



# Steel forged to your needs

The Forging Technology of GMH Gruppe



**GMH GRUPPE**



# Steel in top form However you need it

At six sites, with combined expertise and efficient processes, the Forging Technology companies of GMH Gruppe manufacture customised open-die and die-forge parts: excellent results, supplied at very short notice and made precisely to suit your individual needs.

Our experts in their specialised companies combine all their experience, their ability and their knowledge to provide the very best solution to suit the requirements of customers representing many different sectors – along the entire value chain. Starting from extensive materials expertise with numerous options and qualities via a comprehensive portfolio, also containing some highly specialised products, with unit weights of 5 kilograms to over 50 tonnes to numerous processing possibilities for pre-finished, finished and ready to assemble processed components, we join forces to produce top quality results.

### Individual solutions, also produced in series

Our products drive your market forwards, represent sustainable reliability for the functioning of your machinery under heavy strain, and increase the efficiency of end products and processes. For this purpose, production takes place in close collaboration with the customer – to achieve an individual result, precisely to suit your requirements. Whether prototype, small scale or large scale production, tool steel, a component for mechanical engineering or a rolled ring: we mould steel precisely to suit your requirements.

## Business units within GMH Gruppe

GMH Gruppe consists of over 20 internationally oriented companies with over 7,000 employees. We produce pioneering solutions and, in accordance with customer requirements, made-to-measure products along the entire value chain. From scrap recycling to ready-to-install components: **Our business units represent the full spectrum of expertise in steel.**

### STEEL PRODUCTION

#### Steel, as individual as our customers' requirements

Steel is an integral part of our daily lives and a sustainable material with a future. The production of stainless and high-quality steel therefore plays a key role in our Group: whether as cast ingots, continuous casting, semi-finished products, steel bars, bright steel or hot-rolled special profiles, for the automotive industry, rail suppliers, mechanical engineering and plant construction. We produce and supply steel – individually, to suit our customers' requirements.



### STEEL PROCESSING

#### Steel, as versatile as our business

Steel can be used for an extensive range of applications – and the spectrum of products and services offered by our Steel Processing business unit is comprehensive enough to cater to all of them. A wide range of processes are used to ensure these results, producing both individual components and ready-to-install parts. We process with maximum precision to guarantee products with extremely low tolerances – such as those required in the automotive sector. Top-precision steel – as versatile as our business.

### STEERING SYSTEMS

#### Steel, leading the way in mobility

We are one of the world's leading manufacturers of steering racks for automotive steering systems. In future we also intend to continue our pioneering approach for our customers with regard to the manufacture of high-quality components for the future of mobility: advice and support, national and international, from concept and prototype development to series production.



### FORGING TECHNOLOGY

#### Steel moulded to top form for customers

In the Forging Technology business unit our production sites manufacture open-die and die-forge parts as prototypes, and also for small and large-scale series – from 5 kilograms to over 50 tonnes. Supplied within a very short time – with an excellent result. Our experts are even in a position to simulate the forging process after the development phase. Once this is done, production itself takes place, followed by post-treatment if required. The result is steel – moulded to your individual needs.

### CASTING

#### Steel or iron – solutions from a single casting

Under the umbrella of GMH Guss GmbH, we bundle our expertise on innovative, complex, casting solutions made of high-quality iron and steel. The ongoing development and positioning as a producer of technically sophisticated parts have made the company a recognised partner of many renowned customers requiring castings all over the world. In close collaboration with our customers, we produce series and individual cast parts. Together we create innovations – cast in either steel or iron.



# Our tool steels: A strong basis with highest quality and service life

Tool steels of the Forging Technology business unit are used as the basis for products and forged parts all around the world – which is no surprise with over 300 different materials and 2,000 material varieties. Our tool steels are used wherever reliable quality, long service life, innovative capacity and a competent service with an international sales network are required.



## Leading in High Nitrogen Steels

Using our PESR plant we can produce pressure-nitrided steels for special requirements. Our CRONIDUR® 30 steel offers exceptional performance in situations where other steels simply are not suitable. This steel is used in aerospace sectors, medical technology and high-end applications because it has the highest hardness values, enormous strength and toughness as well as an excellent degree of purity while showing extreme corrosion resistance.



### Pioneering solutions

As one of the leading suppliers of tool steels – working in close collaboration with customers – we are consistently developing new possibilities to meet the challenges of tomorrow. Our product range is correspondingly large – with a wide selection of ingots of up to 76 tonnes (conventional) and 84 tonnes (ESR) charge weight. This includes tool steel ingots with outstanding polishing and graining capability, which we achieve by means of high purity values, low segregations and compliance with narrow tolerance limits. We have our own service centre which enables us to supply European customers with customised products quickly and reliably. Whether semi-finished tool steels, sawn blanks produced to precise customer specifications or machined in accordance with individual drawings: we supply a unique variety of tool steels.

Decades of experience in plastic mould steels, die steels and heat-treated steels on the global market make us a reliable partner. Our aim is always to fulfil the specific requirements of our customers – many of whom are long-standing – flexibly and efficiently. This is reflected in the broad spectrum of applications – ranging from the automotive, aerospace and pharmaceutical sectors to high-tech industry.

#### We offer our customers:

- World-wide availability of our products
- Solid network of service centres with technical advice provided by an expert team – before, during and after purchasing
- Complete production chain at one location
- The highest quality in accordance with industry standards from selected use of scrap, melting in the electric arc furnace, forging on 27-MN-/60-MN open-die forging presses and specialised heat treatment capacities to final processing in the mechanical workshop



# In mechanical engineering forms are in demand

## A full range of products

For customer segments such as energy and heavy engineering the Forging Technology companies of GMH Gruppe provide components which have to withstand sustained extreme levels of strain. These components are renowned for providing top performance and maximum durability, precisely manufactured in accordance with customer specifications.

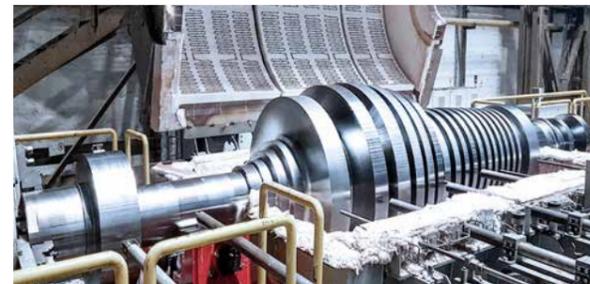


### Strong in the power-generating industry

Flexibility and reliability are two of our core strengths which have made us one of the leading suppliers of heavy forged pieces for the global energy sector. On the basis of many years of experience we manufacture tried-and-tested materials and products for power station technology; our innovative capacity means we fulfil the continually changing needs of the market and our customers. We manufacture in accordance with international standards and our customers' specifications, using conventional or ESR materials.

### Quality without compromise

Retaining rings are one of the components of a generator which come under the highest levels of strain. With over 100 years of experience, Energietechnik Essen has the greatest level of expertise in the world in the manufacture of retaining rings. This results in absolute reliability due to the consistently high level of quality, which is also a characteristic of our other Forging Technology products: turbine and generator shafts, discs for gas and steam turbines, components for hydropower, discs and shafts for compressors.



### In great demand for mechanical engineering: the variety of steel

The forging technology companies provide the perfect solution for the most varied of functions in mechanical engineering by utilising the full range of options regarding dimensions, weights, material qualities and machining depths.



### Steel for reliability:

- Components for vessel construction (such as lid and trunnions for Castor containers)
- Rolls (working rolls for special profiles, pilger rolls)
- Form rolls (e.g. for container bases)
- Conrods and special products (e.g. cable clips for cable cars)
- Components for construction machinery, truck axles
- Crane hooks
- Joint support and brake discs for railways
- Components for gear construction etc.

### Forged to keep big machinery moving

We forge and machine high-quality components which drive large machinery.

Our global customers include manufacturers of large, four-stroke diesel and gas engines, piston compressors and displacement pumps.

As leaders in the manufacture of crankshafts, our range of services includes:

- Forging of crankshaft blanks using the TR forging process as well as crankshaft finishing - up to 13 metre lengths
- Repair of crankshafts
- Refinishing
- Development advice for crankshafts: selection of material, forging process, heat treatment, manufacturing and economic optimisation of the production chain

Our product range also includes further components for large engines, such as conrods and piston heads and bottom sections.

In the die forging process our specialists manufacture rough-machined and finished products to ready-to-install components made of low-alloy and high-alloy steels in a weight range extending from 5 to 3,500 kilograms. Areas of application include the large engine industry, commercial vehicles industry, railway industry, mechanical engineering and the mining industry. Our powerful plants ensure the highest quality of the die-forged parts, from small-scale to large-scale production:

- Own tool and die making
- CAD assisted simulation of forming processes
- High-performance forge aggregates. We have one of the world's largest counterblow hammers (630 kNm)
- Mechanical production

# We offer rolled rings And provide top precision

**Our rolled rings are renowned for precision, dimensional accuracy and special material properties such as outstanding degrees of purity, even microstructure and resistance to wear and corrosion. The broad spectrum of products extends from seamless rolled rings and flanges to wheel tyres.**

When it comes to the manufacture of rolled rings, we always find the best solutions to suit the diverse requirements of our customers: rings in seamless rectangular and/or profiled rolled designs, supplied in a rough, pre-finished and machined finish with unit weights of up to 4,000 kilograms and outer diameters of up to 4,000 millimetres.

Due to our flexible approach we produce customised results: whether structural steels, fine-grain structural steels, high temperature steels, stainless, acid and heat-resistant steels, quenched and tempered steels, bearing steels, tool steels or special grades in accordance with your requirements - supplemented by heat treatment upon request.

## Irreplaceable: experience

At our site in Gröditz we have been manufacturing seamless rolled rings for decades. Whether as wheel tyres for rail vehicle construction, die rings for the animal feed industry, materials recycling and energy production or as a gearing component in gear and engine construction e.g. in the wind energy sector.

We also manufacture flanges and pipe connections for the (petro) chemical industry, tools for solid forming as well as components for heavy-duty performance in construction and drilling equipment. Our experience makes us a reliable partner for customers all over the world.



## Certified quality

Additionally to certifications in accordance with organisations such as DNV GL, LR and TÜV, we hold a range of product and customer-specific certifications/approvals. Approvals from Deutsche Bahn AG, including classification as a "Q1 supplier", for example, as well as in accordance with RISAS and CD for the railway industry in Great Britain and Czech Republic.

# Combined expertise Our companies

At locations across Germany specialists and experts in forging technology within GMH Gruppe combine their abilities, knowledge and service to fulfil exact customer requirements.



### Steel for versatility

Variety is a distinguishing feature of Schmiedewerke Gröditz GmbH. Customers benefit from an extensive range of open-die forged parts and ring-rolled products, heat treatments as well as mechanical processing.

[www.stahl-groeditz.de](http://www.stahl-groeditz.de)



### Guarantee for safety

Energietechnik Essen GmbH stands for safety-critical and specialised products, from retaining rings to nitrogen-alloyed steels – manufactured with wide-ranging materials expertise.

[www.energietechnik-essen.de](http://www.energietechnik-essen.de)



### Service close to steel

As a service centre Gröditz Werkzeugstahl Burg GmbH provides high-quality tool steel to suit customer needs – semi-finished, as sawn blanks produced to precise customer specifications, machined in accordance with individual drawings.

[www.werkzeugstahl-burg.de](http://www.werkzeugstahl-burg.de)



### Expertise for manufacturing

SMB Schwerkmechanik GmbH specialises in mechanical processing of primarily medium-sized and heavy components in individual and small batch production. Customers include companies from sectors such as energy and power station plant construction, valve construction, the oil and gas industry as well as large welded steel construction.

[www.smb-gmh.de](http://www.smb-gmh.de)



### Components with drive

Schmiedag GmbH manufactures rough-machined and finished die-forged parts which are used in areas such as the railway sector, the large engine industry, the mining industry as well as in special applications and special vehicles.

[www.schmiedag.de](http://www.schmiedag.de)



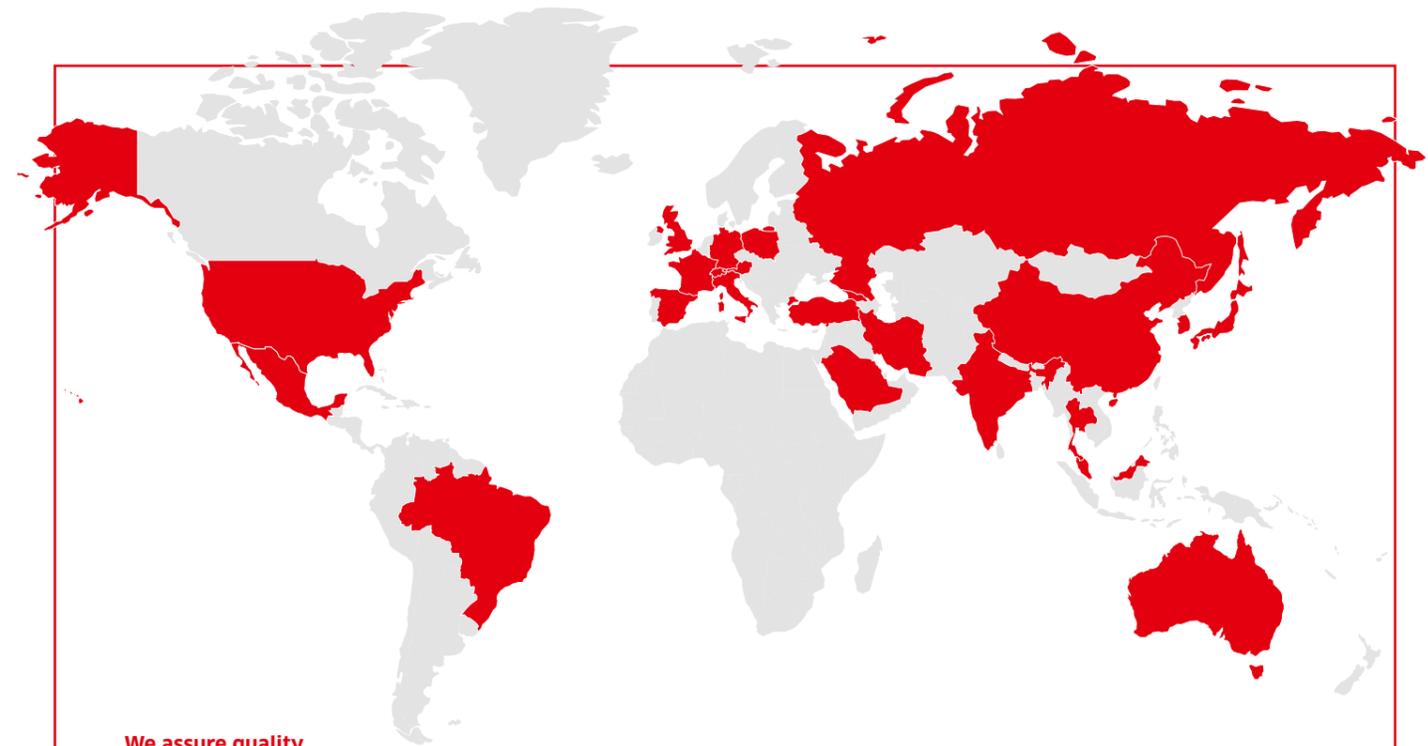
### Ensuring big machinery keeps moving

Wildauer Schmiede- und Kurbelwellentechnik GmbH products are used all around the world to keep ships, diggers and generators moving – reliably, under extreme strain. Particular strengths are the large die-forged parts and ready-to-install crankshafts.

[www.wsk-wildau.de](http://www.wsk-wildau.de)

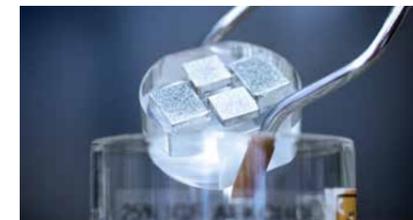
# GMH Gruppe A strong "WE"

Under the umbrella brand of GMH Gruppe – as pioneers, as experts, and as the go-getters who make things happen, we are the first port of call at international level for innovative solutions and premium-quality steel. We always want to find the best solution for customers.



### We assure quality

To achieve uncompromising quality we combine the knowledge and expertise of our employees around the world. Together we find innovative solutions for complex requirements, provide top precision and excellent products, supported by a comprehensive quality management system. This means that in any area where mechanical strains and challenges are involved our products may also be used.



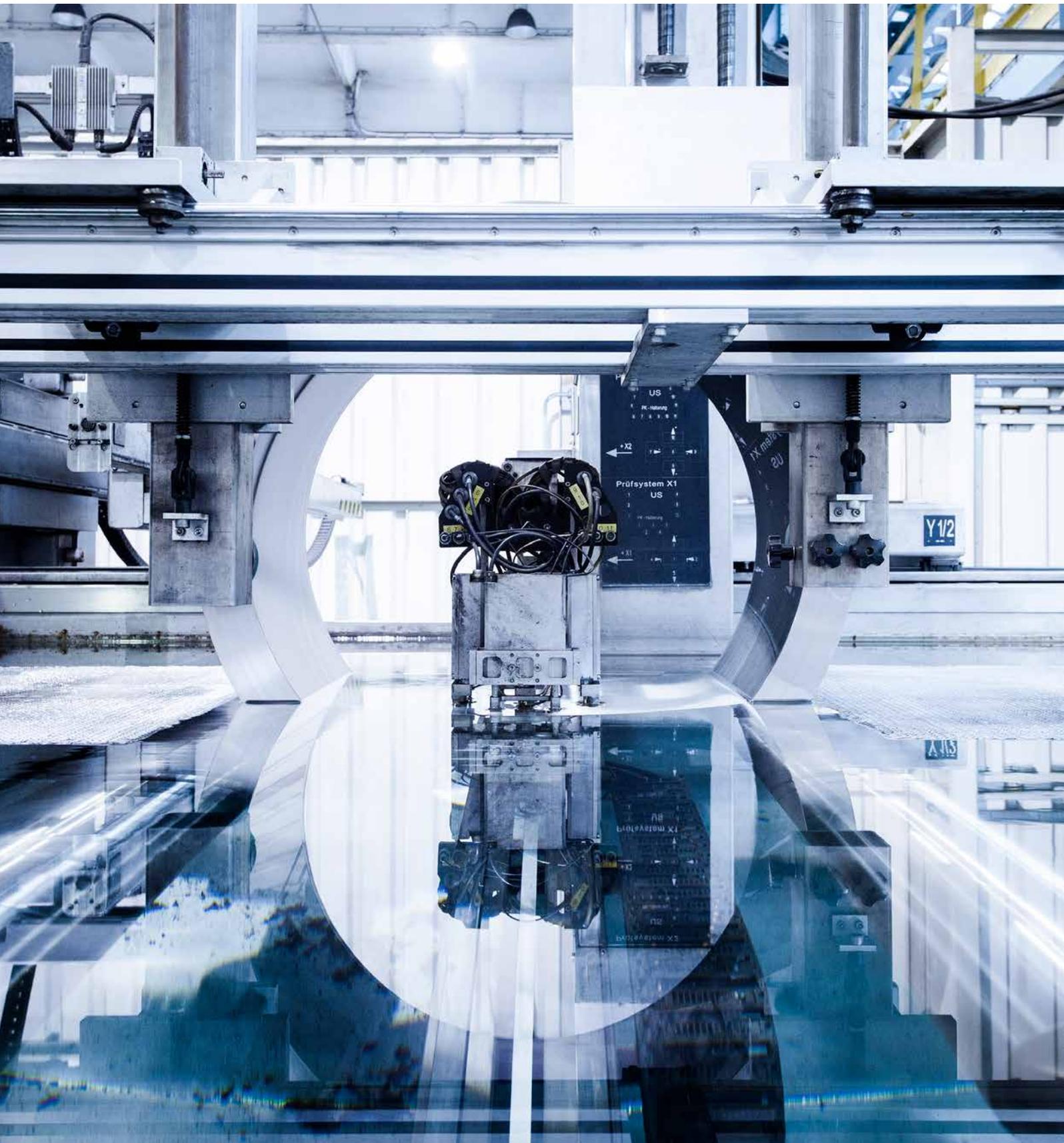
### We think ahead

As an innovative partner for our customers we find the answers – even to questions that others have not thought of asking yet. Working with your needs as our starting point we continually think in new ways and find the optimal solution – beyond site and technology-based boundaries. By doing so, we keep discovering new products and applications.



### We always act responsibly

The strong "we" of GMH Gruppe is recognisable everywhere. We are committed to sustainability in order to preserve the environment and climate as well as to protect our staff. As a medium-sized family-owned business corporate responsibility is deeply embedded in our tradition. This includes the fact that the environmental management systems of our companies are certified in accordance with DIN ISO 14001.



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