

# ZOLLERN

Solid metals. Fine solutions.

The  
ZOLLERN-  
Group

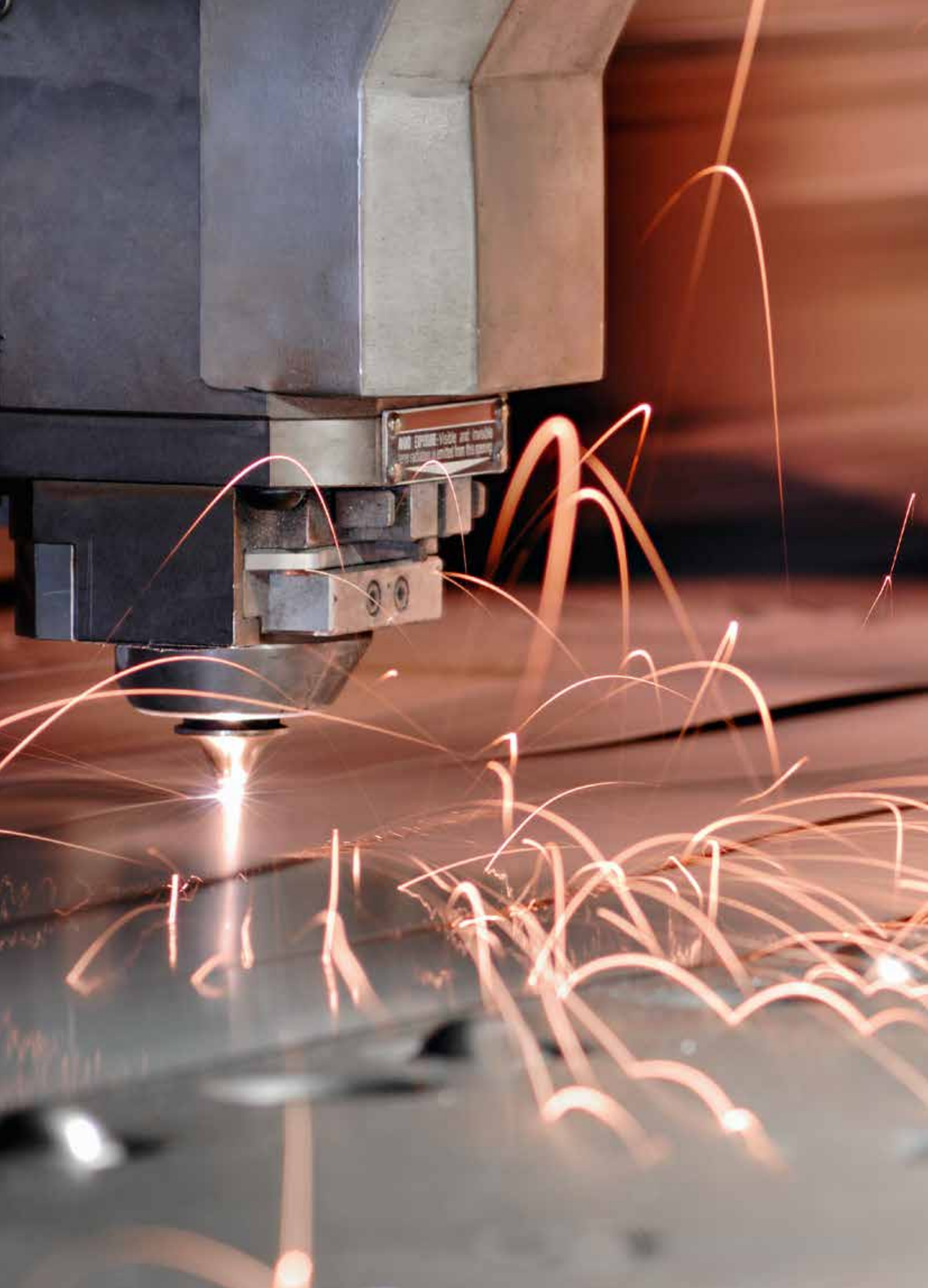


# “ Top performance for customers.

More than 300 years of history make the ZOLLERN group one of Germany's oldest familyowned companies – and simultaneously one of the most dependable partners in the metal processing industry. Its success is due to expert solutions for processes and products that support customers aiming for technological leadership. Everything from customized one-off products to volume production is possible. ZOLLERN reliably meets technical as well as logistical challenges, always delivering premium quality. Equally important, profound knowledge of the industry enables the company to develop innovative applications and efficient solutions for specialised markets worldwide.”







# Precision profile for 300 m/min.

Machines are fundamental to a modern world. ZOLLERN supplies premium high-tech mechanical engineering elements to various industries, e.g. precision profiles for linear guides such as those used in laser systems. Linear guides of this type are used to position the cutting head exactly so that the laser can move precisely over the material at speeds of up to 300 metres per minute, thus ensuring optimal positioning accuracy and dynamics.

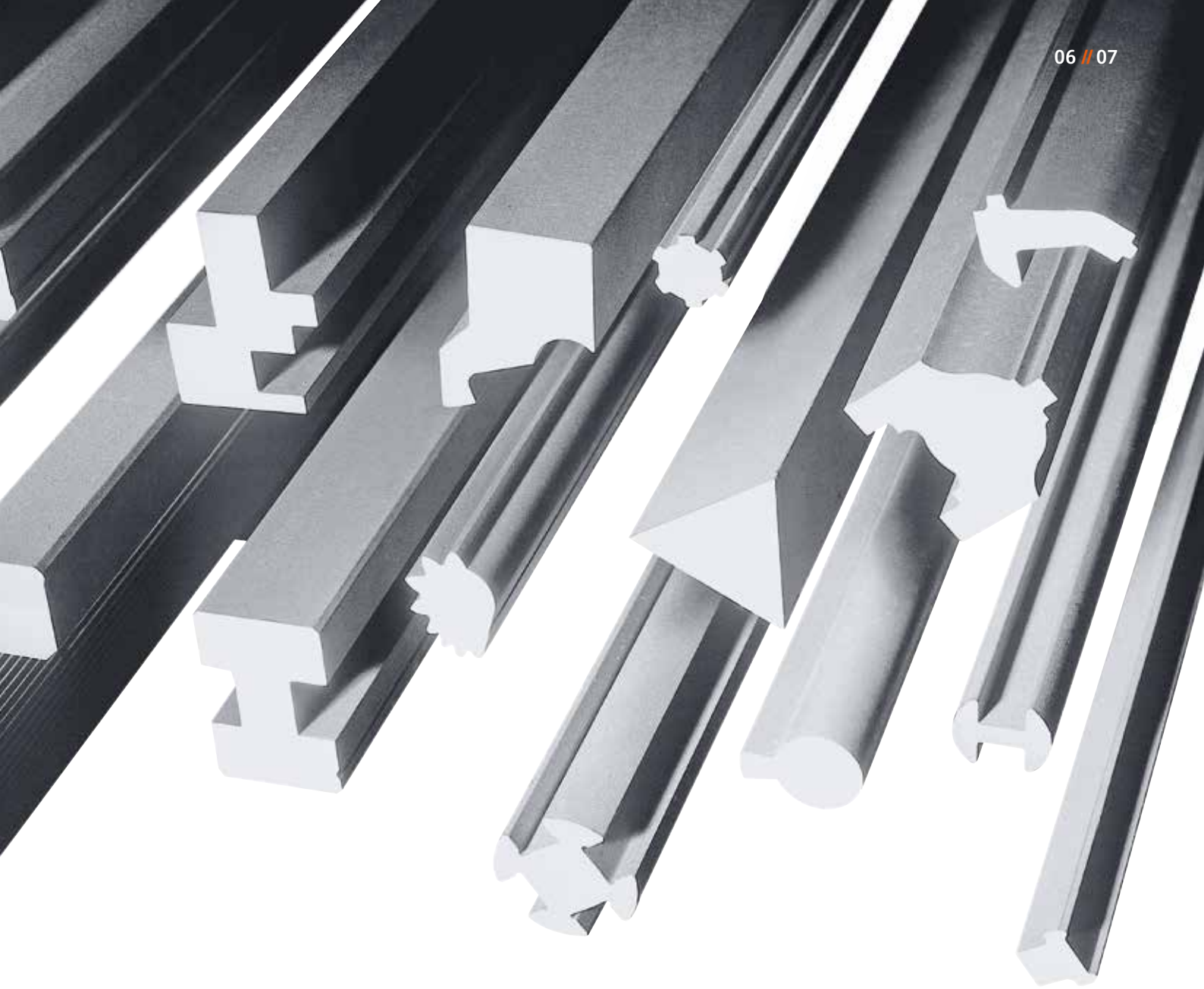


# ZOLLERN guiding technology is accurate to 3 $\mu\text{m}$ .

Nowadays machines do much of the work in production processes of all kinds. The quality of these machines is central to industrial structures. In mechanical engineering, material, workmanship and efficiency are paramount. ZOLLERN unites these customer requirements in a variety of components and applications.

Steel profiles, which are used extensively for linear guides, are one of ZOLLERN's main specialisms. Over 1,500 different profile types are also used in the automotive industry,

safety engineering, textile machinery and sectors such as printing and paper or wood processing. The list of applications and possible materials is endless. ZOLLERN makes profiles with excellent finishing characteristics. The partially or wholly inductive hardness of steel profiles, plus the fact that all annealing processes are conducted under protective gas, guarantees top profile quality and optimal customisation – for raw material or pre-finished components.



In addition to individual parts and components, ZOLLERN also produces whole systems for the mechanical engineering sector. For the manufacture of its customers' high-precision processing and measuring machines, ZOLLERN supplies rotary and tilting tables whose core components, such as torque motors and hydrostatic bearings, are also a product of ZOLLERN workshops. These systems allow flexible spatial positioning of the workpiece. This ensures absolute precision for processing and measuring – from all angles and perspectives.

ZOLLERN produces nearly six million metres of steel profile per year. That's the distance you would travel if you crossed the Atlantic from Europe. ZOLLERN profiles are suitable for a wealth of applications, including cutting, moving, guiding, transmission and propulsion. And all in accordance with the strictest standards and customer-specific criteria.



Full power  
at 315 km/h.





Speed and power are not just numbers – they are an expression of the freedom that mobility brings. ZOLLERN precision-cast wheels are crucial to turbochargers which guarantee full power coupled with lower emissions. ZOLLERN sets its sights on the mobility solutions of tomorrow.

# ZOLLERN packs a punch at 320,000 rpm.

The motor car is the epitome of mobility and freedom. It appeals to our emotions while radiating efficiency and power. The parameters of mobility generation are rapidly changing. And ZOLLERN is in the vanguard of that change. "Downsizing" is the order of the day, as engines decrease in size while gaining in efficiency. ZOLLERN follows this trend with high-quality components such as turbine wheels for turbochargers. Precision casting allows these highly complex geometries to be produced in exceptionally resistant materials. And that calls for top manufacturing standards. That's why ZOLLERN uses the latest technology and maximum degree of automation, in order to accommodate the above-average expansion of this market segment and ensure the highest possible process stability.

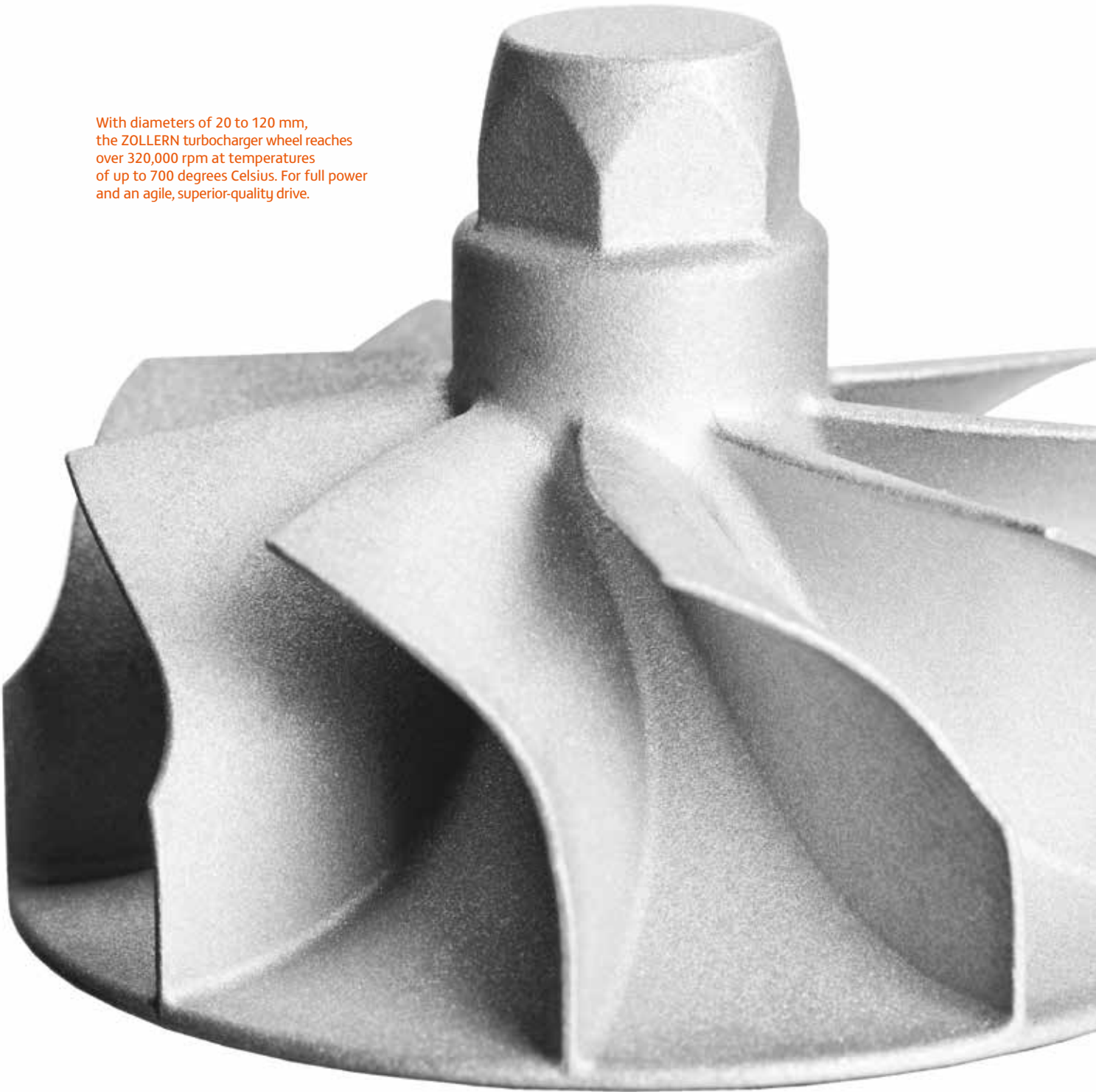
ZOLLERN is similarly focused on efficiency when it comes to its customers' production processes. When it comes to automation engineering, ZOLLERN develops and produces extremely efficient handling systems to support sophisticated shop floor assembly lines in the automotive industry, for example. Sometimes even the odd ZOLLERN part finds its way into the vehicle via these systems.

But ZOLLERN does much more to ensure the privilege of mobility. Steel profiles in engines, brakes or seat belts are components which are mostly concerned with safety in the automotive sector. Whenever it comes to moving people around, you'll find ZOLLERN: whether by air, on water or on land – in lightweight construction or turbine elements for aviation, in engine elements for ship propulsion or in electric motors for high-speed trains, where copper elements help to ensure operational reliability.



ZOLLERN supplies the housing for a space navigation system. This consists of an ultra-thin casting with highly complex structures. For this exceptional development in high-tech casting technology, ZOLLERN received the "Aerospace & Automotive" special prize in the European Aluminium Awards.

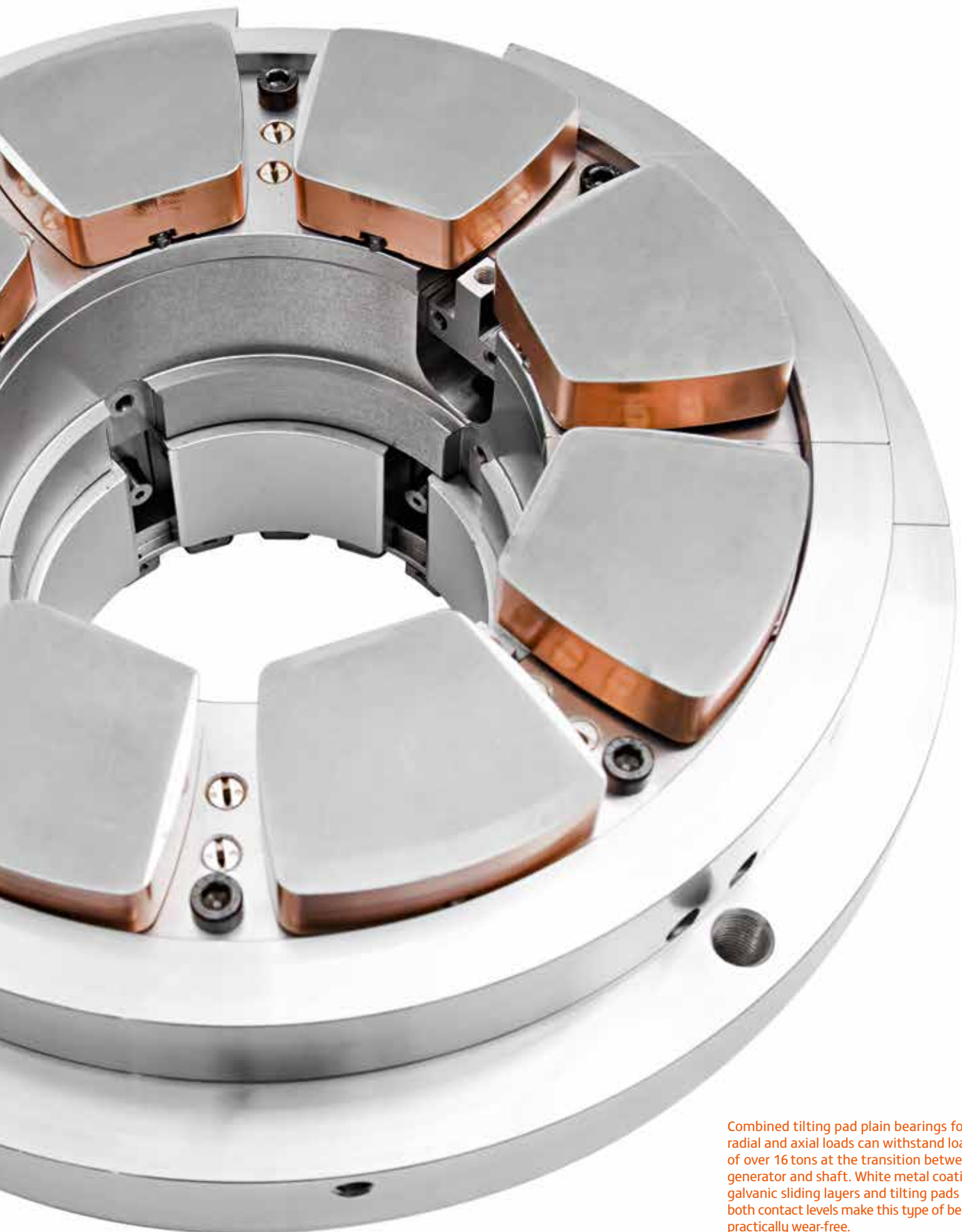
With diameters of 20 to 120 mm, the ZOLLERN turbocharger wheel reaches over 320,000 rpm at temperatures of up to 700 degrees Celsius. For full power and an agile, superior-quality drive.





# Wear-free for up to 100,000 hours.

Power generation makes the highest demands on technology and material. Inside the power station, kinetic energy is transmitted to ZOLLERN's cast turbine blades. The shaft, which rests hydrodynamically on ZOLLERN slide bearings, transfers this mechanical energy to the generator, where it is in turn transformed into electrical energy. All ZOLLERN elements are characterised by a special resistance which enables them to withstand incredible force, heat and momentum – and which makes possible a lifecycle of up to 100,000 operating hours.



Combined tilting pad plain bearings for radial and axial loads can withstand loads of over 16 tons at the transition between generator and shaft. White metal coatings, galvanic sliding layers and tilting pads on both contact levels make this type of bearing practically wear-free.

# Sliding speeds up to 130 m/s.



ZOLLERN slewing gears are used to position wind turbine towers for optimal wind exposure and angle the rotor blades for ultra-efficient energy generation.

The world needs energy. More and more. All the time. Everywhere. Energy is the hot topic of the future. At ZOLLERN, it already accounts for a quarter of the total sales figure. ZOLLERN produces components for large-scale engines, turbines and generators in various contexts which are notable above all for their reliability. These include turbine blades for gas turbines made using special casting techniques, along with integrally cast turbine wheels made from ultra-resistant alloys for hydroelectric power stations or high-precision steel profiles for generators. ZOLLERN gears are used to align wind power plants, and high-quality copper components are essential elements of generators for energy production. And whenever it comes to transmitting rotary motion, ZOLLERN slide bearings with special material coatings, patented galvanic sliding layers and vibration-damping tilting pads ensure a practically wear-free support for the rotating parts. Their above-average lifetime can amount to up to 30 years based on sliding speeds of between 1 and 130 m/s.

# 1,000 tons in one stroke.

In port applications, ZOLLERN gears turn the loading crane that hoists the freight onto the ship with ZOLLERN rope winches. The ship's engine springs into life, and inside it an array of ZOLLERN components. The conrod and crankshaft rotate in hydrodynamic ZOLLERN slide bearings. Finally, the momentum is transferred to the ZOLLERN ship's propeller, in order to drive the transport and circulation of goods and merchandise.







# A combination of just 700 parts.



The growing industrialisation of the world also means changes in terms of goods flows around the globe. Transporting them is becoming an ever greater challenge. Drive Technology from ZOLLERN

offers solutions ranging from standard to customised. Planetary gears are central to these, and wherever loads are lifted by cranes, there is a strong likelihood that ZOLLERN is involved. Rope winches with integrated planetary gears are crucial for marine, port and offshore applications. They enable the heavy-load vessels to load and transport wind turbines, yachts or tanks on the high seas – with a maximum lifting capacity of 1,000 tons per loading crane.

But ZOLLERN's enormous feats of lifting, turning and conveying are not confined to the maritime sector alone. Construction machinery, mining and large-scale sugar mills along with stationary and mobile crushing plants all rely on ZOLLERN solutions. A sophisticated, modular-style system of gear design allows customised solutions based on just 700 standardised gear components. That way even individual orders can be executed economically and with the requisite technical reliability. Each of these compositions is coordinated and supported by the excellent input of ZOLLERN application engineers.

Without ZOLLERN gears and rope winches (right), 50 percent of all deck cranes world-wide would be unable to move. The same goes for mobile cranes and off-highway construction machinery.





# Over 700 alloys for every need.

Extraordinary demands call for extraordinary solutions. The medical sector requires innovative applications right down to the last detail. As a specialist in copper and steel alloys, ZOLLERN responds with tailor-made solutions. These include components for cancer therapy. Pipes consisting of 99.9 percent pure copper serve to concentrate laser beams for tumour treatment.



The properties of copper and its alloys make it an ideal metal for all kinds of applications. Sterility is a key factor in medicine, but food-safe, seawater-resistant and electrically conductive applications are also made from copper alloys.



# ZOLLERN is 100% evolutionary.

Health is not just a human aspiration, but a necessity. And medical progress is the key to achieving it. Technology and materials for medical applications are important to ZOLLERN too. Copper is a raw material which is already gaining ground in many areas of medicine due to its useful properties. The excellent sterility of copper alloys makes it ideal for reducing the spread of germs in medical applications. ZOLLERN specialises in casting and forging copper alloys of this kind. It also focuses on high-quality steel alloys which are really put to the test, e.g. in tableting machines or other technically demanding applications. On this basis, over 700 alloys have already been produced – and counting. Developing new alloys to meet customer demands is almost routine for ZOLLERN nowadays. From the melting down of the alloy elements to the pre-finished part including spectrum analysis and high-end testing, the ZOLLERN value chain is virtually exhaustive, and its customer service seamless.

ZOLLERN is also represented in the research sector. Particle accelerators are research facilities which are used to investigate the big questions facing mankind. Here too, ZOLLERN plays a role, supplying a thermal shield for the equipment.

The Group has its own laboratory which is used for testing products and materials. Special test series shed new light on manufacturing processes, in order to ensure continuous improvement for the customer.



Premium-grade implants are precision-cast from superalloys. Femur and tibia elements for knee joints are a particularly promising area for ZOLLERN, also in the US or China.



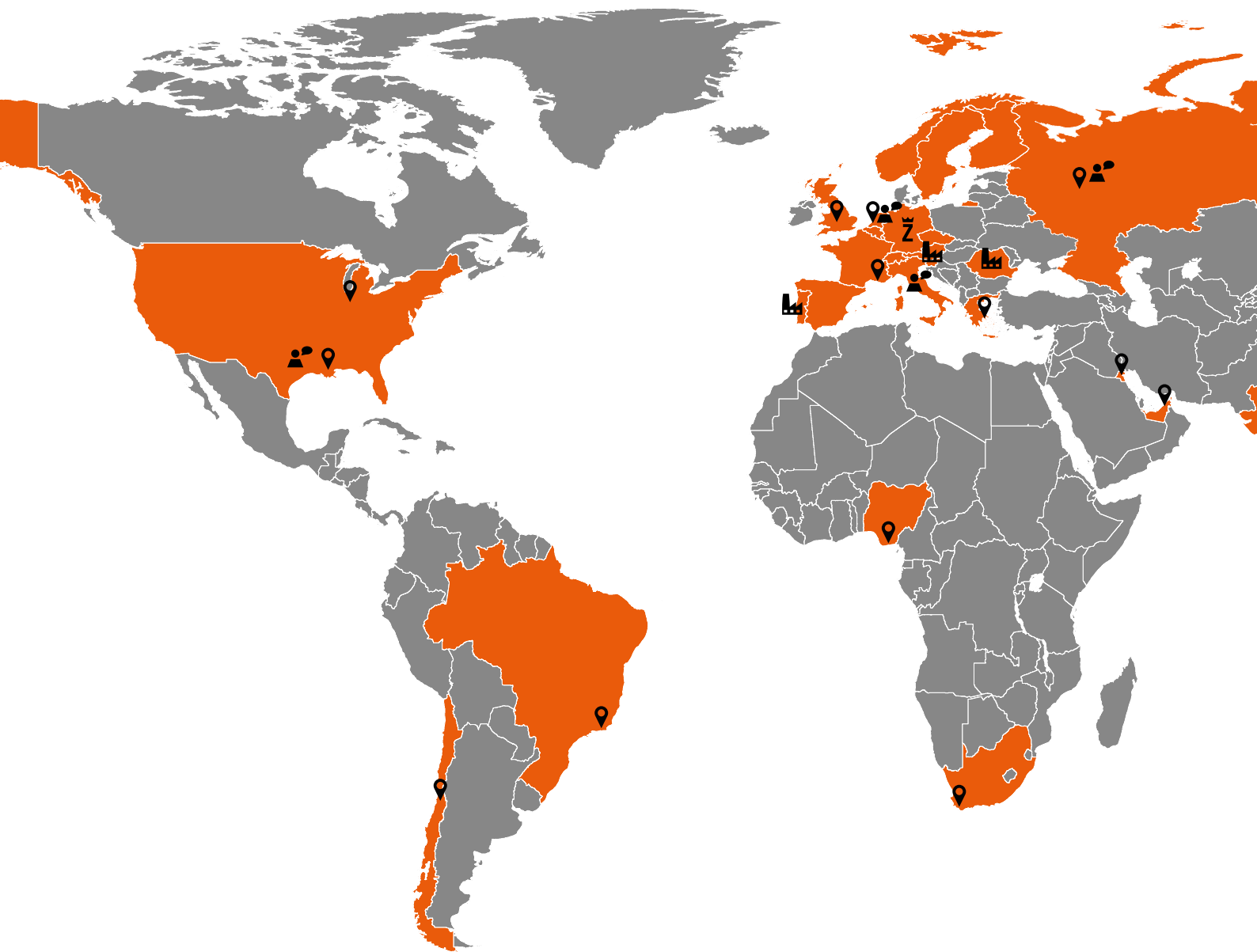




# 55,000 people under one roof.

ZOLLERN makes mega-projects a reality. 16 ZOLLERN rope winches with a tensile force of 50 tons each are used for example to open and close the dome roof – the world's largest with a surface area of 20,000 m<sup>2</sup> – over the Singapore National Stadium in Kallang Bay. And ZOLLERN is always on the lookout for new challenges and superlatives. ZOLLERN goes the extra mile for the customer, supporting its claim to technological leadership with the best expert solutions on the world market.

3 continents,  
13 locations,  
**2,000 people.**





www.zollern.com

## Group headquarters

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## Service partner

## ZOLLERN-Drive technology

### Gearboxes

- Wheel and track drives from 100,000 Nm to 2,300,000 Nm
- Slewing gears from 1,000 Nm to 1,550,000 Nm
- Plug-in winch drive gears from 1,000 Nm to 2,500,000 Nm
- Industrial gears from 1,000 Nm to 4,000,000 Nm
- Tunnel boring gears up to 3,000,000 Nm
- Sugar mill gears 550,000 Nm to 6,300,000 Nm
- Gearbox combinations up to 5,000,000 Nm (planetary gears, spur gears, bevel-helical gear units, helical-worm gear units)
- Electrical drive systems

### Winches

- Free fall winches for free fall weights up to 60 t
- Rope winches with planetary gearboxes for lifting or pulling forces up to 265 t (at the rope drum)
- Winch systems, application-specific complete systems as plug and play solutions

### Direct drive systems

- Torque motor kits, outer diameter up to 2,200 mm, torque up to 60,000 Nm
- Synchronous motors kits
- Standard synchronous motor assemblies from 80 to 400 kW
- Special motors (synchronous/asynchronous) according to customer specifications

### Hydrostatic bearing systems

- Hydrostatic spindles
- Hydrostatic guides
- Hydrostatic bearings

### Rotary tables

- Hydrostatic rotary tables with diameters up to 4,000 mm
- Aerostatic rotary tables with diameters up to 2,000 mm
- Rotary tables with roller bearings with diameters up to 3,000 mm

### Automation

- Linear axes (payload up to 10,000 kg)
- Telescopic axes (payload up to 1,600 kg)
- Line and area gantries (nominal stroke up to 50 m)
- Plant and system solutions (turnkey)



[www.zollern.com](http://www.zollern.com)

## ZOLLERN investment casting

### Investment casting

- Complex components according to the lost wax process
- Open cast steel alloys  
up to 180 kg casting weight, max. 760 x 500 mm
- Vacuum cast superalloys  
up to 90 kg casting weight, max. 600 x 600 mm
- Low-pressure cast aluminium  
up to 130 kg casting weight, max. 800 x 600 mm
- Vacuum DS/SX directional solidified components  
up to 4 kg, max. 200 mm height
- Solidification characteristics: EQX; DS; SX
- Pre-finished components

## ZOLLERN sand casting and forging

### Sand casting and other casting processes

- Complex single pieces and small series, also finish machined
- Unit weights up to 2t in steel and 8t in copper alloys
- Patternless forming by milling the moulding material and printed sand cores
- Production according to EN, DIN, WL, AMS, ASTM and other national standards

### Forgings

- Complex single pieces and small series made of copper and copper alloys, also finish machined
- Forgings up to 3t/pc, also in special dimensions
- Round and flat bars, discs, thick-walled rings and bushings
- Rings up to 2.5 m diameter
- Die pressed parts up to 15 kg
- Special extruded copper profiles with graded conductivity
- Production according to EN, DIN, WL, AMS, ASTM and other national standards

## ZOLLERN Steel profiles

### Special profiles and finished parts

- Profile types: hot rolled, cold rolled, cold drawn, induction hardened up to 64 HRC
- Profile cross sections from 5 mm<sup>2</sup> to 7,650 mm<sup>2</sup> (40 g/m to 60 kg/m)
- Surface roughness: from Rz 5 µm, dimensional tolerances from 20 µm
- Mechanical properties, optimally adapted to the application
- Machined and ready-to-install components from steel profiles

## Plain bearing technology

Together with Miba AG, ZOLLERN is actively part of a joint venture for plain bearing technology ([www.miba.com](http://www.miba.com))

# ZOLLERN

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