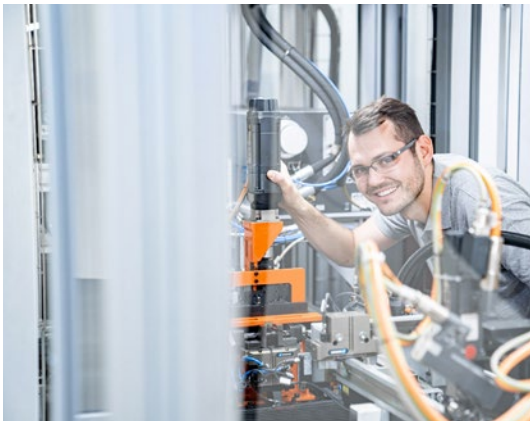
Gehring

Excellence in motion.
Future in mind.

Our company at a glance

The Gehring Group offers innovative production solutions for highly efficient conventional and electrified powertrains. In the field of precision machining, the company shapes the development of honing technology and provides the automotive industry with answers to the current challenges surrounding the combustion engine and electric drive with the processes of laser roughening, coating, honing and e-mobility.



The production technology for the electric motor complements the portfolio and sets groundbreaking signs for the future direction of the company. From pin production to pin setting, twisting and welding of the pin ends to impregnation of the stators with drips and powder coating, we offer all steps from a single source.

As a globally active company, the Gehring Group is represented in key markets in the automotive and supplier industry, hydraulics and pneumatics, and aerospace technology.

Corporate Culture

The success of our company is primarily due to our employees, who work with expertise, passion and creativity for the interests of our customers and the values of the company. That's why we invest in the professional and personal development of our employees - whether through sustainable training programs, targeted training of experienced staff or the use of modern management and leadership concepts.

One of our primary goals is to be an attractive employer. A low fluctuation rate and the high identification value of our employees confirm us in this. Open, active interaction with each other, mutual trust and the joint pursuit of new paths require daily commitment - to our customers, our self-image and our future.

History

1926
Foundation of the Gehring company in Naumburg/Saale by C.-W. Gehring for the repair of engines and first production of honing tools.

1941
The first Gehring honing machines with hydraulic stroke drive, central lubrication and honing oil treatment are built.

1948
New start as Maschinenfabrik Gehring in Ruit on the Filder near Stuttgart.

1960
Introduction of plateau honing of combustion engines.

1961
Construction of the first honing machine with pneumatic in-process measuring.

1966
Construction of the first honing tool with direct cooling.

1975
Introduction of Gehring cylindromatics.

1977
For the first time, a cylinder shape of less than 1 µm is achieved in large-scale production when honing parts for diesel injection technology.

1979
Diato GmbH is founded as a manufacturer of diamond and CBN cutting blades.

1989
Gehring presents the first NC-controlled honing machines at the International Engineering Fair EMO.

1992
Introduction of laser technology and laser honing of combustion engines.

2006
Development of the lifehone series for small diameters.

2007
Introduction of position honing. Development of powertrainhone engineering series.

2010
Introduction of shape honing. Honing of diameters ≤ 0.8 mm is developed to production maturity.

2016
Gehring celebrates its 90th anniversary. Foundation of the Gehring Academy.

2018
Gehring and copperING, specialist for the production of electric drives, merge. Development of laser roughening.

2020
Gehring is integrated into the NAGEL Group.

2021
Cooperation with WAFIOS AG.

2022
Cooperation with Daimler Truck AG. The first e-mobility line gets ordered.

Our customers

We are proud to convince customers from a wide range of industries with our services. Here are a few examples:

Automotive industry
Audi
BMW
Changan
Chery
FAW
Fiat
Ford
General Motors
Great Wall
Hyundai
Mercedes Benz
Opel
Peugeot
Porsche
Renault
Scania
Stellantis
Volkswagen
Volvo

Their suppliers
Bosch
Continental
Federal Mogul
Mahle
Shanghai Gear
Stellantis
Valeo

E-Mobility
Daimler Truck
Denso
Marelli
Nidec
Vitesco
ZF

Manufacturer of construction and commercial vehicles
Caterpillar
Cummins
Doosan
Liebherr

Machinery and plant engineering
GROB
Heller
MAG
Oerlikon

Hydraulic and pneumatic parts manufacturer
Beijing Huade
Bosch Rexroth
Linde

Aviation engineering
Hindustan Aeronautics
Magnaghi Aeronautica
Messier-Bugatti-Dowty

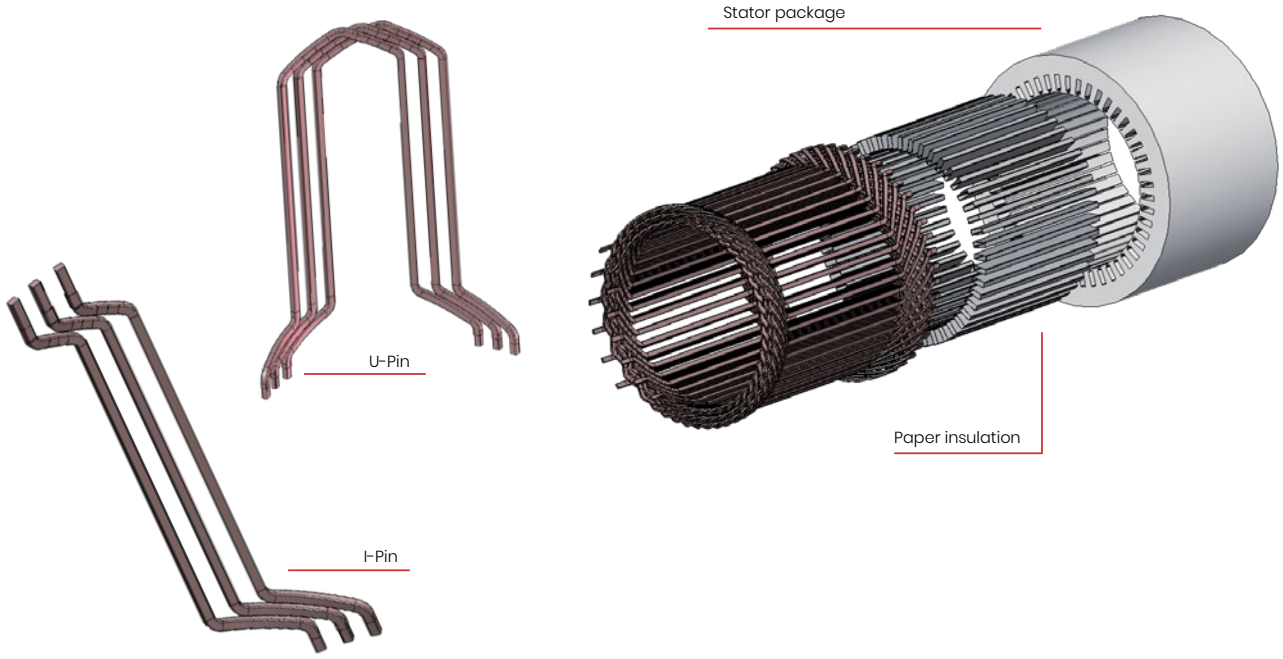
Ship building
Jürgensen
MAN Augsburg
Mercury Marines
Wärtsila

Your system partner for stator manufacturing

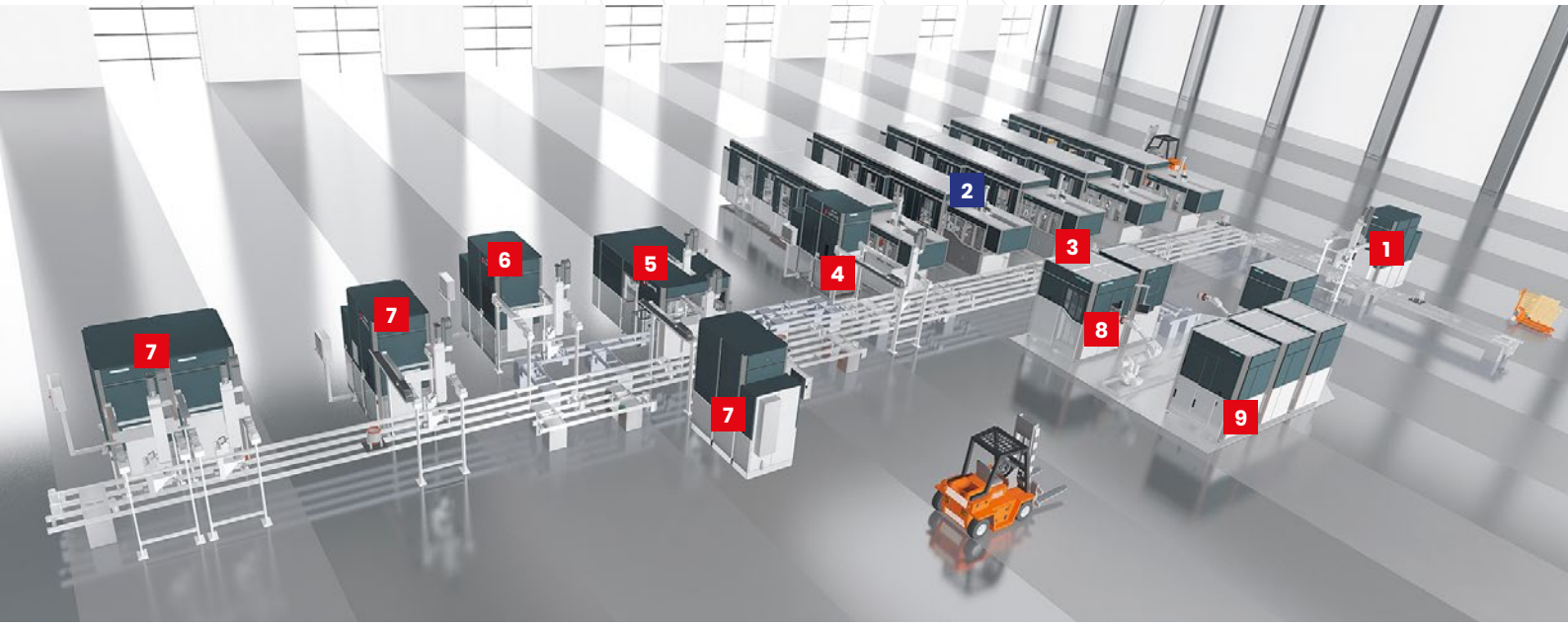
Gehring stands for technologically innovative approaches, extensive know-how in production technology for the electric powertrain and, last but not least, many decades as a system supplier for the automotive industry. The integrated portfolio includes production technology for manufacturing traction drives in electrified vehicles based on hairpin technologies.

These designs combine efficient electric motor characteristics with high automation capability and process reproducibility, essential prerequisites for large-scale automotive production.

The range of products and services extends from independent, customized solutions for stator prototype development and small series production to fully automated, new system solutions for electric motor production lines.



Turnkey Solutions

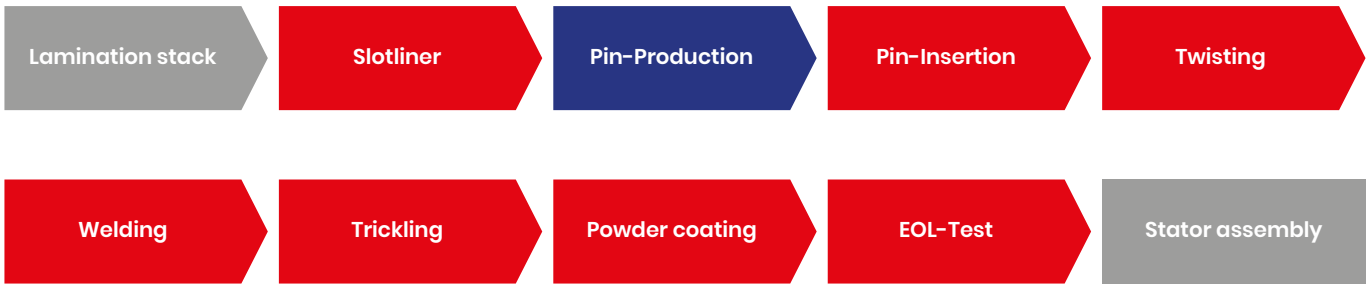


Stator production line

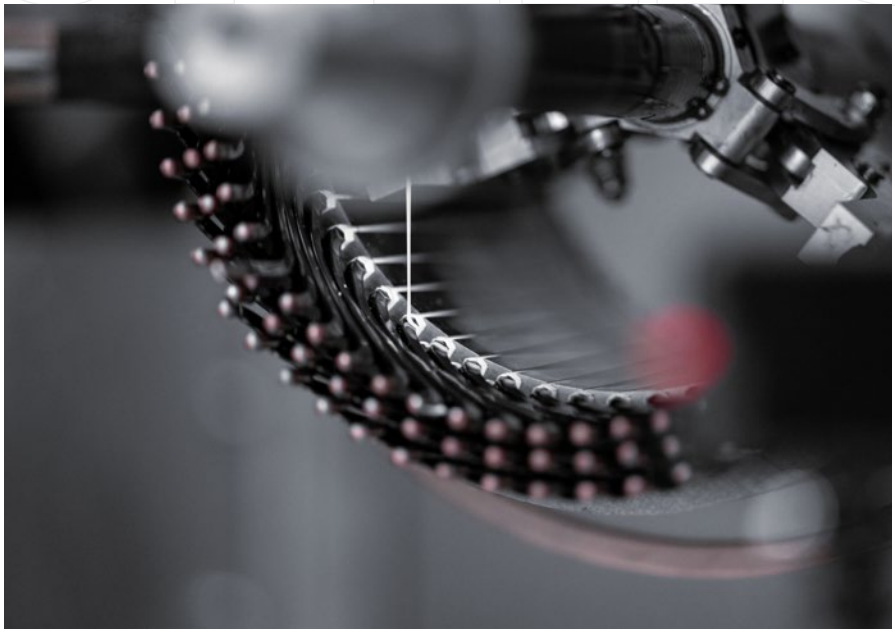
Cooperation for electromobility

With the cooperation of WAFIOS AG since 2021, Gehring can offer the complete turnkey production line for hairpin stators with bundled expertise and thus supplies the production line from a single source.

1. Slot insulation
2. Pin-Production
3. Pin-Insertion
4. Widening
5. Twisting
6. Pin cutting
7. Welding
8. Impregnation
9. Powder coating

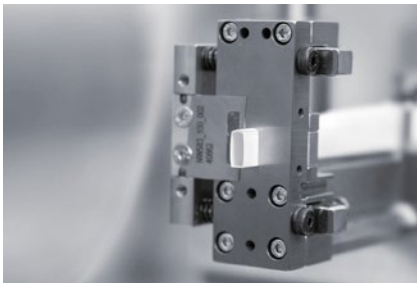


Engineering Solutions for the development of electric motors



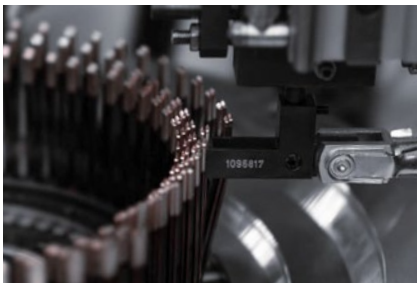
Impregnation

The development of electric drives and the prototype production of electric motors require comprehensive know-how in the interaction of the individual production steps. We pass this knowledge on to our customers and provide support from the development of the product through prototype production to series production.



Slot insulation

Pin production with SpeedFormer



Widening

Twisting

Electric motor design

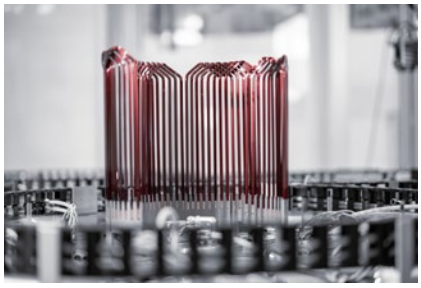
Already in early development phases, it is the close customer support that distinguishes us. During the development of the product, we contribute our know-how in a targeted manner and provide support in the design, taking into account a high level of production suitability. The investigation of different concepts and production processes serves the decision-making process and facilitates the transfer to series production.

Prototype production

Prototyping of electric motors as proof-of-concept and for test applications during product development is essential. The simultaneous development of product and production processes together with our customers and the identification of critical properties or interactions with manufacturing tolerances serves quality assurance before the start of series production and facilitates the structural setup of the product.

Turnkey solutions

We offer complete turnkey solutions and production lines for electric motor manufacturing. From pin production, pin assembly and insertion, twisting and welding of pin ends to impregnation of stators and powder coating, we offer all steps from a single source. Our cooperation partner Wafios offers the right solutions for your pin production requirements. Our automation ensures a continuous flow of stators through the line.
With modern simulation methods and many years of expertise in project management, we are a competent partner for the design of new production lines with high productivity. The bundling of all competences, the extensive know-how of the individual production steps and the direct contact person simplify and optimize project execution for the customer.

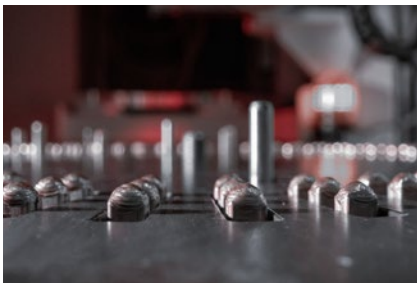


Segments as basket ring

Hairpins assembly

Segments driven together

Pin cutting



Laser welding

Powder coating

Laserstructure

Principle of laser structuring

Laser structuring for roughening surfaces is being increasingly used. This produces raised micro profiles, which achieve the highest possible static friction to the counter body. The pulsed laser beam is focused on one point the material surface, resulting is very high local intensities.

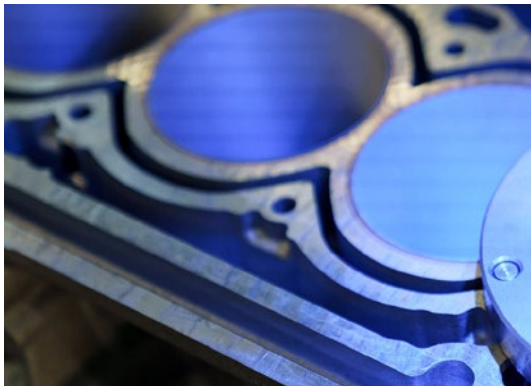
The material is converted into the melt phase by the thermal processing. This leads to melt beads, which protrude as elevations from the surface. These individual profile peaks consist of melt burrs, which are formed as raised structures in the surface of the counter-body and produce high static friction.

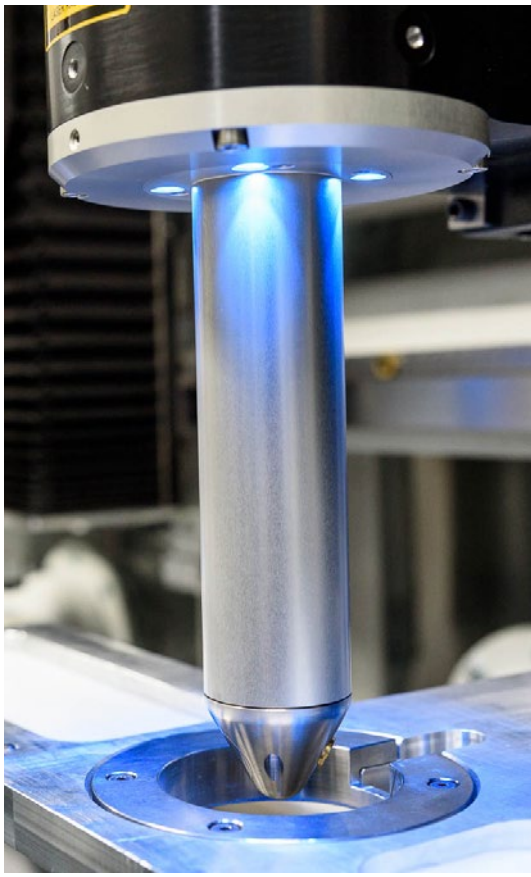
Goal of laser structuring

The roughening of technical surfaces with static friction function creates a lossless torsion-proof and/or antislide connection between two components. This combination fulfills the functional requirements, simplifies the engineering design of the components and substitutes friction enhancing intermediates such as diamond foils or galvanic diamond coating and thereby reduces the production costs of one unit.

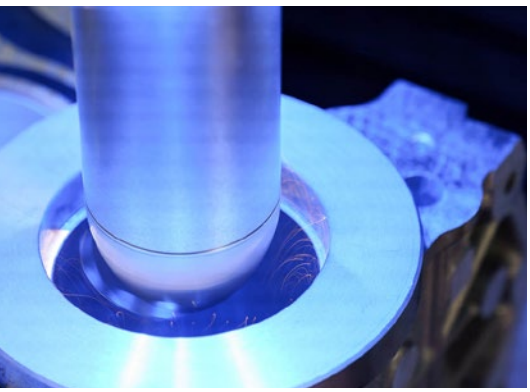
Your advantages

- Substitution of diamond foils or diamond coating front face connection
- Substitution of slot and feather key connection hub – shaft
- Freely selectable surface structure
- No tooling costs
- Machining time of a few seconds
- No tensioning of parts
- Practically no heating of the part
- High reliability
- High degree of automation
- Worldwide experience in series production





Laser roughening



Production technology for laser Roughening

The laser roughening process is controlled by the innovative rotating optical system. Thanks to the compact design of the Gehring machines, two identical cylinder bores can be machined at the same time. The hollow-shaft motor and stationary submersible optical system enable operation with virtually no vibrations. Using high-quality materials guarantees a long service life for the optical components. An industrial camera is used to monitor the process, especially during the setup stage. The peripheral equipment for the fully automatic roughening module with optimized footprint consists of an extraction system and coolant device for the beam source and rotating optical system.

Thermal coating of cylinder bores is a highly sought-after technology, with increasing the efficiency of the combustion engine being the overriding objective.

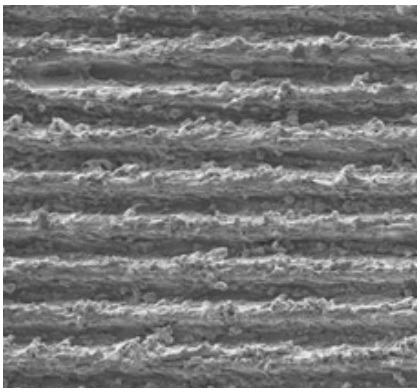
Applications of laser roughening

Our many years of previous experience with engines from different performance classes show that laser roughening is an innovative and economical process for modern series production. Laser roughening can be used as a pretreatment for all conventional thermal coating processes.

The use of powerful beam sources makes it possible to machine aluminum alloys as well as cast iron. The special potential offered by laser roughening becomes apparent when machining two-stroke engines. In this process, the beam can come out of the bore and then re-enter the bore, where it remains, without causing a deterioration in the quality at the overflow ducts.

Gehring has extensive expertise in the entire „laser roughening, coating and honing“ process chain. Harmonized process steps result in lowfriction, wear-resistant cylinder surfaces.

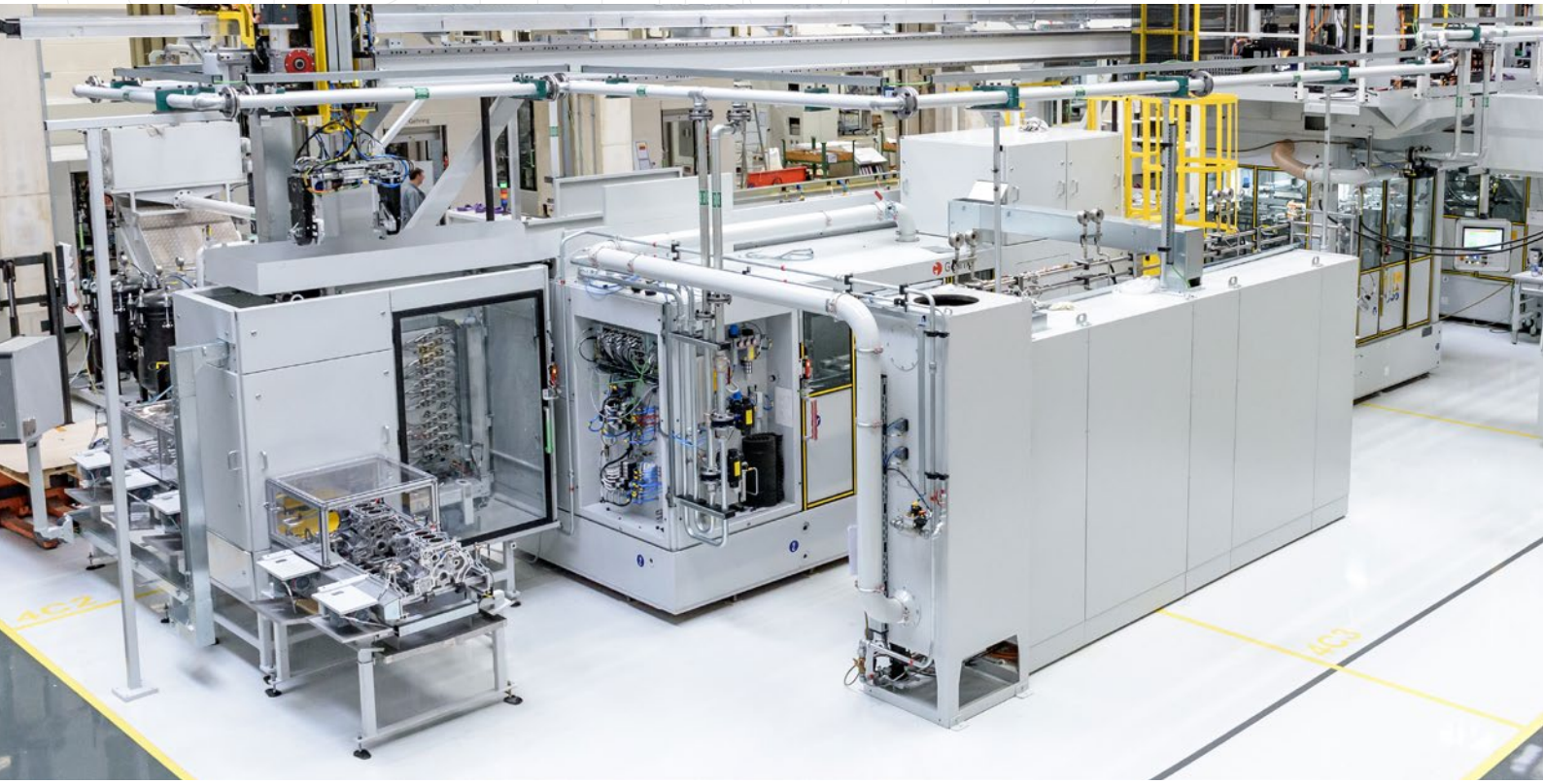
In order to produce a reliable bond between the layer and substrate, a high-performance roughening process is required which ensures functionality in all aspects.



Your benefits

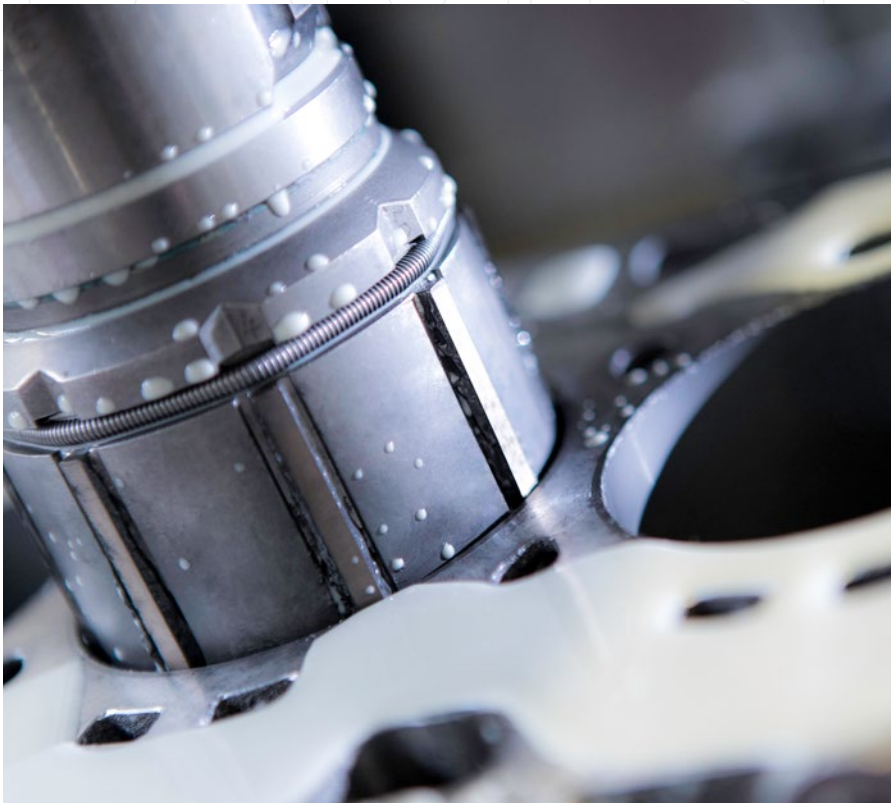
- High adhesive strength
- Saving on coating material thanks to both low roughness and high adhesive capability
- Suitable for cast iron and aluminum
- Use with two-stroke engines
- High level of flexibility in the form of the structural topography thanks to parameterization
- Suitable for all thermal coatings
- Laser roughening is tested in series production
- Economical series operations because no tool costs are incurred
- No mechanical damage to the the surface, but thermal structuring

Honing technology and function optimized surfaces



As a metal-cutting fine machining process, honing is primarily used in the machining of bores. The process improves dimensional and shape accuracy and optimizes tribological properties. The overriding objective is to reduce friction. Savings in energy and material use, 12 honing technology and function-optimized surface production and maintenance allow us to make a decisive contribution to conserving energy and raw material resources with our honing technology - one of the central points of our corporate statement „Team Gehring“.

CHNOLOGY CTION SURFACES



For more than 90 years, we have been following our claim to launch innovative technologies in order to respond professionally, quickly and successfully to the latest requirements. With formhoning, for example, we present the forward-looking technology for reducing emissions - and are a reliable partner for our customers in implementing the international requirements for lower CO2 emissions.

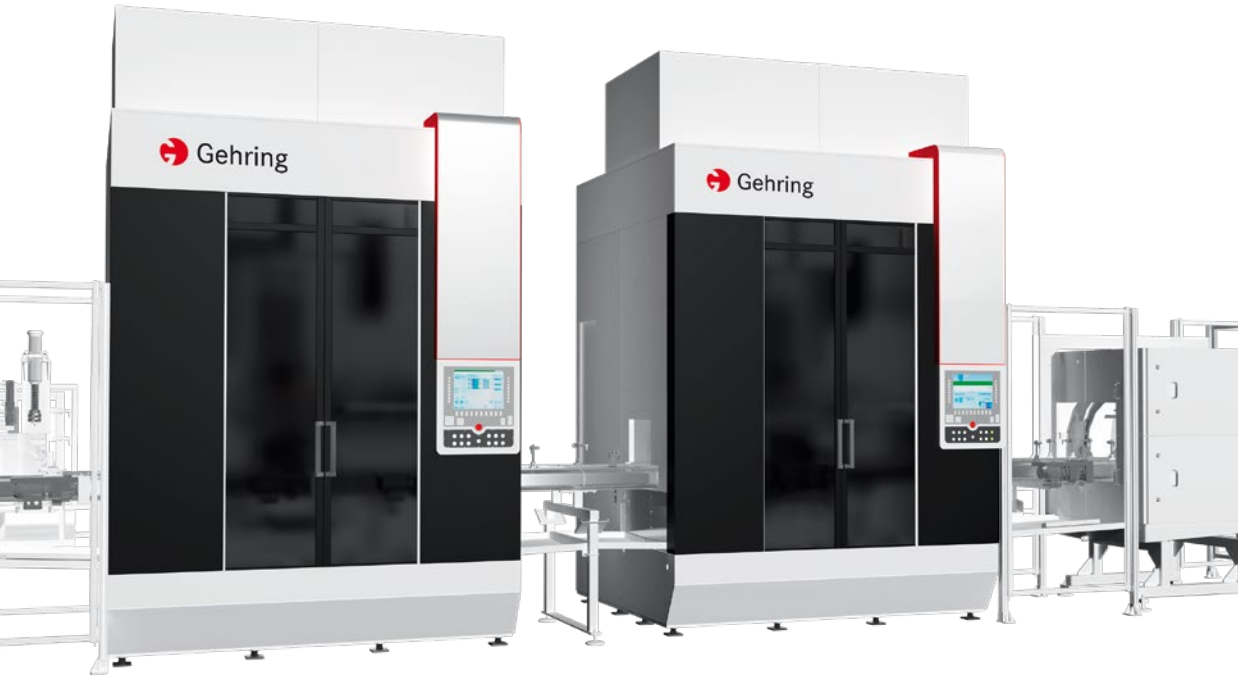
Machines and systems

powertrainhone

The powertrainhone series is used in the automotive industry in particular. Its typical areas of application include all types of cylinder crankcases in which the cylinder surfaces and the crankshaft bores need to be machined. The efficiency of modern combustion engines can be increased by means of the design of cylinder surfaces and their geometry.

Specifically designed process chains and honing systems enable the production of geometric tolerances in the range of a few micrometers with a precisely defined surface profile. Among other things, shape honing - e.g. with a widened bore outlet for friction reduction - is mastered reliably.

Depending on the production strategy and your requirements, we offer a wide range of solutions. Our modular series open up a wide range of solutions for production scenarios thanks to their configuration options with multiple workspaces and scalable number of spindles. Our transfer lines are a conventional and interesting alternative for large volumes with low type variance.



TEMS

lifehone

The lifehone series is used to machine a wide variety of workpieces, from pneumatic and hydraulic parts to control blocks and injection pumps to connecting rods and cams. The modular machine design for vertical and horizontal honing centers as well as transfer machines allows customer-specific configurations of the individual work and function stations as well as the workpiece transport. Specific, highly productive solutions for gear manufacturing such as multi-spindle honing centers for gear, sun and planet gears from vehicle transmissions round off the lifehone series.

deephone

Workpieces with lengths or diameters reaching up to several meters can be machined efficiently and in high quality on machines from our deephone series. Main applications come from the aerospace, energy and food industries.

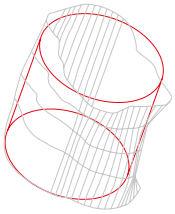
With lengths of up to 10,000 mm, the horizontal machining machines of the deephone division can be adapted to the respective workpiece. A wide range of tasks is also covered by different vertical honing centers.

laserstructure

Structured surfaces can help increase the transmittable torque between two parts. On our laserstructure series, for example, connecting rod bores for anti-rotation of bearing shells can be structured with laser technology.

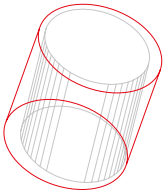
The laser roughening process is determined by the innovative rotating optics and is used for pre-machining for thermal coating. Due to the compact design of our machines, twin machining of two cylinder bores in one crankcase is possible at the same time.

Forward-looking technologies



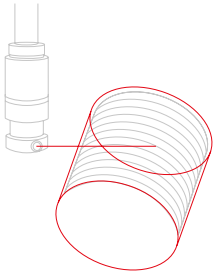
Form honing

With form honing technology, we offer the ideal process to successfully meet current regulations for CO2 emissions. Form honing simulates the deformation of cylindrical shapes of combustion engines during honing, which results in a nearly cylindrical shape under operating conditions. This influences the emissions, oil and fuel consumption.



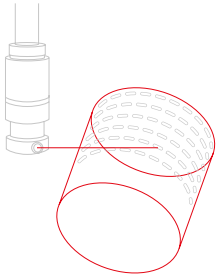
Position honing

Position honing aims at shortening the process chain of cylinder block production without reducing the final quality. Position honing combines fine boring and rough honing in one step, improving not only size, form and surface accuracy, but also positional accuracy such as perpendicularity and bore position.



Laser roughening

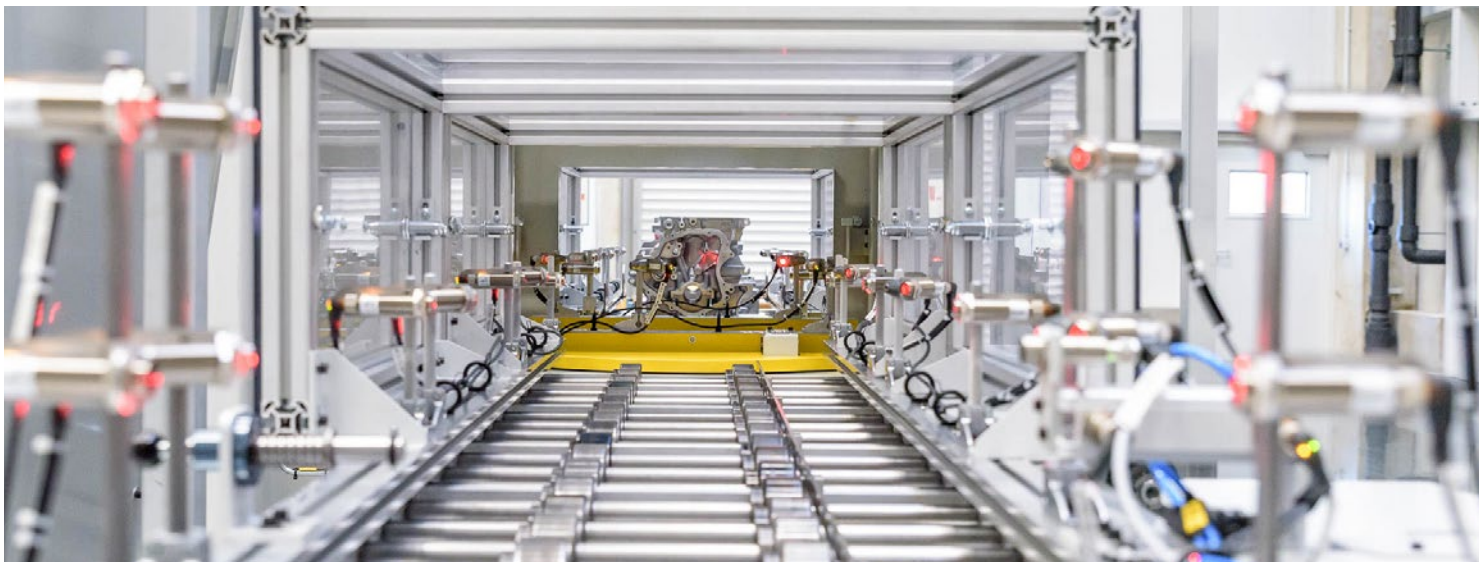
Laser roughening is an innovative and economical process for modern series production of cylinder crankcases.
As a pretreatment for the process of thermally coating cylinder bores, the surfaces are roughened using a laser. Provided appropriate parameters have been selected, this results in the formation of the profile roughness best suited to the function – in the case of both aluminum and cast iron. It is only the overall effect of the adhesive pull functions that creates a high adhesion strength.



Laser structuring

Laser structured surfaces enhance static friction and serve as absorption of torques and shear forces. Elevated micro structures achieve a rigid connection of components. Friction based connections with laser structured surfaces are applied, for example in crank bores on connecting rods, cast cams and spur gears.

Automation



Gantry systems and roller conveyors for entire honing systems

Gehring's automation systems with standardized functional assemblies are now available to implement the process chain for Gehring honing systems with even greater ease.

We design, produce and assemble these systems ourselves to make the whole process simple and uncomplicated for you. The result is the ideal solution for you that corresponds to the weight and workpiece size. The roller conveyor with lowering unit or Gehring's new gantry loading system ensures that the workpiece is passed through the process smoothly.

We are flexibly equipped to meet your requirements and can configure the ideal solution for you with our standardized assemblies. Integrated pre-control or post-gauging stations and rotary, lifting and transfer stations are adapted according to the layout. Gehring's unloading stations are designed specially for cleaning engine blocks, providing the ideal addition to our transport systems.

In interlinked systems, we therefore provide you with the ideal solution for minimizing leakage of cooling lubricant, in addition to conveying.

Gehring loading and unloading systems – interface to the customer's automation system

To facilitate workpiece handling for you, Gehring has developed its own loading and unloading system. Enjoy the benefits our transport system has to offer and utilize its high level of flexibility in your series production processes.

Honing tools and abrasives

Precision and longevity are the hallmarks of our tooling systems.

With our tooling systems, we guarantee the highest level of efficiency, optimized surfaces and highly accurate bore geometries.

Tooling system DH series

The newly developed multi-rip honing tool of the DH series is characterized by its wide range of applications. The DH series is used for honing bores in a diameter range of 37 - 600 mm.

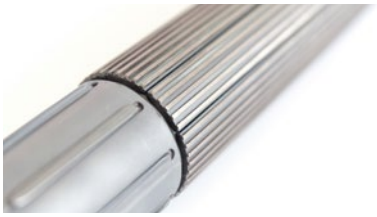
Tooling system PT series

Multi-stone PT tooling system is designed for honing bores with a diameter range of 68 – 110 mm. Cylinder crank cases in the most diverse models are applications for the PT series.

OLS
ASIVES

Tooling systems TN/TS

The multiple-stone honing tools of the TN/TS series is used for the honing of bores with a diameter range of 5–1,000 mm.



Crankbar honing tool

The crankbar tool is designed for the machining of bores with a diameter range of 45-80 mm.

Abrasives

Made of synthetic diamonds or cubic boron nitride (CBN), both available in different in different grain sizes and crystal types.

Tooling system L series

For honing high-precision bores with a diameter range of 3–15 mm. This joint features high concentric accuracy (≤ 5 µm) as well as the transfer of high torques and axial forces.

Bushing tool

The bushing tool is designed for special machine concepts and can finish bores with the diameter range from 60-190 mm. However, in shipbuilding, this bushing tool can process bores up to a diameter of 360 mm. Typical product applications for this tool are cylinder liners for larger engines.

Gear tool

The gear tool is suitable for the machining of bores from Ø 20-60 mm. It is characterized by the high-precision guidance of the feeding cone and adapted to our gearwheel fixture. A longer service life is possible through the use of compact frames. This tool is typically used for gears.

Digital Solutions

Our “Digital Solutions“ business segment enables us to apply new possibilities of IT networking in order to increase the efficiency of our honing systems. Here, we want to provide solutions in the fields of customer platform, maintenance & repair and production analytics.

With these solutions, we improve the access to system specific and customer specific information. Bottlenecks in honing systems are identified by the targeted analysis of productive data and downtimes of machines are reduced.

For our customers, we want to provide general starting points for bench marking in the field of Digital Solutions.

Connectivity and augmented reality

We enable our customers to be directly and conveniently supported by Gehring experts anytime through our Gehring Connection Module. The box allows for a secure and reliable access to your machine. Independent of business processes in IT, we hereby provide our customers with an opportunity for direct, quick and professional support via our remote service. We guarantee that the data control is always with our customers.

Platform support

We offer platform solutions with our IT specialists in order to offer a broad range of networking options to our customers. Hereby, we can define high standards of cyber security and cyber safety.

Engineering solutions for honing and laser processes

Honing and laser processes are subject to complex influential factors, which require a high level of expertise to be fully understood in numerous applications – expertise which we have built up over more than nine decades. We are happy to share our knowledge with our customers and support them with the installation of new processes, the introduction of innovative technologies and the determination of new specifications in the manufacturing of complex components.

We offer:

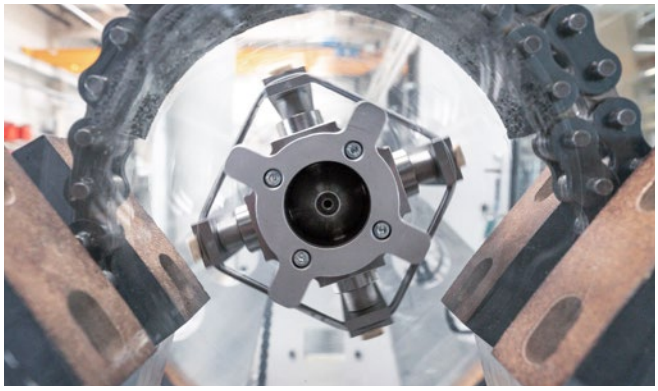
- Honing in various forms
- Laser structuring
- Laser-based and mechanical roughening processes
- Coating technologies

Process development and Technology support

Our experts assist you in defining the correct process chains and parameters and advise you regarding the optimal part properties relevant to the manufacturing technology being used. We want our customers to successfully achieve the absolute optimum in terms of product and production properties.

Honing trials and job honing

We offer our customers the option to perform honing trials as we want to guarantee high assurance in the process control. We can process your prototype jobs for small and medium size quantities offering you a temporary, economical and feasible addition to your production capacity.



Total Customer Care

360- degree support – we meet your individual requirements

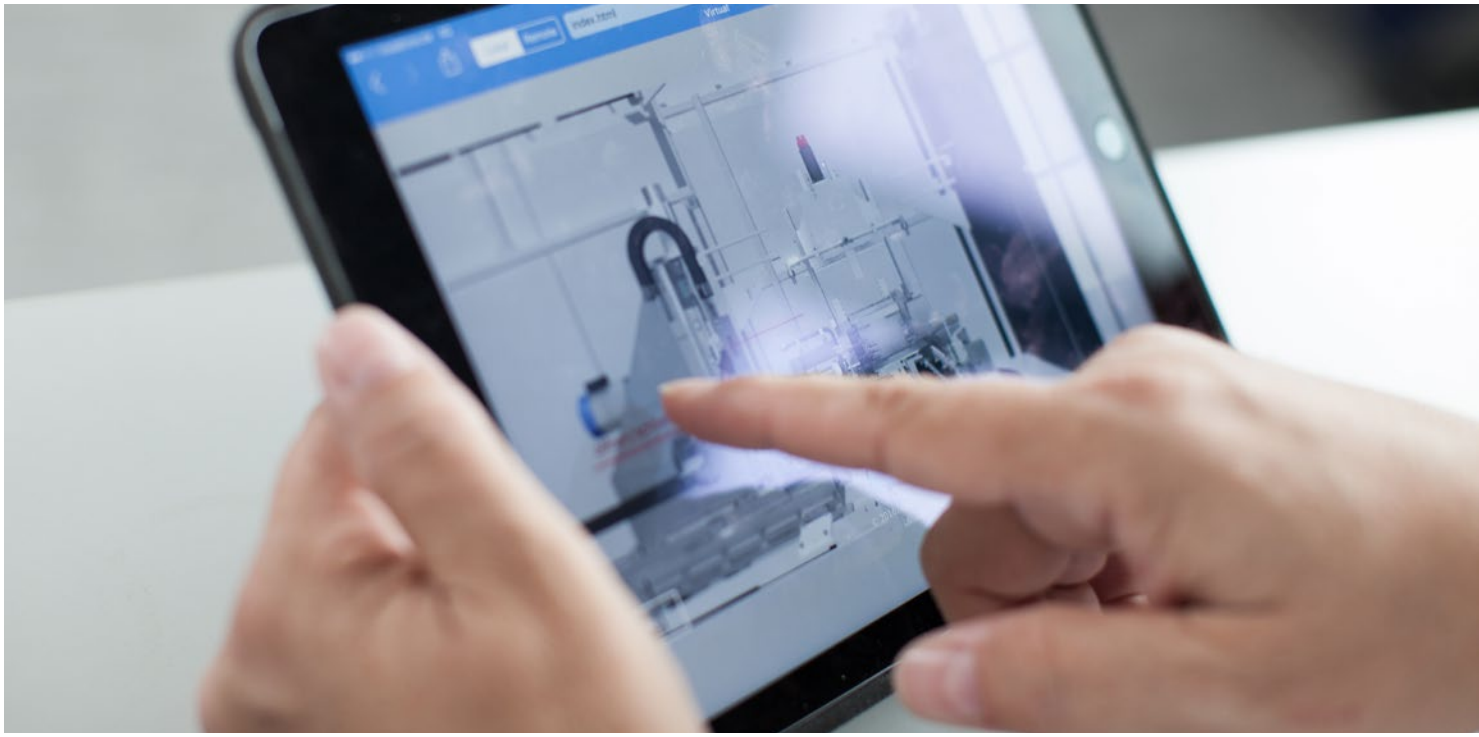
A high performance product needs assistance that is of high quality during the entire life cycle and in all aspects of the production cycle. Our Total Customer Care can support you with any of your concerns.

Academy

Only with highly qualified operational and maintenance personnel, can ideal manufacturing quality be achieved. In order to guarantee this, we have developed comprehensive training programs which meet your individual requirements. Our academy is certified by the TUV testing body and provides training to our clients and our employees alike.

Refurbishing and updating

The processes of machining new workpieces or changing production concepts call for production systems with modern components. Together with our clients, we devise suitable concepts and make their machinery ready to handle new tasks.



R CARE

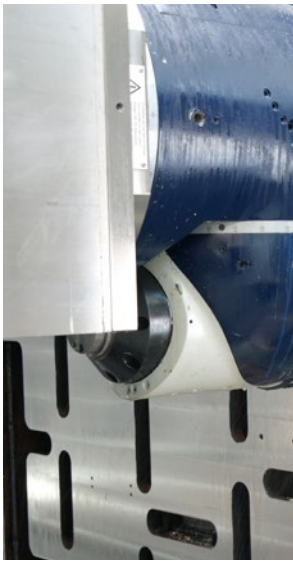
Spare Parts

For todays' production scenarios, it is essential to have a broad and easily accessible range of spare parts available. Our experts can advise you about onsite stocking and component availability. That is how we guarantee that machine downtime can be reduced to a minimum.

Service & Hotline

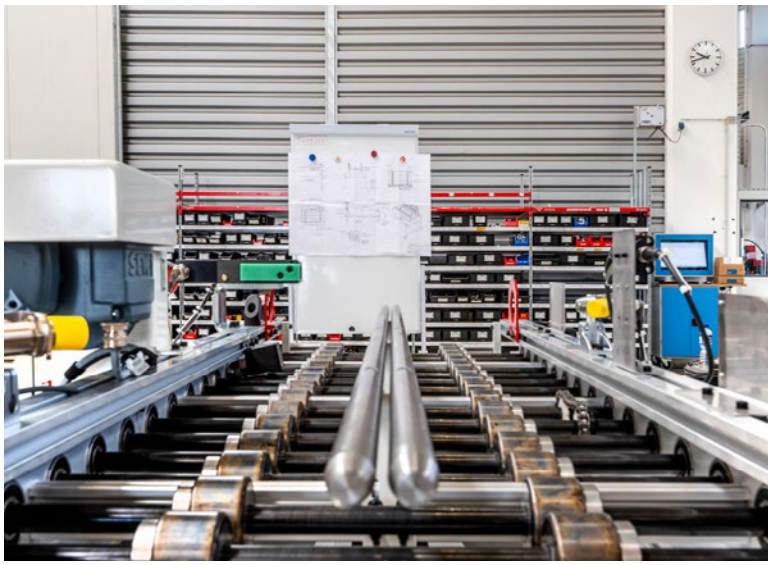
We are happy to assist you with any problems and issues that might arise. Our hotline provides direct support for systematic troubleshooting. Our global team of experienced service technicians can support you at your site for both preventative maintenance and production problems. Due to our global presence and expansive service network, we are always closely available and ready to help you.

Efficient machining of large parts at Gehring Production



Your advantages

- Mechanical processing in large dimensions and highest precision
- Many years of experience in machining of weldments
- CAD-CAM coupling - your CAD model as a basis for our machine programming
- Heat treatment of your workpiece
- Low throughput times
- Production capacity on an area of 8,700 sqm



Machine portfolio	Dimensions (l x w x h)	Accuracy
Boring mill Soraluce FS14000	14000 x 3300 x 1600	0,03 mm
Boring mill Soraluce FS10000	10000 x 2800 x 1500	0,03 mm

Technical changes and deviations in design and equipment reserved

Machining center

Precision in large format

- Large, heavy, precise
- Up to 20 tons
- All metal materials
- CAD - CAM coupling
- From the idea to the finished part

Diameter control of the honed raceway

Diverse material processing

We can machine for
you the following material:

- Structural steel
- Aluminum
- Cast iron
- Cast aluminum
- Stainless steel

Other materials on request.

CAREER

Career

Be Part of the Future. Electrifying Possibilities.

Realize your professional goals with the entry into a future-oriented mechanical engineering company.

Gehring embodies the combination of experience and innovation. We always look to the future, keeping tomorrow's trends in focus. Continuous reflection on our work is an integral part of our corporate culture, as is the ongoing optimization of our products and services.

Global presence

With a presence on three continents and a total of 14 branches, we are very well positioned and ideally equipped for the increasing globalization of the world economy.

In addition, our representatives around the world provide competent support and are your direct contacts in the market.

Gehring locations

- Ostfildern (Germany)
- Naumburg (Germany)
- Paris (France)
- Farmington Hills (USA)
- Silao (Mexico)
- Shanghai (China)
- Bangalore (India)

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