



BRIGHT MINDS,
BRIGHT LIGHTS.



[THE WORLD OF ZKW 2019]

OUR VISION

“Pioneering premium lighting and electronic systems by ZKW for all mobility concepts in the global automotive industry”

Dear Reader,

We are the ZKW Group – your specialist for innovative premium lighting systems and electronics. As a system supplier, we are one of the world's leading strategic partners in the automotive industry. We are an Austrian company with over 9,700 employees in Europe, America, and Asia. We are improving our efficiency with flat hierarchies and short decision-making pathways.

We develop and produce premium lighting systems and electronic modules for the automotive industry. Our product portfolio ranges from interior and license plate lamps to highly complex, AFS-capable full LED headlamps with integrated laser high beams; we also develop and manufacture circuit boards and electronic modules for LED headlamps, thus shaping the appearance and character of vehicles around the world.

We deliver products to our customers with uncompromising quality and absolute reliability, and with leading global technologies for more individuality, safety, and environmental compatibility. They receive attractive products with more personality and expression.

As a successful player in all of our locations, we offer our employees the opportunity to be part of a dynamic success story with good future prospects. We achieve this through attractive and secure positions for both top executives and top talents, and through a large number of continued training options and international career prospects.

Our suppliers benefit from reliable partnerships with long-term, stable prospects. We are able to offer opportunities for international growth based on our global network. Our force of innovation and diverse opportunities for cooperation smoothe the pathway for good collaboration.

The history of innovations produced by our company is long, and we still feel obligated to maintain our pioneering spirit. Extensive investment in research and development ensures that we can maintain and further expand our top position. Thousands of bright minds in many different countries are excited to work with us to do just that.



Oliver Schubert, CEO ZKW Group

A handwritten signature in dark ink, appearing to read "Oliver Schubert". The signature is fluid and cursive. Below the signature is a short horizontal line.

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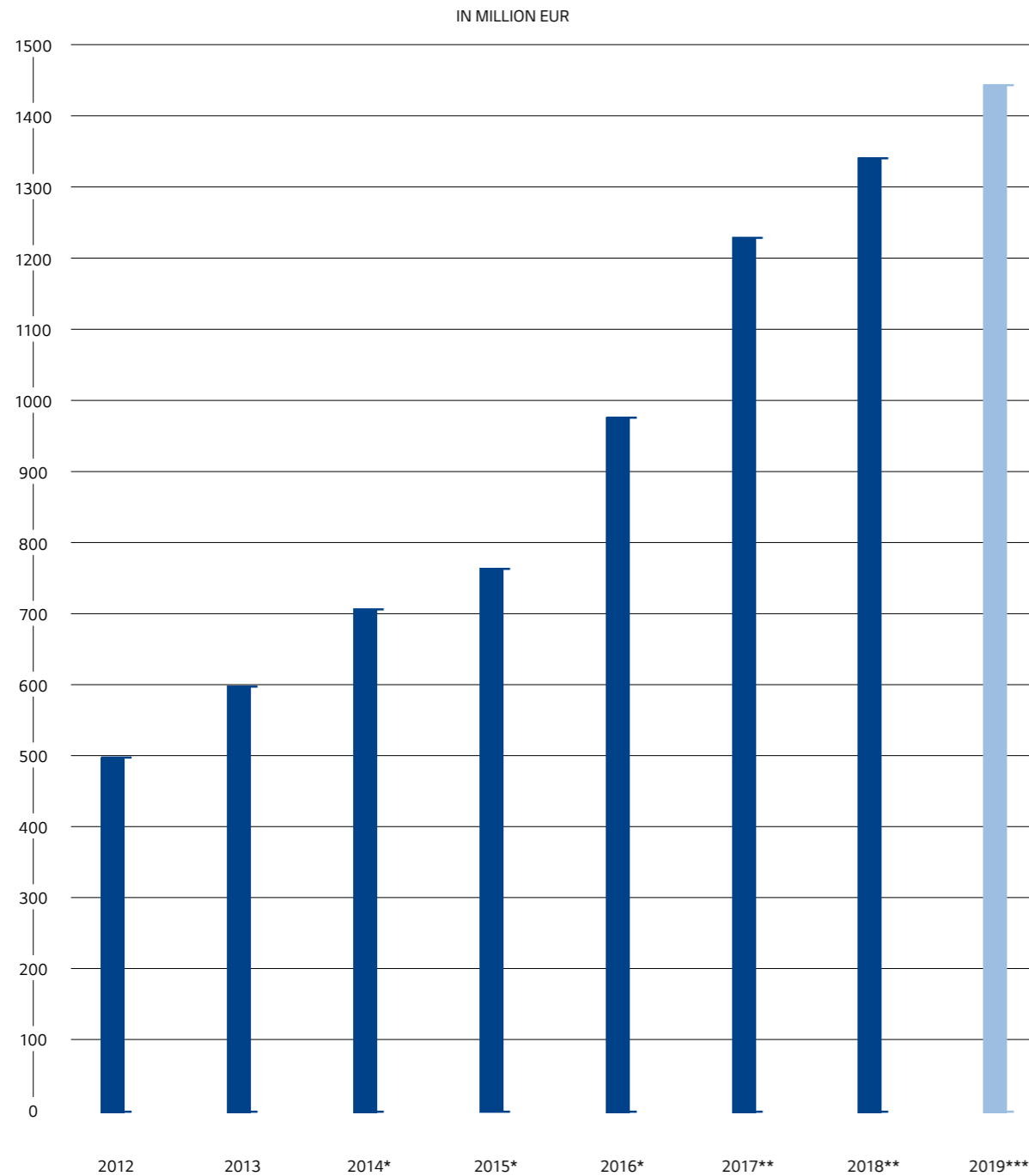
01

FACTS AND FIGURES

KEY DATA ABOUT
OUR COMPANY
AT A GLANCE

SALES PERFORMANCE

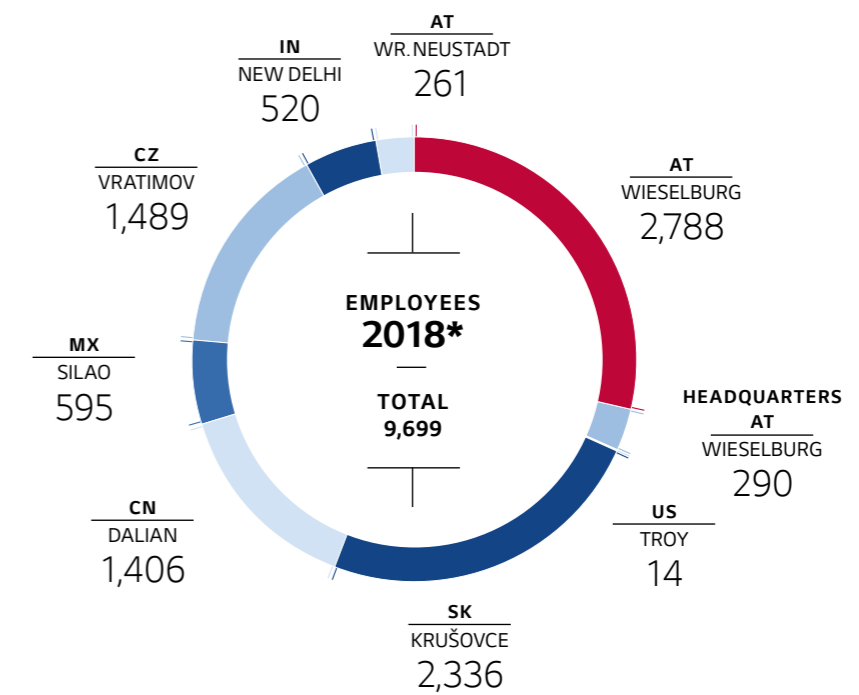
ZKW sales performance,
with a 2019 sales forecast.



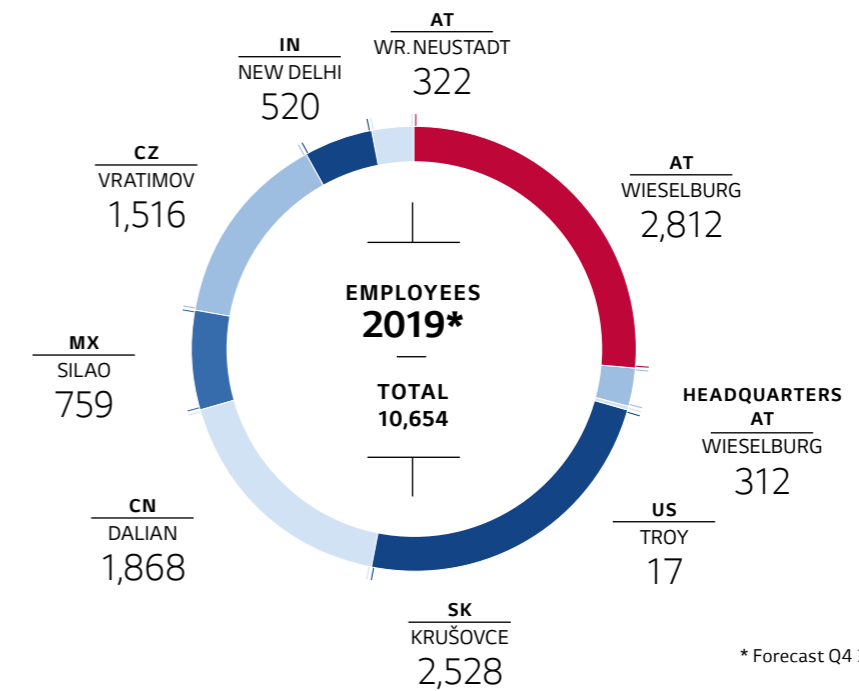
* Accounting acc. to IFRS | ** Unaudited figure according to IFRS | *** Forecast

EMPLOYEES

The development of ZKW group employees
across all international locations.



* Status Q4 2018



* Forecast Q4 2019

PRODUCT RANGE

Headlamps, fog lamps, daytime running lights. All available in laser, LED, xenon, and halogen – we put customer requirements in the right light.



VOLVO TRUCKS FM



BMW Motorrad K50



BMW 7 series



LAMBORGHINI Urus



FREIGHTLINER Cascadia



KTM SuperDuke

TRUCK HEADLAMPS

MOTORCYCLE HEADLAMPS



AUDI Q3



OPEL Insignia



BMW, fog lamp



LYNK & CO 01, auxiliary lamp



ŠKODA Octavia, fog lamp

AUXILIARY LAMPS



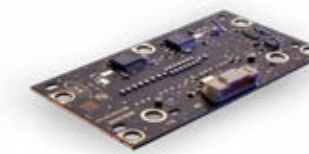
MERCEDES GLC



PORSCHE Boxster 982 & Cayman



TwinLite, light engine



PixelLite, control board



LED control unit

CAR HEADLAMPS

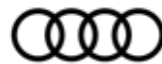
ELECTRONIC PRODUCTS

BRANDS THAT TRUST US

Whether they are premium or volume manufacturers, or whether they make cars, trucks or motorcycles: Our customers demand innovative lighting systems.



BMW



AUDI



PORSCHE



MERCEDES-BENZ



VW



ŠKODA



VOLVO CARS



OPEL



FORD



BUICK



JAGUAR



LAND ROVER



ALPINE



INFINITI



QOROS



ROLLS-ROYCE



LYNK & CO



LAMBORGHINI



LINCOLN



CADILLAC



KTM



MAN



VOLVO TRUCKS



FREIGHTLINER

+ OTHER AND AFTERMARKET

* no specific order

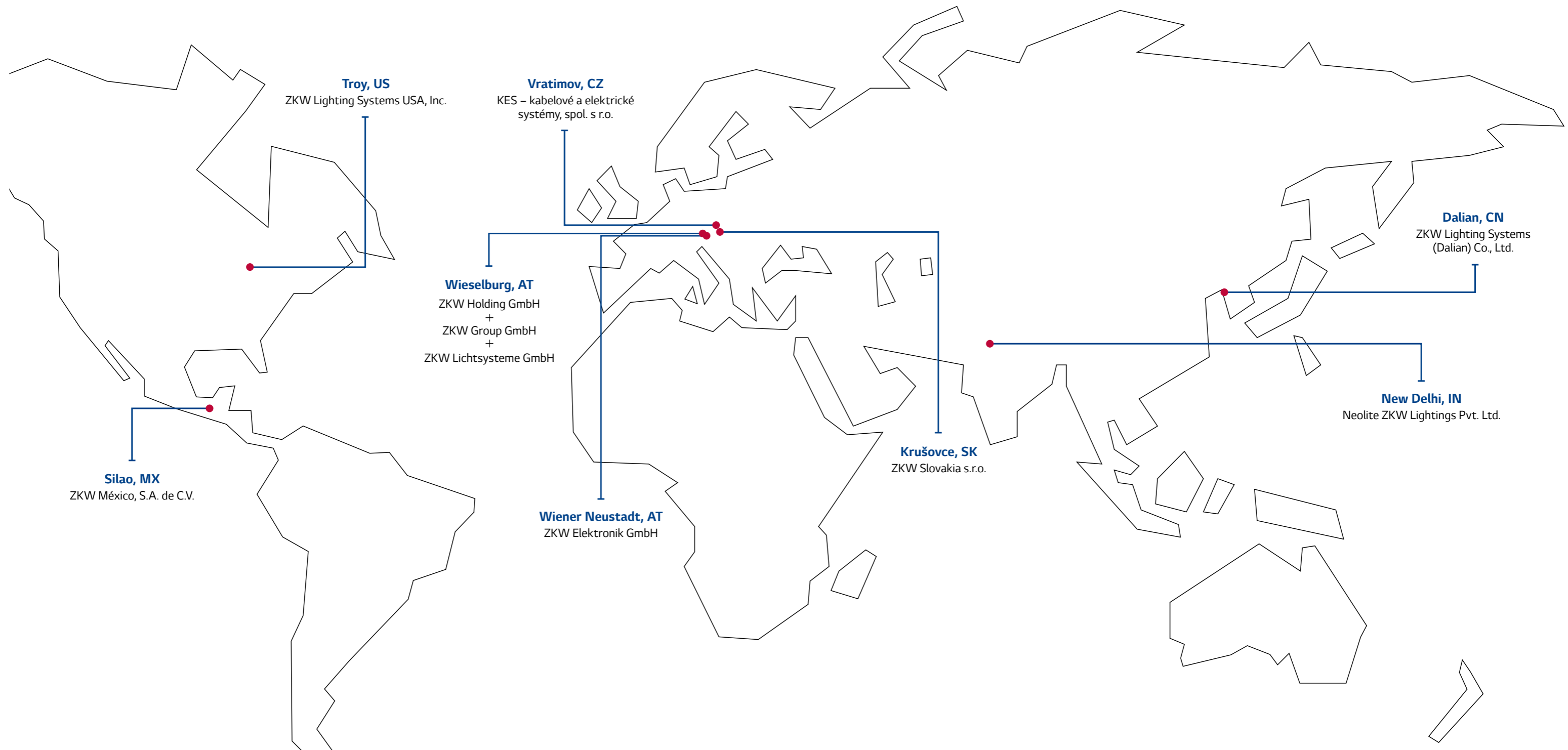
02

LOCATIONS

THE ZKW GROUP
IS HEADQUARTERED
IN AUSTRIA
AND EXPORTS
TRAFFIC SAFETY
ALL OVER THE WORLD

ZKW WORLDWIDE

From Austria, through Europe, to the world.
ZKW – We export traffic safety worldwide.



GROUP ORGANIZATION

Our executive management, located at our corporate headquarters in Wieselburg, Austria.



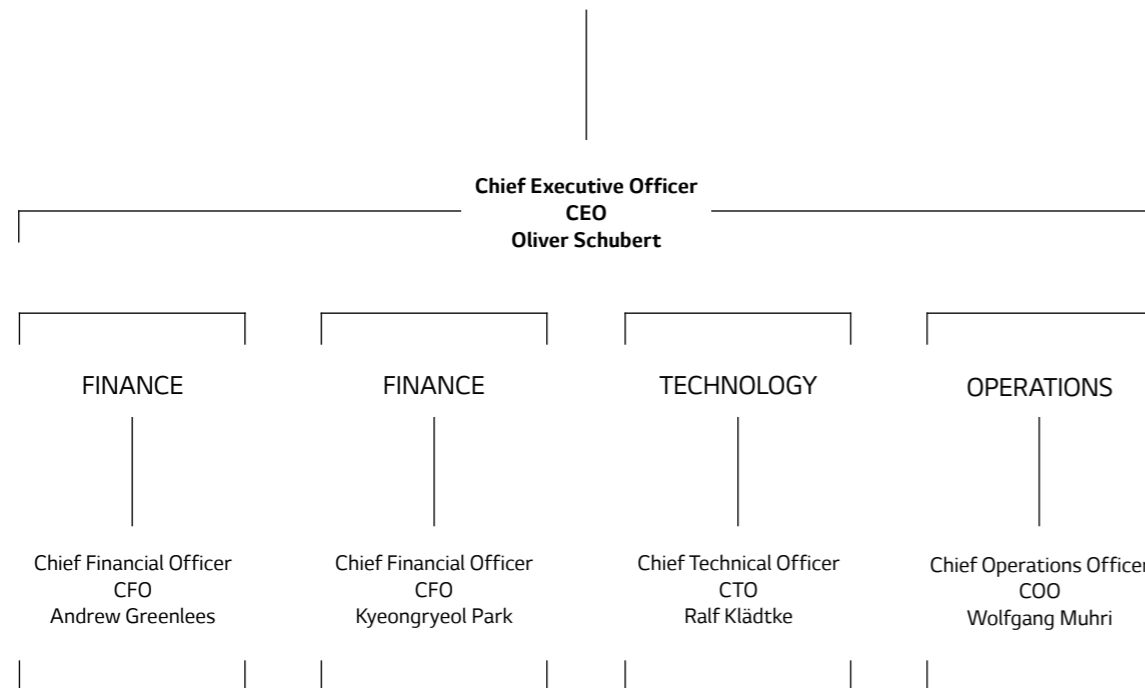
CFO Greenlees

CFO Park

CEO Schubert

CTO Klädtke

COO Muhri



GROUP HEADQUARTERS

We maintain innovative, skilled development centers and flexible, high-performing production sites.



- Asset management and consulting
- 100m²
- 7 employees*

ZKW HOLDING GMBH

Rottenhauser Straße 8
3250 Wieselburg
Austria



ZKW GROUP GMBH

Rottenhauser Straße 8
3250 Wieselburg
Austria



- Group management
- Administration
- Research & development
- 900m²
- 312 employees*

ZKW LOCATIONS

ZKW is present in the most important growth markets and works continuously on expanding its global presence.



ZKW LICHTSYSTEME GMBH

Scheibbsner Straße 17
3250 Wieselburg
Austria



- Headlamps
- Research & development
- 170,000 m²
- 2,812 employees*
- Since 1954



ZKW SLOVAKIA S.R.O.

Bedzianska cesta 679/375
Krušovce 956 31
Slovakia



- Headlamps
- Auxiliary lamps
- Development
- 228,000 m²
- 2,528 employees*
- Since 2007



- Headlamps
- Auxiliary lamps
- Development
- 52,500m²
- 1,868 employees*
- Since 2010

**ZKW LIGHTING SYSTEMS
(DALIAN) CO., LTD.**

Development Area
Tie Shan Dong San Road No. 51
116600 Dalian
China



- Headlamps
- Auxiliary lamps
- Development
- 116,800m²
- 759 employees*
- Since 2014

**ZKW MÉXICO,
S.A. DE C.V.**

Avenida Mineral de Peñafiel No. 1
Puerto Interior, Silao de la Victoria,
Guanajuato 36275,
México





**ZKW ELEKTRONIK
GMBH**

Samuel-Morse-Straße 18
2700 Wiener Neustadt
Austria



- Focus on research & development
- Electronic modules
- Electronic circuit boards
- 18,200m²
- 322 employees*
- Since 2012



**KES – KABELOVÉ A
ELEKTRICKÉ SYSTÉMY,
SPOL. S R.O.**

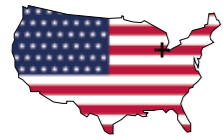
Popinecká 983/30
73932 Vratimov
Czech Republic



- Harnesses
- Electrical components
- Development
- 15,100m²
- 1,516 employees*
- Since 1993

**ZKW LIGHTING
SYSTEMS USA, INC.**

100 West Big Beaver Rd.
Suite 300, Troy, MI 48084
USA



- Headlamps
- Auxiliary lamps
- Development
- 20,300m²
- 520 employees*
- 26% share
- Since 2010

- Sales
- Development
- 390m² (rent)
- 17 employees*
- Since 2014



**NEOLITE ZKW
LIGHTINGS PVT. LTD.**

New Delhi (IN)
26%

36, Sector-4B, HSIDC, Industrial
Area, Bahadurgarh – 124 057
District Jhajjar (Haryana)
India



* Forecast Q4 2019

03

HEADLAMP PRODUCTION

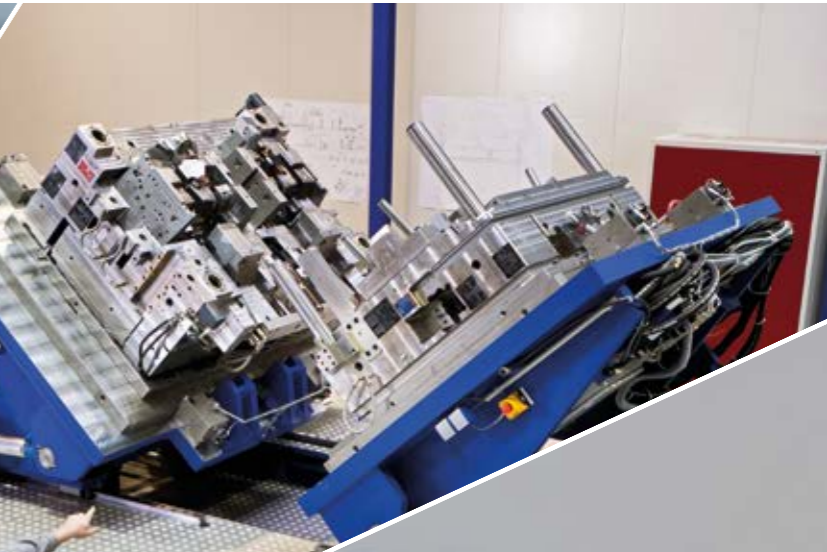
FROM IDEA TO
FINISHED PRODUCT:
THE HARMONY OF DESIGN
AND TECHNOLOGY

2 DESIGN

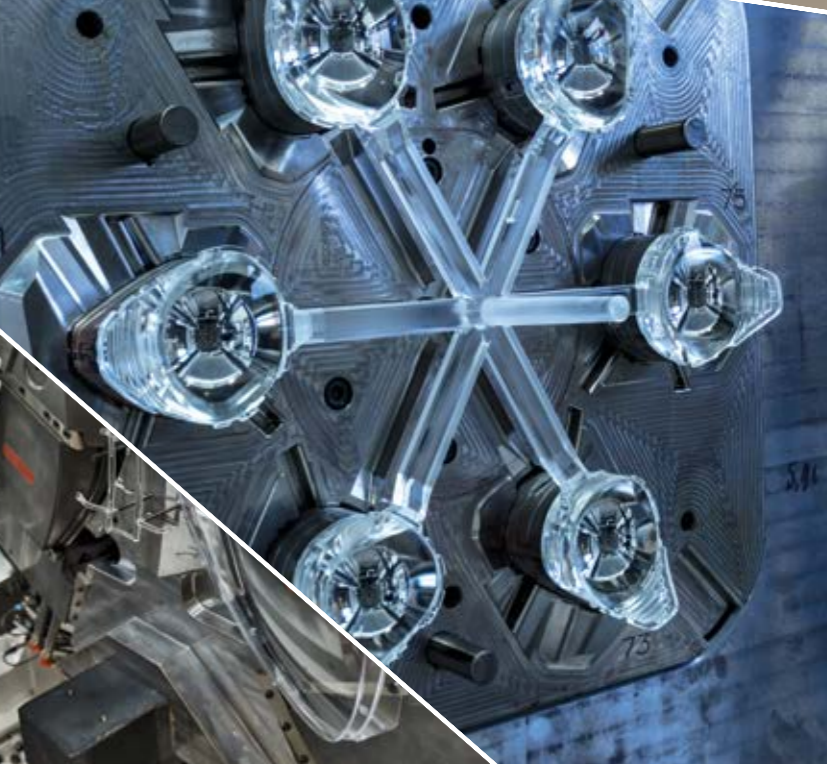
3 DEVELOPMENT

4 TESTING

5 TOOL SHOP



12 ASSEMBLY



11 LOGISTICS

10 HARDCOATING

9 SURFACE

8 INJECTION MOLDING: LENS

6 RAW MATERIALS

7 INJECTION MOLDING: COMPONENTS

IT ALL STARTS WITH AN IDEA

Lighting streets and increasing safety:
Headlamps by ZKW are innovations come to life, with exciting design.



1 PUTTING PEOPLE FIRST

The heart of the ZKW Group beats through our workforce, sounding uniformly across all our locations. In our company, you'll find professionals with great expertise who enjoy what they do and have an eye for light technology of the future. Common goals, mutual respect, and ongoing knowledge transfer form the foundation of our corporate culture. We promote education and continued training with our internal competence training center and open up custom and international career prospects to our employees at all ZKW Group locations.

2 DESIGN

Headlights are built in several development phases. In the early design phase, the initial styling suggestions from our customers are checked for feasibility. After this phase is completed and our customers approve the designs, the Construction Department begins with the detailed design development of all headlight components. The data for ordering individual parts, assemblies, tools and production aids are described directly in the 3D model by means of 3D PMI (Product Manufacturing Information).

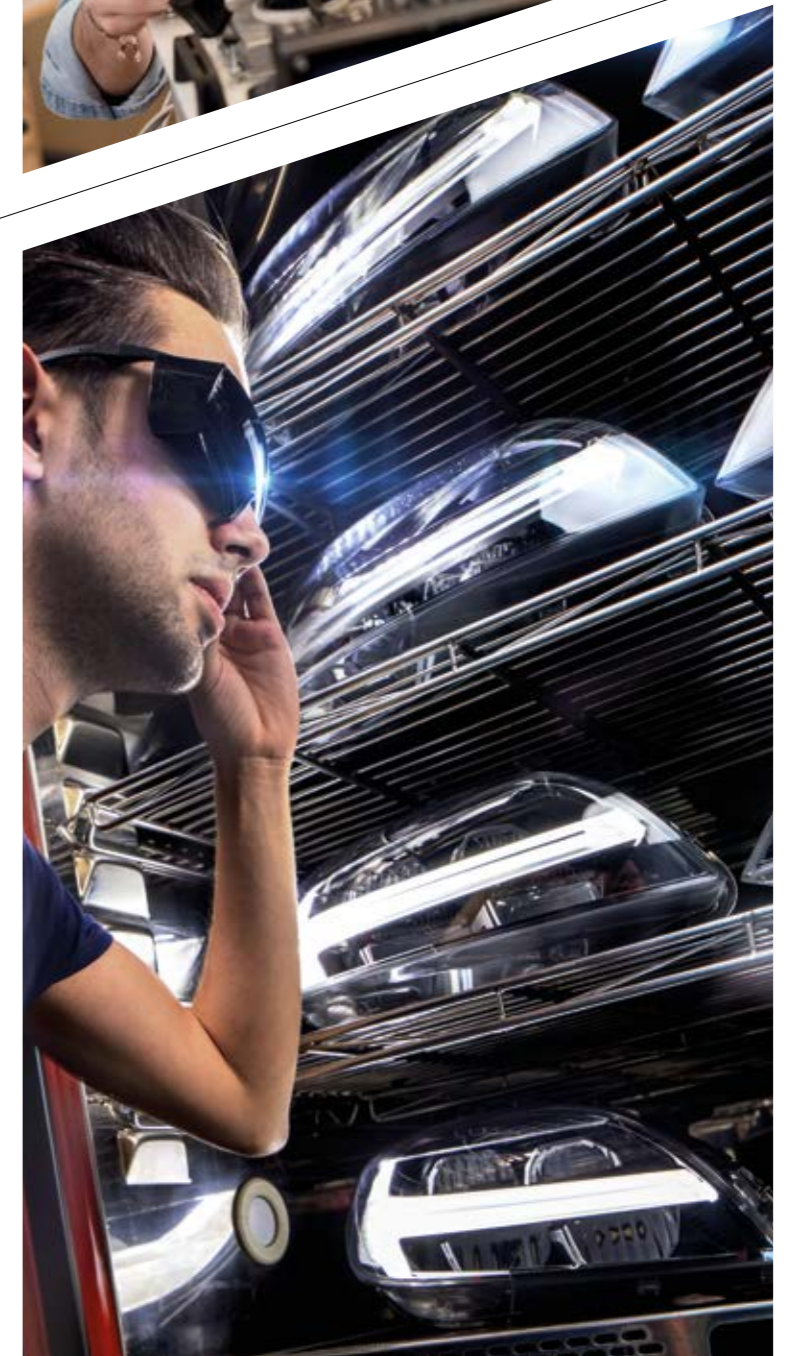
3 DEVELOPMENT

The market share of lighting systems based on LED technology is growing steadily. ZKW develops and manufactures the electronic components and modules we need to produce such systems in-house. This means our customers can be certain to receive ZKW products with internal values to match.



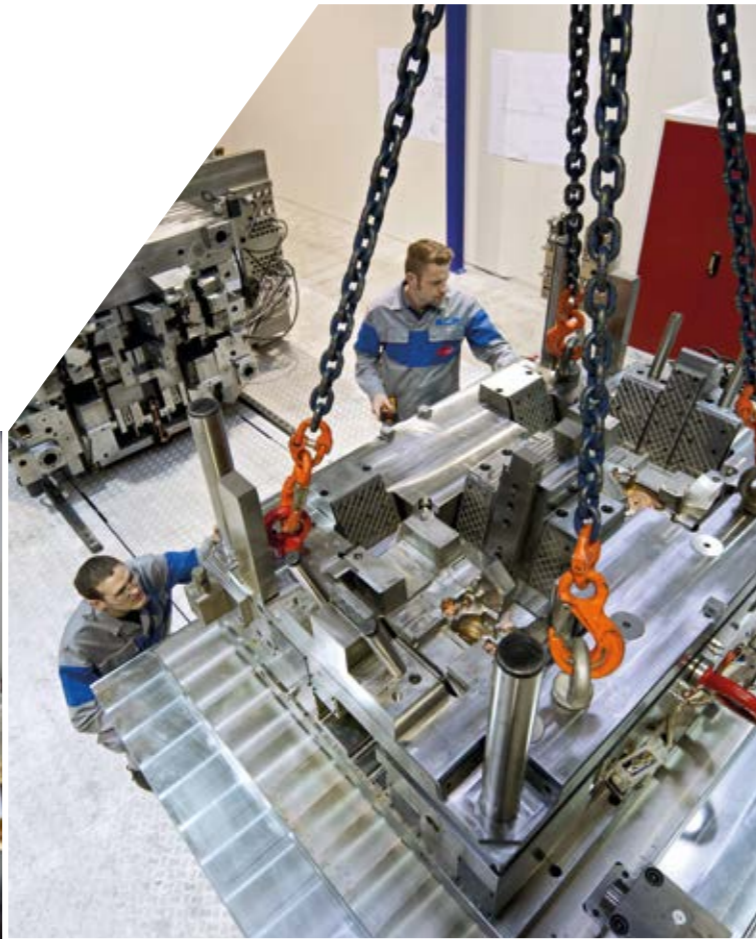
4 TESTING

Each product is subject to specific requirements, and can only be produced with custom quality assurance measures. Each of our products, from license plate lamps to full LED headlamps, must undergo numerous tests – such as temperature cycling tests – before it is installed in cars, trucks or motorcycles.



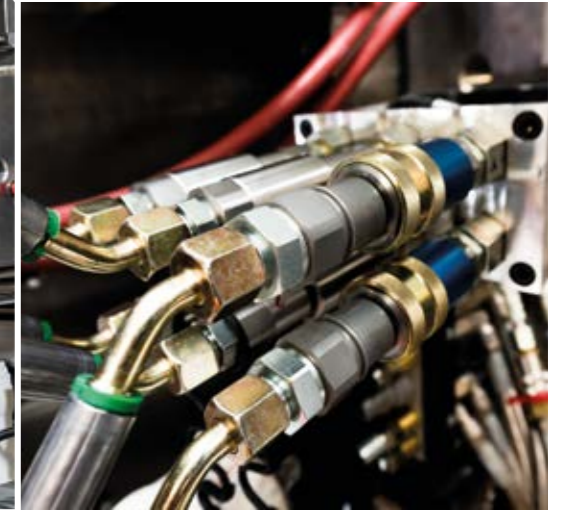
5 TOOL SHOP

To guarantee the quality of our light technology components, we develop, manufacture and maintain the tools we need for production ourselves. Our machine park includes high-quality equipment developed expressly for this purpose, from common turning machines and milling tools to HSC milling tools, wire cutting machines, and eroding machines. Experienced technicians manufacture all sorts of injection molding forms for synthetic materials used by ZKW and other products using high-precision steel.



7 INJECTION MOLDING: COMPONENTS

We produce our housings, optical lenses and reflectors ourselves. To do so, an injection molding machine suction granulates of synthetic materials, heats them, and then injects them into a pre-made tool at high pressure.



6 RAW MATERIALS

Headlamps and lights are manufactured using a large number of materials, which mainly include synthetic materials. ZKW uses technical thermoplastics, which must fulfill high requirements for mechanical and thermal stability and in some cases must provide outstanding surface quality.



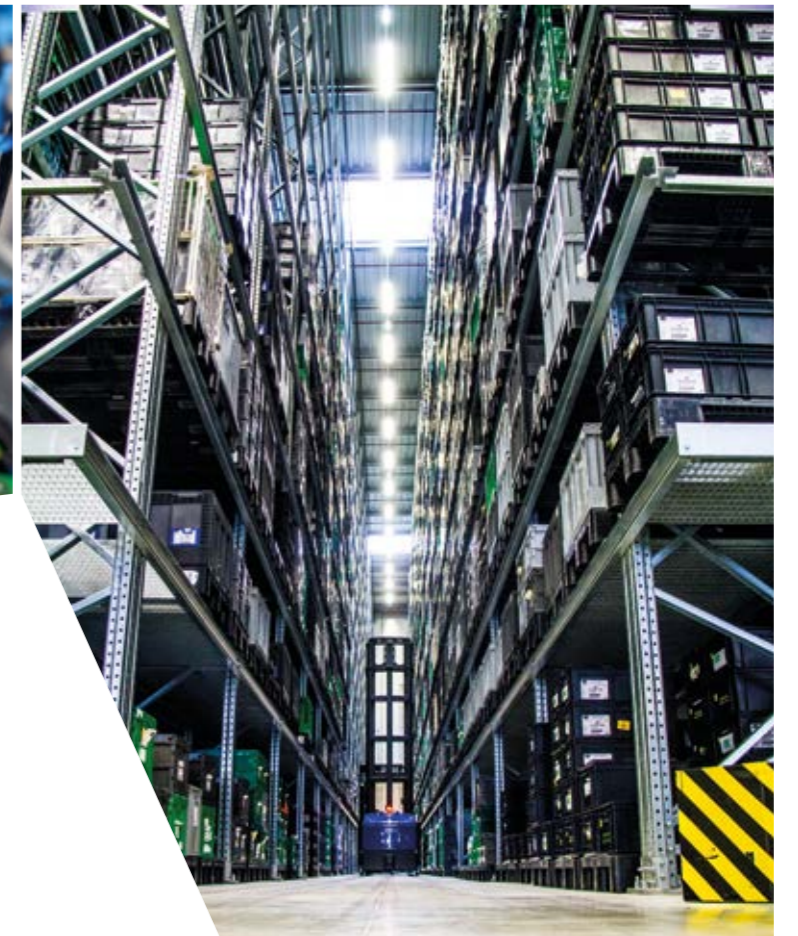
8 INJECTION MOLDING: LENS

For components critical to light technology such as bezels, light rings, reflectors, or lenses, ZKW uses injection-molding technology in specially enclosed areas. They are manufactured from high-quality synthetics.



9 SURFACE

These days the refining of surfaces plays a significant role. That's why the use of different varnishing and PVD technologies is part of the daily business to create functional and/or decorative component coatings. These coatings include for example: effect glazing of design elements, the inserting of structures into surfaces as well as the metallization of components.



11 LOGISTICS

The planning, control and execution of the material and information flows are a key element of efficient and flexible production. Fully automatic systems and modern IT solutions support employees in the efficient implementation of the logistical processes.

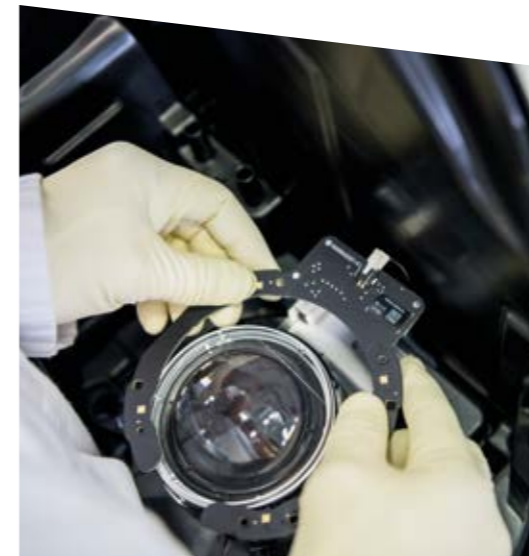


10 HARDCOATING

All lenses are covered in a protective varnish before assembly. This seals the surface and becomes a hard wear-protective layer that guards against environmental influences and scratches.

12 ASSEMBLY

In general, over 200 individual components must be assembled to produce one single headlamp. That's why we need the most up-to-date assembly concepts available to produce our high-quality products. Final manufacturing on our fully automated equipment and manual work stations is completed with a variety of different methods and highly sensitive technology.





The secret of truly great lighting systems is more than the sum of its parts.

04

FURTHER DEVELOPMENT

INNOVATION FOR
THE MARKET,
WITH A CONSISTENT
EYE TOWARDS
OUR ENVIRONMENT

FROM CANDLE LIGHT TO INTELLIGENT SYSTEM

For many years, comparatively little attention was paid to vehicle lighting. Today, however, lighting's contribution to safety is indispensable.

In the early years of automotive history, lanterns mounted on the sides or directly on the hood of the car gave drivers a minimum sight distance at night. In other words: The first headlamps were nothing more than candles in wind-proof boxes. Later, electrically operated lamps took their place. Over time, companies like ours have revolutionized this technology; modern vehicles today are equipped with better lighting than has ever been available before. Light-emitting diodes (LED or laser) today provide very high levels of light quantity and facilitate light levels above 1,000 lumens and intensities at the limit of what the law allows – a hundred thousand times the power of a candle.

However, today how strongly a light shines is less important. A variety of applications nowadays are used to ensure the best possible traffic safety: such as adaptive light from ZKW, for instance. Headlamps adjust their lighting focal point, luminous range, and width to your driving direction and speed so as to pro-

vide an optimal range of sight. We have also created further developments on this basis. ADB (Adaptive Driving Beam) systems developed by ZKW are a big step towards optimal visibility at night. These systems seek always to drive with high beam and dip the beam only for other drivers, which they recognize using a camera – dazzle-free high beam.

We are currently working on projects like “smart” headlamps – a front light that reacts autonomously to traffic and driving conditions, automatically adapts to changing light and traffic situations, and actively supports drivers in recognizing situations, such as marker lights. Sensor and camera technology in vehicles is also becoming more and more complex as it becomes an integral part of headlamps – without the right amount of light, even a camera can't see anything. In the not-too-distant future, headlamps in self-driving cars will also be used to communicate with the outside world, such as with other road users or pedestrians.

*Intelligent lighting systems,
created by the best minds
in the field.*



DEVELOPMENT WITH QUALITY

Only a company that continuously develops can permanently deliver top quality.
Our development projects show where we stand today: right out front.

Because innovation is kept in motion through research and development processes, we don't just work to fulfill customer orders. Based on a corporate strategy with the goal of making complex products and processes safer and more efficient, we promote innovation management and work to create our proprietary developments.

Continued development of our simulation methods and virtual night trips to simulate customer-specific light distribution patterns allow us to continuously improve our quality assurance. We promote quality assurance through the following points:

- Measures to ensure project quality through a FEM simulation program for temperature, structural stability, condensation and de-icing, injection molding, and vibration testing, taking pedestrian protection into account.
- Static and dynamic front LED light applications, including cooling and electronic implementation

- Testing and measurement laboratory to verify development results, including light channel for legally conforming measurements and assessment of the light distribution of individual headlamps up through testing of complete vehicles and trucks.

In the ZKW Group, we use one of the largest light channels available and the world's most modern measurement technology to assess prototypes and series production headlamps for their homogeneity, light color, and light intensity.

LED technology is the technology of the future, and it's already here today: This light technology facilitates innovative applications, while also placing new and higher demands on electronics. To remain a leader in this field, ZKW is developing our company from a system integrator into a system manufacturer.

The share of LED vehicle lighting continues to grow. LED tail lamps and front headlamps came first, but were only available in premium vehicles – today it is clear that LED lighting will completely replace the halogen and xenon systems on the market in the future. However, laser lighting can be seen as the next step in lighting technology to fulfill



the most exacting demands. The laser is a new form of semiconductor-based light source and is already in use in some cases where high light intensities are required, such as in high-power projectors. It will be used more and more frequently in cars in the future. Compared with traditional light sources like halogen, LED and above all lasers have entirely different properties. That's why they need a new approach when it comes to optics, electronics, mechanics and thermal management. The process and production technology, production safety, and general safeguards are also new.

The development of analog switches, software for control units, LED driver topologies, and the visual use of LEDs with fully automated systems – the ZKW Group is already working on all of these issues. In the future, we will also be promoting innovations in miniature lasers, digital light processing (DLP), micro electrical mechanical systems (MEMS), organic light diodes (OLED), and specialized LED configurations. In the future, other technologies like sensors will also be used in headlamp technology, turning the headlamp system into a key and fully networked sub-component of the vehicle. For

ZKW customers, this means all solutions come from a single source.

At ZKW, innovation means combining and building the knowledge we need to consistently apply new technologies throughout our entire product range. What are the advantages for road users? Improved light quality makes it easier to see and be seen, and light distribution adapted to a specific driving situation provides additional safety. In addition, new types of optical modules facilitate exclusive design, their long service lives save costs, and reduced energy consumption protects the environment.

Our patent division works with the innovation department to develop a global patent strategy. It is integrated into the entire innovation process, and allows us to protect a large number of inventions from our research and development area each year.



PRODUCTION

Of painting booths and clean rooms: Perfect light demands perfect surfaces, created with materials from our own workshop.

In production, ZKW uses a wide array of the most modern injection molding machines available (45t to 1,700t clamping force), most of them in fully-automated production, to manufacture all the technical thermoplastics for ZKW products.

We must ensure coating is possible with no issues. Besides a perfect surface, this also requires anti-static treatment. That's why production also takes place in clean rooms, in order to avoid contamination from particles of dirt.

ZKW also collaborates on surface treatments:

- Hard coating systems (UV-curing varnish systems and painting with robots)
- High-pressure aluminum vacuum evaporation systems
- Painting booths

ZKW produces our products in highly modern production cells (fully automated injection molding process followed by metallization in our sputter system) and on assembly lines with automatic screwing and press-fit stations using adhesive robots, handling machines, and integrated testing and control stations (on-line-seal testing and light adjustments) for the world's vehicles.

In lens manufacturing ZKW produces plastic lenses for LED modules. Plastic lenses enable weight savings within the headlamp as well as they offer more design options.



SUSTAINABILITY

Sustainability begins in the mind and all our actions are based on holistic thinking.

As a global corporate group with an international production and purchasing network, we consider fulfilling our responsibilities in the areas of quality, business ethics, resource management, environmental protection, health and occupational safety as well as social considerations is an essential part of our activities. We also believe, we need to establish requirements to meet these demands in our supply chain.

By proactively managing our environmental impacts and continuously reducing our resource consumption, we are pursuing our goal of reducing the ecological footprint of our products throughout their life cycle. Preventive actions and thus a minimizing of risks for employees ensures a safe and healthy work environment. These factors in turn increase the quality of our products.

A constant flow of information and a motivated, safe and healthy work environment anchor these considerations in the minds of our employees. We have their commitment and collaboration to thank for ensuring ZKW has been able to establish processes with

results that go far beyond statutory requirements.

Depending on our locations' requirements, management system standards ISO 9001, IATF 16949, ISO 14001 and ISO 45001 are implemented or certified in part or in their entirety.

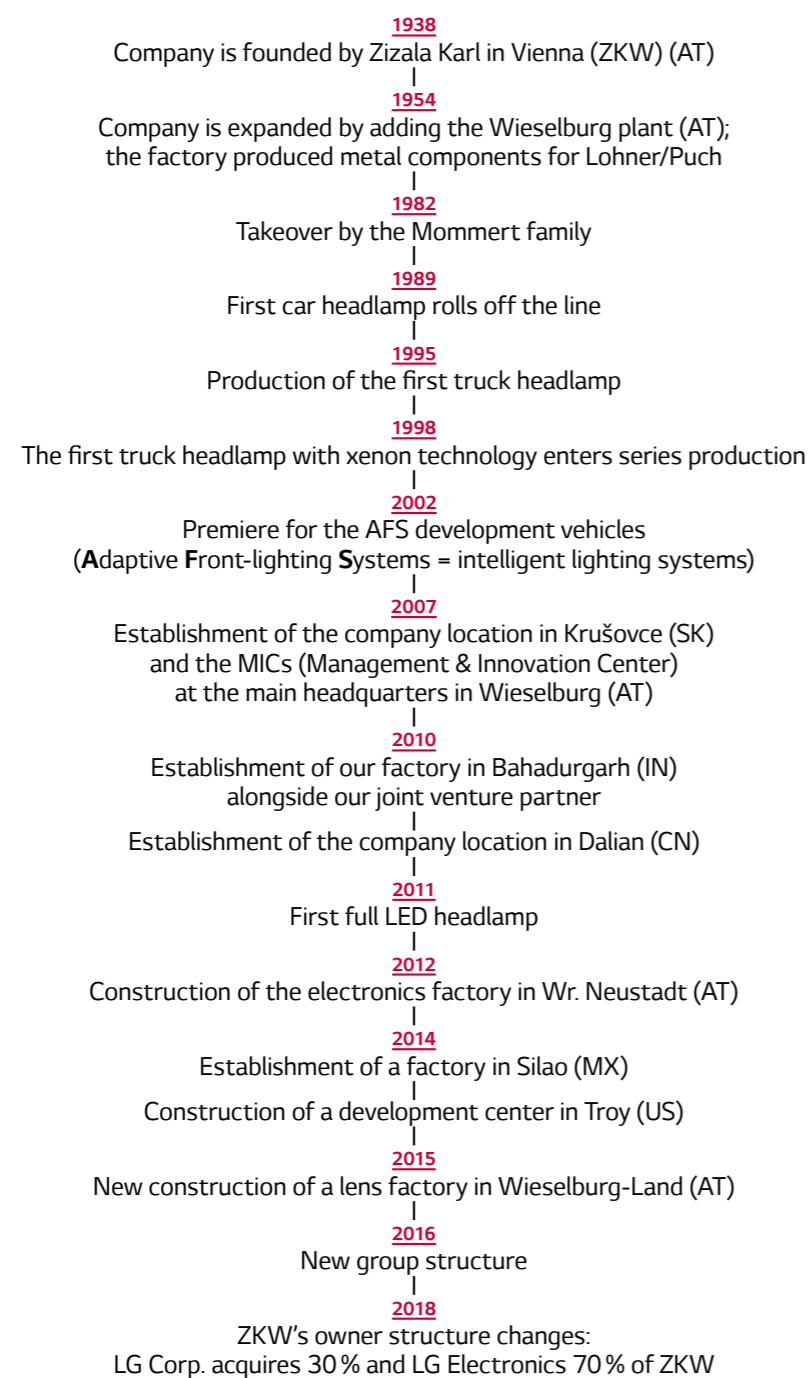
With this awareness, we have expanded our concept of quality: We only call a product high quality if it is produced as responsibly as possible by using innovative processes and by taking into account all work and safety aspects.

As a global player, however, the issue of social responsibility is becoming more and more a focus in our company – including in our supply chain. At ZKW, it is fundamentally important to us that all of our partners in our procurement network accept their social responsibility towards their employees and society. Responsibility and competence permeate all levels of the company. All employees down to the smallest areas are included through active communication.

ZKW is improving its company environmental protection measures voluntarily, going beyond statutory requirements.

MILESTONES

Moving ahead step by step:
Overview of the history of ZKW.



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