?

116

... in 2018, ElringKlinger successfully organized 116 trade shows relating to its Original Equipment and Aftermarket business, plus conferences and recruitment events?

Follow us!

8,131

... ElringKlinger has 8,131 followers on Facebook and 9,721 YouTube subscribers? Follow us on our social media channels.



143

... as of December 31, 2018, ElringKlinger AG employed 143 vocational trainees and students combining academic and practical studies?



Das Original

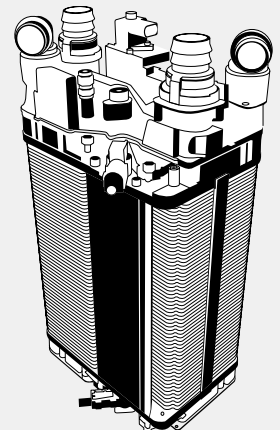
... the full range of gaskets in the Aftermarket division comprises more than 11,000 *Elring* products? The gaskets, gasket sets, and service parts in original equipment quality are available in over 130 countries.

140

... ElringKlinger will celebrate its 140th anniversary this year? In 1879, Paul Lechler set up a trading company for technical products and gaskets in Stuttgart, laying the foundations for ElringKlinger to become the global player that it is today.

60-85 °C

... the preferred temperature of the polymer electrolyte fuel cell in continuous operation is between 60 and 85 °C? With its own fuel cell products, ElringKlinger offers innovative solutions to the challenges posed by stricter emission standards for conventional combustion engines and the limited ranges of battery-powered electric motors.



Global presence

45 sites



NAFTA

21 %

SHARE OF SALES

1,924
EMPLOYEES

7
SITES

SOUTH AMERICA AND REST OF THE WORLD

5 %

SHARE OF SALES

441
EMPLOYEES

2
SITES

EUROPE (excluding Germany)

30 %

SHARE OF SALES

2,144
EMPLOYEES

12
SITES

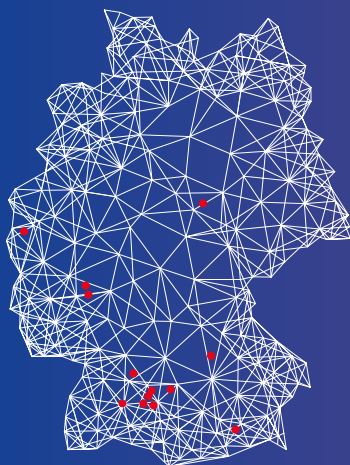
ASIA-PACIFIC

19 %

SHARE OF SALES

1,596
EMPLOYEES

11
SITES



GERMANY

25 %

SHARE OF SALES

4,324

EMPLOYEES

13

SITES

Imprint

pulse

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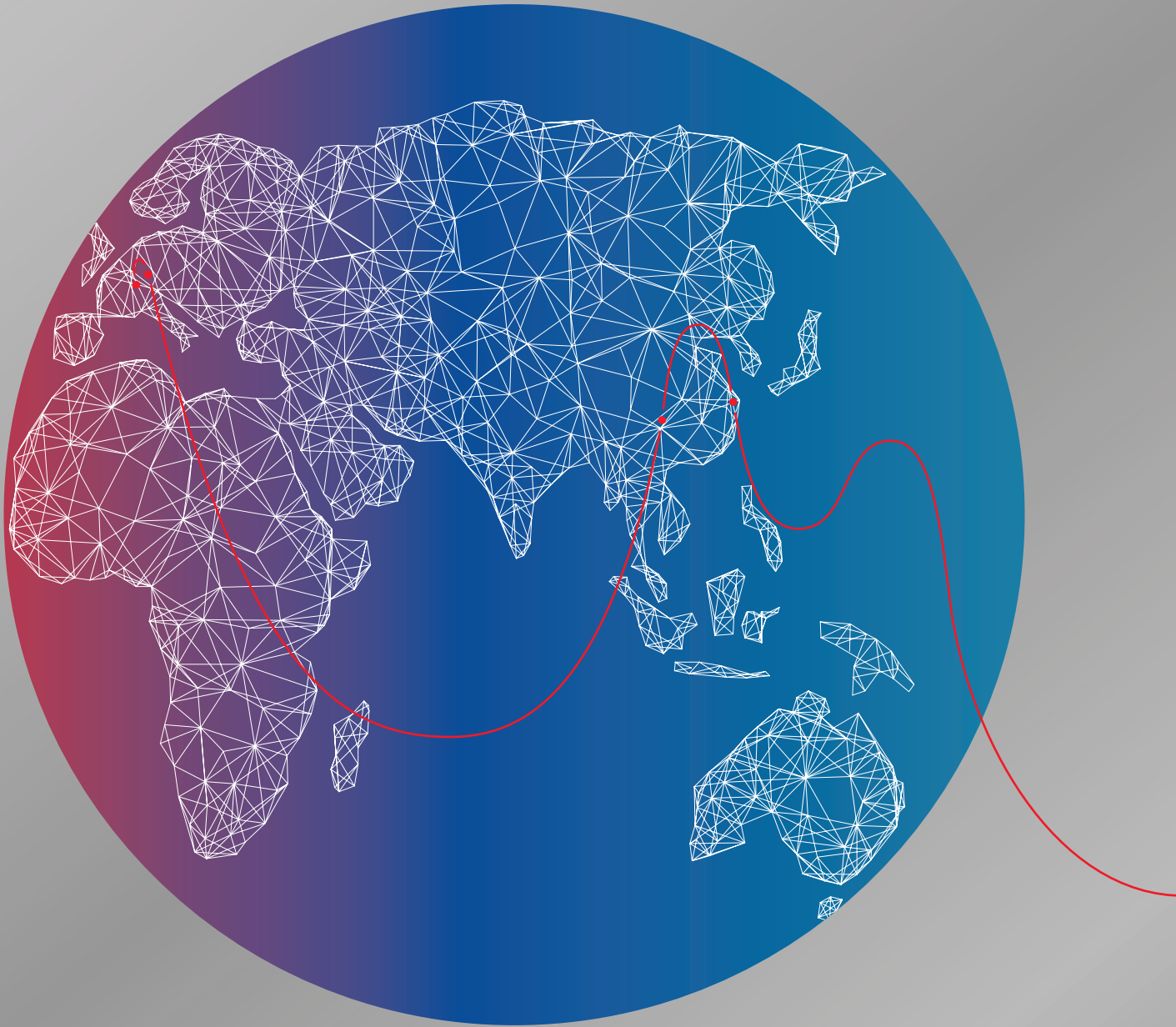
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