

Setting ideas in motion

Rotary unions · Electrical slip rings · High-precision air bearings
Test rig equipment · Minimal-quantity lubrication



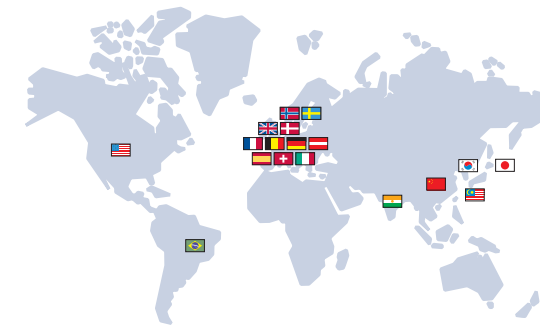
GAT[®]
Gesellschaft für
Antriebstechnik mbH

www.gat-mbh.de



Challenge us – we will provide the right solution

For over 30 years GAT (Gesellschaft für Antriebstechnik mbH) has been an expert for fluid and sealing technology. Our extraordinary reputation rests on convincing concepts and sophisticated technology. With more than

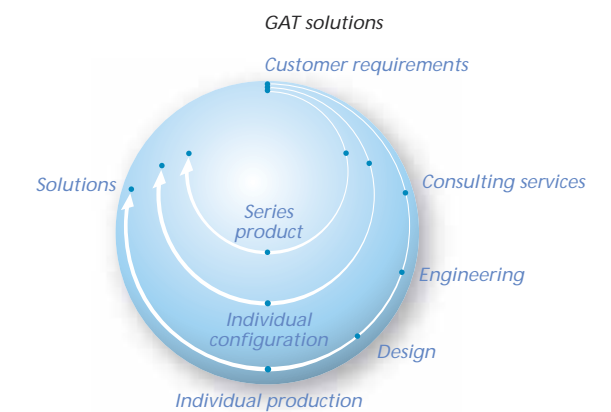


120 employees GAT develops, manufactures and sells a wide range of rotary unions, electrical slip rings, high-precision air bearings, torque motors and minimal-quantity lubrication systems. Thanks to our 18 sales offices around the world we are always close to our customers, providing competent consulting services and direct support.

GAT focuses on custom solutions to meet the highest expectations. That is why our

sales efforts are mainly dedicated to a thorough application analysis carried out by our engineers and product specialists. With their expert knowledge of a broad range of industries they are able to solve complex tasks. Even when faced with completely new challenges our seasoned consultants simply know what is technically feasible.

The continuous development of products and production processes as well as the ongoing extension of employee know-how express the passion we share for perfection and reliability. A powerful company resources planning system and transparent process control ensure reliable production processes and short delivery times. After production and before leaving the company, all finished products are thoroughly tested to guarantee superior quality, because in the end customer satisfaction is the only thing that counts.



Headquarters and production site at Geisenheim, Germany



Air-conditioned production



Exhibiting at international trade shows



Devising solutions together with the customer



3D-CAD and FEA software



Assembly by trusted hands



Proven references: Technology for many industries

Our technically elaborated products are used wherever uncompromised reliability under the most adverse operating conditions is crucial. When it comes to ensuring system availability our products play a key role:



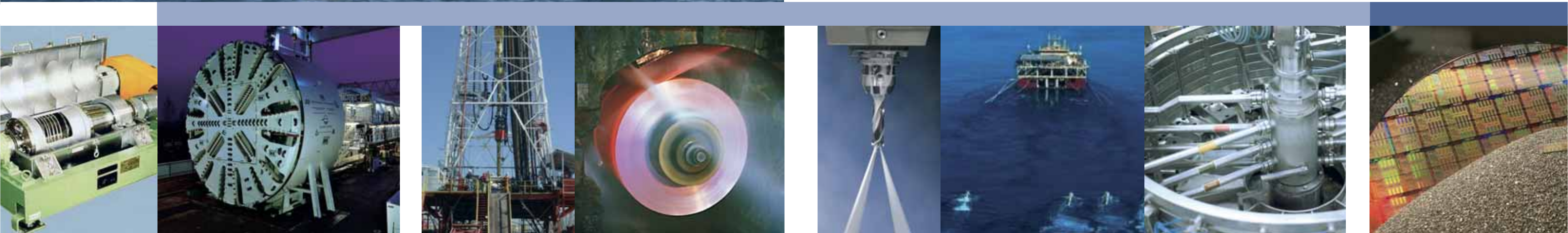
- In wind turbines, our hydraulic rotary unions and slip rings allow correct adjustment of blade pitch to wind direction, even under rough conditions.
- Thanks to the reliable supply of coolant to milling spindles, production runs smoothly even at high utilization rates.
- The production rates of rolling mills can be increased as the rotary union ensures a reliable supply of hydraulic fluid to the spindle - even at high speeds.
- Highway tunnels are driven through mountains in record-breaking time

thanks to special rotary unions providing effective protection against abrasive rock dust.

- GAT slip rings allow ships to perform seismic ocean-floor scanning at unprecedented speeds.
 - GAT is the product manufacturer of choice for the petroleum industry to further reduce downtimes.
- Products from GAT are used in critical situations and in various production plants and machines.

GAT industry expertise

*Wind turbines Tooling machines Rolling mills
 Tunnel-boring machines Petroleum industry
 Semiconductor production
 Human centrifuges Packaging machines
 Injection-molding machines Water turbines
 Solar cell manufacturing Special machines
 Separating centrifuges Crane manufacturing
 Transmission manufacturing
 Seismic Seabed Mapping Bottling machines
 Automotive painting lines
 Vacuum coating technology
 Vessel winches Robots Torsion test rigs
 Vacuum technology Theater stages
 Pharmaceutical industry*



Centrifuges

Tunnel-boring machines

Oil-drilling systems

Rolling mills

Machine tools

Seismic measuring systems

Packaging machines

Production system for semiconductors

Our principle: First-class functionality

GAT products embody more than 30 years of experience gained from the development of solutions for the fluid and sealing technology resulting in more than 150 patents. A high degree of flexibility allows us to provide a wide product range of custom solutions in small quantities as well as standard solutions in high quantities. All products offer utmost precision and reliability: From 500 gram emulsion rotary unions to 4 ton hydraulic rotary unions, from 150-channel slip rings to ultra-high precision air bearings. Using the best ideas and latest technologies we continue to enhance our products. Each product is carefully optimized to the respective operating requirements. Although custom solutions are at the center of our efforts we also offer a wide range of standard products.



GAT rotary unions: Reliability for production

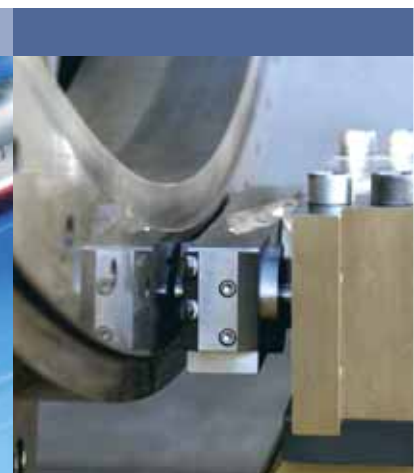
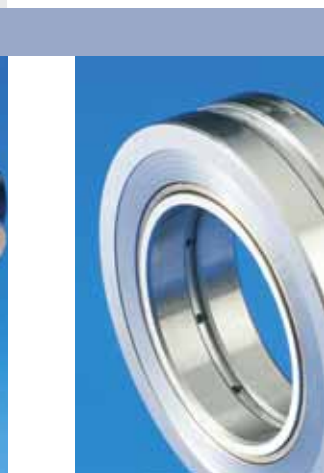
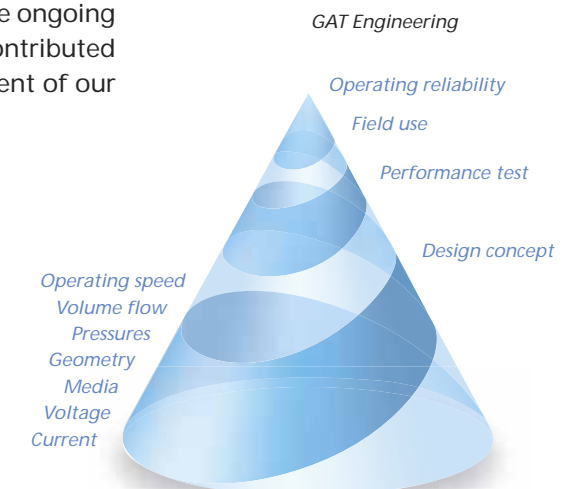
High-performance rotary unions are employed in many industries to transfer the most diverse media between fixed and rotating machine elements. Depending on the application, the requirements for rotary unions vary.



To offer the best solution for any kind of application GAT has developed eight different sealing systems, including: Leakage-free elastomer seals with optimized sealing ring profiles featuring wear-resistant shaft coatings, ceramic mechanical seals with hydrostatic wear-reduction and contactless gap seals of various geometries for high-performance rotary unions. To obtain a compact comprehensive solution for specific applications the systems can be combined with each other.

The long-term use of our rotary unions under the most adverse conditions and the ongoing

exchange with our customers has significantly contributed to the continuous development and enhancement of our products.



Rotostat E
Rotary union with radial gap

Rotostat N
Sealing system with axial gap

Rotodisk S
Single-channel axial rotary union with hydrostatically released mechanical seal

Rotodisk S AK
Rotary union with mechanical seal for emulsions, air or oil mist

Rotodisk SW
Mechanical seal cartridge for radial supply

Rotopack
Rotary union with elastic contact seals, leakage-free

Rotovac
Vacuum rotary union with ferro-fluid seal

Rotocal
Radial rotary union for large shafts with diameters of up to 3 m



Where advanced technology meets efficiency

For power and data currents:

GAT electric slip rings

Proven gold/gold technology is used for the transfer of high power currents, fine analog measurement signals or high-speed digital data. Using this combination, highest contact quality and unsurpassed product life can be achieved. Besides, there is no more need to remove abrasion dust. A low electric noise level ensures the reliable transfer of signals of all current BUS systems, including Fast-Ethernet. Due to their modular design our slip rings can be configured for individual solutions and countless applications. The result is a very compact design that can be complemented with an integrated rotary union. Thanks to various industry-standard connectors the system can be installed easily. Fiber-optical rotary joints are available for extremely high data rates. By using a modular design the slip rings can also be configured for individual solutions and a number of applications. The compact dimensions allow for the integration of a rotary union.



All air, no friction:

Aero-static air bearings from GAT

Wherever ultimate speeds or micro-meter positioning accuracy are required, our spindle and linear guide units with air bearings are the system of choice. Based on our proven micro-jet technology our air bearings offer unique durability and a long service life and are adapted to meet individual application requirements.

Rotokombi slip rings for versatile use:

Transferring as well gas, oil and water

All of our sealing systems and slip rings can be bundled into complete systems, allowing the transfer of different media at different pressures and also currents by one single unit. Each rotary union is carefully adjusted to its operating requirements.

Economic efficiency put to test:

GAT test rig technology

Wherever drive elements must be tested to the most demanding conditions, our hydraulic torque motors or hydro swingers come in. Their compact design and the hydrostatic rotor bearing make them first choice for highly dynamic tests. Mechanical power circulation adds to the system's efficiency.

Simply a clean solution:

GAT minimal-quantity lubrication

The conventional use of traditional coolant lubricants for cutting processes is expensive and can cause health and environmental hazards. Therefore, our minimal-quantity lubrication is a smart alternative for many applications as it increases productivity and reduces costs.



Electrical slip ring ESW
Hollow-shaft slip ring

Electrical slip ring ESR
System with quick-release standard industry connectors

Rotoguide
Frictionless high-precision bearing for shafts and guides

Rotospray
Rotary atomizer with air bearings for automotive painting lines

Test rig technology
Torque motors and complete test rigs for the testing of drive elements and components

IMQL: Internal minimal-quantity lubrication
Systems for residual-free consumption lubrication for the significant reduction of manufacturing costs



Rotostat E: Radial gap seal

This seal features a contactless sealing system with a hydrostatically controlled radial gap and is suitable for high rotation rates of up to 40,000 min⁻¹ and very high pressures of up to 600 bars. Pressure and rotation rate are independent of each other. The sealing system trans-

fers oil, water or gas and can be used for a number of purposes such as rotary clamping systems, blade pitch control, pusher centrifuges or high-speed down coilers in mills.

Media	Oil	Emulsions	Water	Air	Gas		
Pressure (bar)	10	20	50	100	200	500	1,000
Operating speed (min ⁻¹)	100 · · · 1,000 · · · 10,000 · · · 100,000						
Channel Ø (mm)	6	10	16	25	40		
Attachment	Radial	Axial	Cartridge				
Channels	1	up to 10					



Rotostat N: Gap seal as cartridge element

This seal comprises a cartridge element with a hydrostatically controlled axial gap seal for the radial supply of media. It is used for high flow rates of up to 700 l/min and high pressures amounting to 250 bars. The system is

also available as a complete rotary unit for particularly rough applications like pusher centrifuges or down coilers in mills.

Media	Oil	Emulsions	Water	Air	Gas		
Pressure (bar)	10	20	50	100	200	500	1,000
Operating speed (min ⁻¹)	100 · · · 1,000 · · · 10,000 · · · 100,000						
For shafts Ø (mm)	30	80	140	200			
Channel Ø (mm)	6	10	16	25	40		
Attachment	Radial	Axial	Cartridge				
Channels	1	up to 4					



Rotostat A: Axial gap seal

With a hydrostatically controlled axial gap seal this seal is ideal for midrange pressures. It is used for oil and water-based liquids and is suitable for high speeds of up to 30,000 min⁻¹ and pressures of up to 80 bars. Due to its compact design, the Rotostat A is often used for the radial supply of cooling lubricants or hydraulic fluid for clamping applications in machine tools.

Media	Oil	Emulsions	Water	Air	Gas		
Pressure (bar)	10	20	50	100	200	500	1,000
Operating speed (min ⁻¹)	100 · · · 1,000 · · · 10,000 · · · 100,000						
For shafts Ø (mm)	30	50	65	80	100	125	150
Channel Ø (mm)	6	10	16	25	40		
Attachment	Radial	Axial	Cartridge				
Channels	1	up to 2					



Rotopack: Contact seal

This sealing system comprises a series of leakage-free axial and radial, single or multi-channel rotary unions with elastic contact seals for high pressures of up to 450 bars and low rotation rates. Thanks to many different sealing elements and materials these rotary unions are of universal use and suitable for almost any medium.

Media	Oil	Emulsions	Water	Air	Gas		
Pressure (bar)	10	20	50	100	200	500	1,000
Operating speed (min ⁻¹)	100 · · · 1,000 · · · 10,000 · · · 100,000						
Channel Ø (mm)	6	10	16	25	40		
Attachment	Radial	Axial	Cartridge				
Channel	1	up to 25					



Rotodisk S: Mechanical seal

This seal comprises a single-channel rotary union with hydrostatically released contact seals made of extremely durable, ultra-hard ceramic. The system is suitable for highest rotation rates of up to 100,000 min⁻¹ and pres-

sures amounting to 230 bars. Pressure and rotation rate are independent of each other. Emulsions, oil or air are supplied to milling or deep-hole boring machines.

Media	Oil	Emulsions	Water	Air	Grease		
Pressure (bar)	10	20	50	100	200	500	1,000
Operating speed (min ⁻¹)	100 · · · 1,000 · · · 10,000 · · · 100,000						
Channel Ø (mm)	6	10	16	25	40		
Attachment	Radial	Axial	Cartridge				



Rotodisk SW: Mechanical seal as cartridge element

This system features a cartridge element with a compact double slip-ring seal and is employed for the radial supply of emulsions. It handles pressures of up to 70 bars at

rotation rates of up to 6000 min⁻¹ and is mainly utilized in milling heads and driven tools with internal coolant supply.

Media	Oil	Emulsions	Water	Air	Grease					
Pressure (bar)	10	20	50	100	250	500	1,000			
Operating speed (min ⁻¹)	100 · · · 1,000 · · · 10,000 · · · 100,000									
For shafts Ø (mm)	25	30	35	40	50	65	80	100	125	150
Channel Ø (mm)	6	10	16	25	40					
Attachment	Radial	Axial	Cartridge							



Rotovac: Ferro-fluid seal

Vacuum rotary unions with ferro-fluid seal transmit rotary motion and media into vacuum applications or transfer vacuum from fixed into rotating components.

The unions are ideal for processes demanding a high degree of cleanliness and ultra-high vacuum applications.

Media	Vakuum					
Pressure (mbar)	10 ⁻⁸	10 ⁻⁶	10 ⁻⁴	10 ⁻²	1	
Operating speed (min ⁻¹)	100 · · · 1,000 · · · 10,000 · · · 100,000					
Channel Ø (mm)	6	10	16	25	40	
Attachment	Radial	Axial				



Rotocal: Sliding-shoe seal

Radial rotary unions for shafts with very large diameters of up to 3 meters. Media is transferred only via a section of the rotor perimeter. Particularly when used in applications with large shafts the patented technology ensures minimal leakage losses and is suitable for all media. Typical applications include fermentation plants, mining machinery, propeller pitch control and more.

Media	Oil	Emulsions	Water	Air	Gas		
Diameter (mm)	100	300	1,000	3,000			
Pressure (bar)	10	20	50	100	200	500	1,000
Peripheral speed m/s	1		20				
Attachment	Radial	Axial					



Rotoflux: Electrical slip rings

Gold spring wire running on gold-plated contact rings is our preferred transfer method. Even with 200 channels the system is rather short. If required, air channels or various rotary unions can be added. Among the typical

applications are rotary tables, wind turbines, packaging machines, tooling machines, theater platforms.

Transfer	Power currents
	Analog signals
	Digital data
	Fiber-optical signals
	Air (optional)
Voltage (V)	0.001 0.01 0.1 1 10 100 1,000 10,000
Currents (A)	0.001 0.01 0.1 1 10 100 1,000
Number of poles (max.)	12 20 30 50 80 160 300
Operating speed (min ⁻¹)	1 10 100 1,000
Compressed air (opt.)	G ¼ G ½ G 1 G 1 ¼



Rotospray: Rotary atomizer

Rotary atomizer using air bearings with a flow rate of 1,200 ml/min at 70,000 min⁻¹. The micro jet air bearing with a high load capacity is perfect for robotized applications. Special bearing materials for high durability.

Pneumatic high-performance turbine with low air consumption.

Media	Air
Operating speed (min ⁻¹)	1,000 · · · 10,000 · · · 100,000
Flow rate ml/min	100 · · · 1,000 · · · 10,000



Rotokombi

By integrating different rotary unions into a single system, different media can be transferred at the same time at different pressures. Electrical slip rings can be added to transfer electric current. This combination system is designed for very high rotation rates.

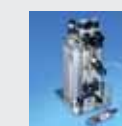
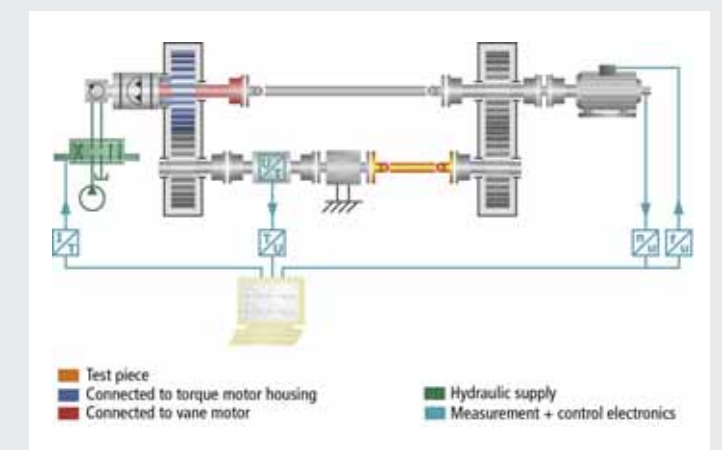


Test rig technology

Designed for the testing of drive elements and components with alternating loads. For the simulation of complex loads relative movement can be superimposed with torques of 120,000 Nm and rotation rates of 20,000 rpm.

Pressure and rotation rate are independent of each other. Power circulation helps to save energy.

Concepts	Torque test rig				
	Torque test bench				
Application areas	Product life	Rigidity			
	Efficiency	Vibrations			
Test samples	Transmissions Shafts	Clutches			
	Shaft-hub joints	Drive elements			
Torques (Nm)	100	1,000	10,000	100,000	1,000,000
Operating speed (min ⁻¹)	100	1,000	10,000		
Control parameters	Independent				
Loads	Static	Rising			
	Dynamic	High-frequency			
Operating costs	10%				100%



Rotojet A

IMQL: Internal minimal-quantity lubrication for the reliable lubrication of cutting points. Oil aerosols are created outside of the spindle and are supplied via a single-channel system – even over long distances. Very

simple dosing adjustment by automatic tool detection. Easy to operate and service.

Application	Turning Milling	High-speed cutting			
	Drilling	Deep-hole drilling Reaming			
	Tapping Thread molding				
Supply	Internal / external lubrication				
Lubricant (ml/h)	5	10	20	50	100
Manufacturing costs	100%				



It's all about quality

Repairs are as annoying as downtimes are costly. We at GAT take every effort to develop and manufacture products that yield a long service life and utmost reliability. GAT products are subject to long operating periods, extreme loads and demanding operating conditions. That is why all parts must be manufactured as accurately as possible.

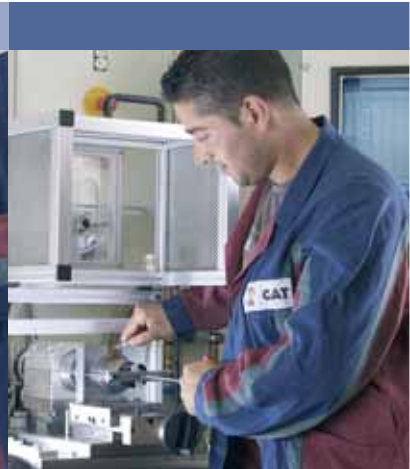
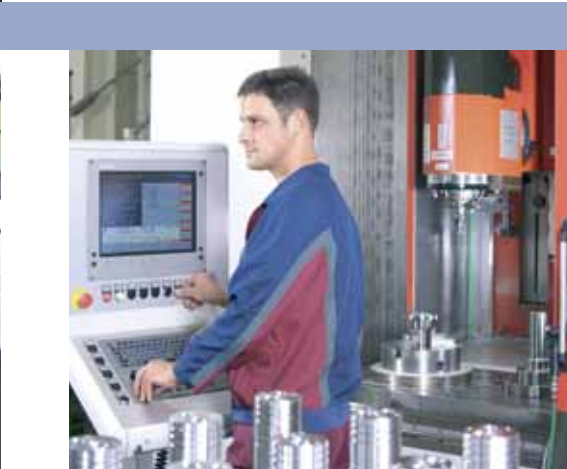


During the initial product design only cutting-edge processes and high-quality materials are used. GAT products are developed with the help of powerful 2D and 3D CAD systems, and FEA serves for the simulation and optimization of critical parts. Machining to minimal tolerances and assembly take place in air-conditioned rooms and in compliance with strict cleanliness requirements. Any tests during the manufacturing process are carried out with modern electronic testing devices. Each product is subject to a final quality check under customer-specific testing requirements, making sure that all functions work properly. Finally, a quality management system in compliance with DIN ISO EN 9001 ensures a consistently high quality of all processes.

With our proprietary quality concept our customers can rest assured that components from GAT are the most durable and reliable parts of their equipment and offer high technology with a long service life.



GAT quality concept



Precision manufacturing on a CNC turning machine

Quality control using electronic measurement devices

Checks using geometry tester with air bearings

Precision machining on a CNC machine

Fully automatic dynamic wet test

Run-in on a computer-controlled test rig



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