

# REISHAUER

Gear Grinding Technology

## Tool Technology



MACHINES

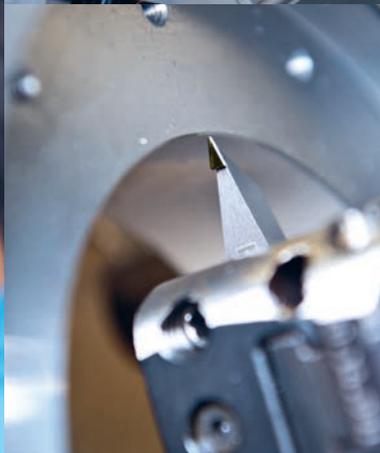
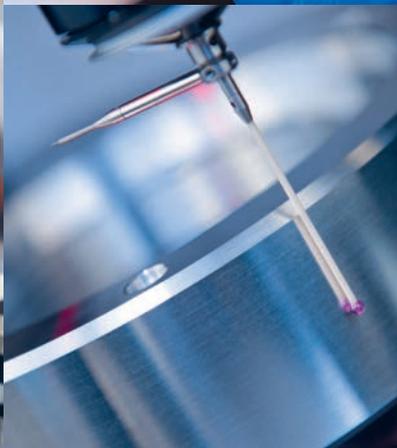
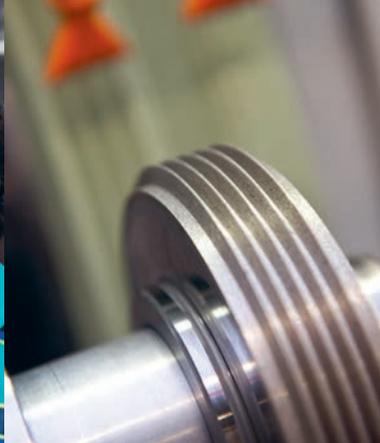
PERIPHERAL SYSTEMS

**TOOLING**

TECHNOLOGY

SERVICES

# Precision Tools for Gear Grinding Processes



# Circle of Competence



**Wälzmaschinen**  
Grinding Machines

**WÄLZMASCHINEN**

**TECHNOLOGY**

**Schleifen** Grinding

**Abrichten** Dressing

**Messen** Gear Measurement

**Analysieren** Inspection

# You can expect more from Reishauer ...

## Cutting edge technology for seamless processes

Dynamic. Forceful. Stimulating. We have made a lot of things move better over the past 230 years: threads, grinding worms and above all gears. Today, as a system and turnkey supplier we develop cost-effective manufacturing equipment in our Gear Grinding Technology department to produce highly productive machines – each tailored to your individual requirements. And you benefit from the seamless interaction between continuously optimized machines, tools and processes.

That is the Reishauer Tooling Circle of Competence. Our continuous process chain for gearings sets standards in quality, process reliability, flexibility and cost reduction. Learn how you can ensure that decisive competitive advantage – hand-in-hand with Reishauer.

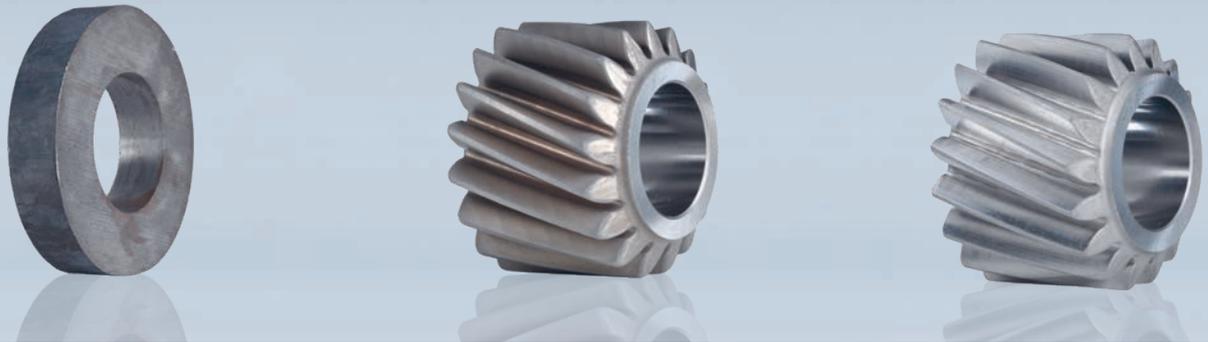
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Wallisellen



Pfaffnau

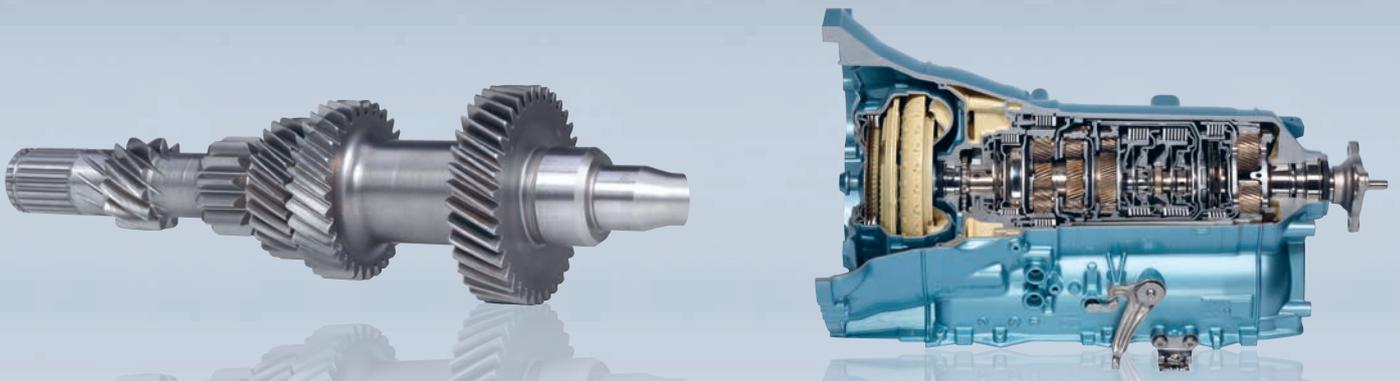


### Tooling know-how from a single source

At Reishauer we exploit synergies: As a manufacturer of precision grinding machines we are well and truly versed in all aspects of grinding, dressing and clamping – including the most complex applications. Consequently, you receive state-of-the-art tooling technology and up-to-date application know-how from a single-source supplier.



... because we are able  
to offer you the entire  
process chain



#### **We take a systematic approach to develop tooling solutions**

Our process competence offers you the benefit of receiving comprehensive technical support to deal with all of the challenges involved with hard gear finishing. We analyze and assess your requirements in great detail, before we develop an individual solution. This gives us the opportunity to offer you tool technology that fulfils the highest demands on precision combined with the highest level of cost consciousness.

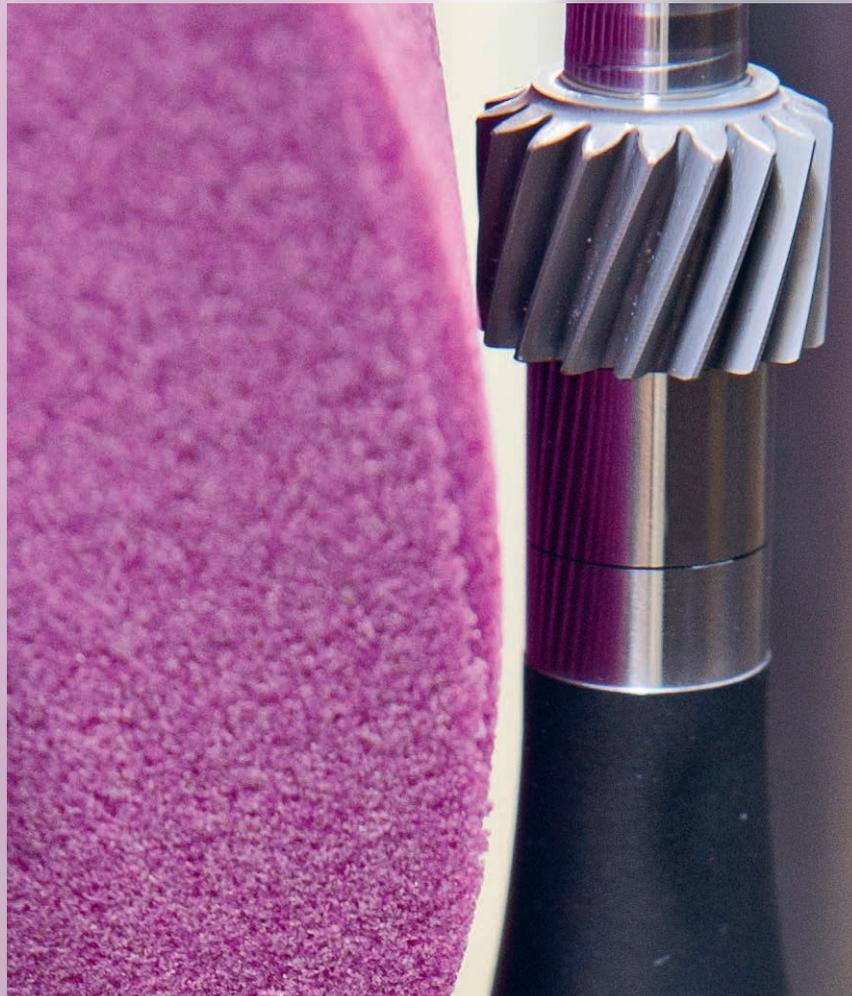
#### **Fully committed to improvement**

You benefit from attractive life-cycle costs, because the initial investment is more than offset by lower follow-up costs over time. Our team of gear specialists contributes to this goal with optimized gear grinding and dressing tool designs.

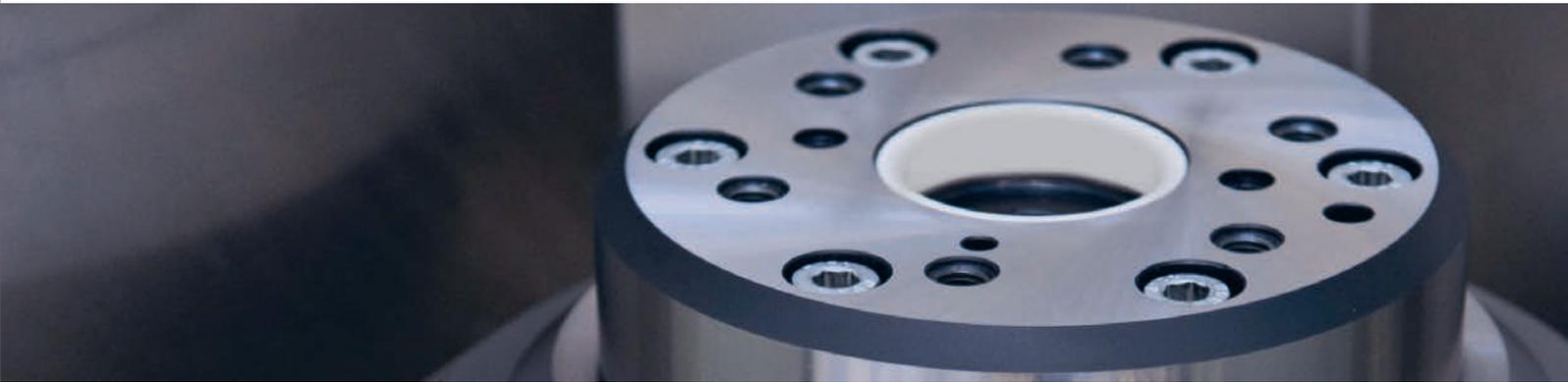
We provide solutions to clamping problems by simulating customer workpieces on our test machines. Furthermore, our engineering services include developing and continuing to optimize new tools on Reishauer machines. Our primary objective is to continuously reduce process costs.

**Where is the development leading?**

- Shorter clamping cycles
- Increased loading clearance
- More precise clamping
- Shorter setup times
- Longer tool life



... because we have  
a tight grip on  
every workpiece



- 1 Clamping arbor
- 2 Clamping arbor
- 3 Quick change system

#### We have a deep understanding of our customer wishes and interests

Our extensive knowledge of the industry and proximity to our customers flow into the technically creative solutions of high quality clamping products – developed and produced by us on your behalf.

There is no question that precision workpiece clamping is absolutely crucial for smooth and efficient production processes. Reishauer clamping systems are the basis for a fault-free and highly productive grinding process.

We put your need for precision into practice just as precisely. Our production processes guarantee high runout precision, optimized wear characteristics and a long service life.





**Our customers value expert ability**

Our machines and the materials we utilize ensure peak performances. And, thanks to optimized specifications, our abrasive materials and bonds play their part to meet different application requirements in generating and profile grinding processes. That allows you to achieve convincing machining performances and a high-quality surface finish!

# ... because we use only abrasive materials with the longest service life



- 1 Grinding worm
- 2 Profile grinding disc

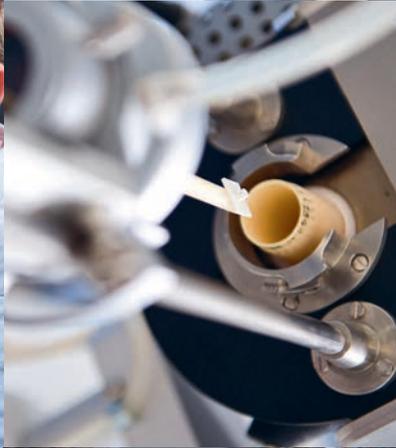
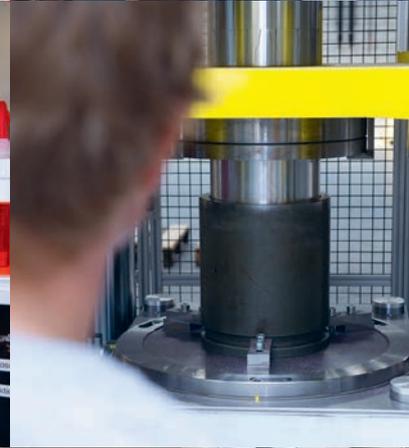
## We take on the challenges

Gears in today's transmissions must fulfil continually increasing demands. That is why we at Reishauer use ceramic generating grinding wheels and profile grinding discs from our own production for hard finishing processes.

Reishauer grinding wheels meet strenuously defined specifications regarding grit and bonds. Each grinding wheel is adapted to the respective material and machine as well as optimized for the module range and dressing process. These are the best prerequisites to achieve the greatest profile stability in conjunction with increased dressing cycles, lower thermal loads and shorter grinding times. The porous layer structure specifically influences chip deflection and optimizes coolant feed.

You can rely on the superior performance of our profile and non-profile grinding wheels.





... because we use  
only the highest  
performing tools

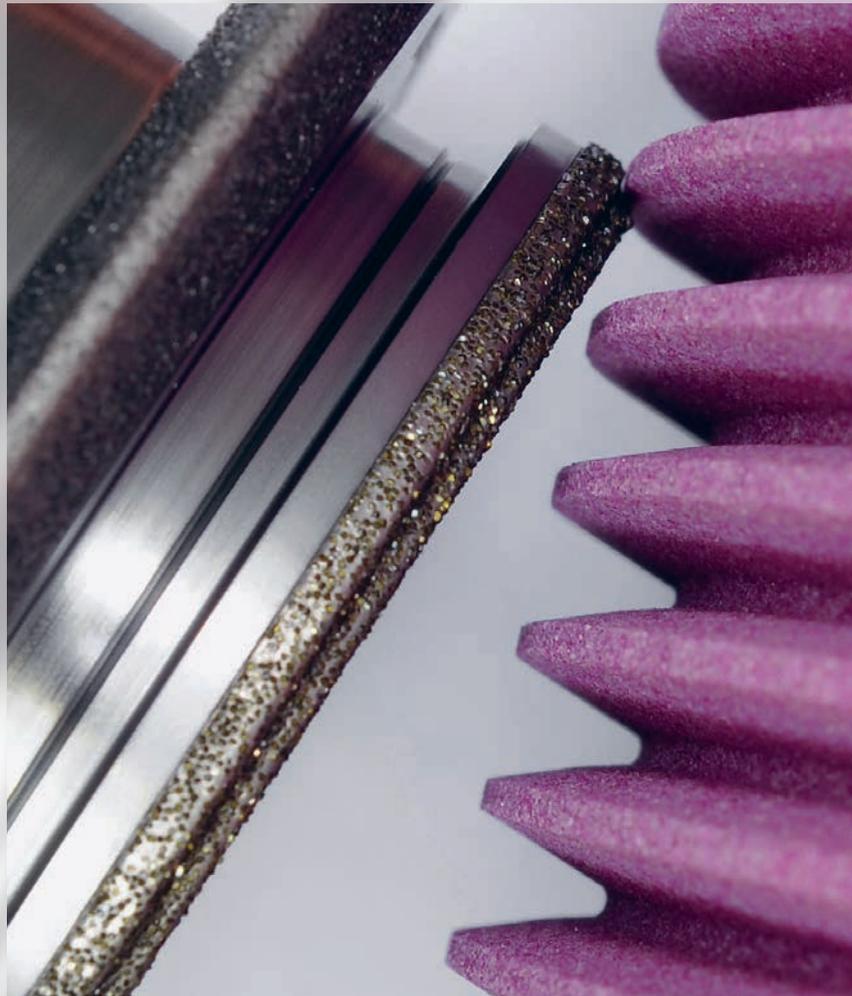
- 1 CBN grinding worm
- 2 CBN profile grinding disc
- 3 CBN profile grinding disc
- 4 CBN profile grinding disc

#### Reishauer is a byword for superior performance over a long life cycle

Our electroplated, high-performance grinding wheels guarantee high machining performances. The reason is the CBN layers, which are characterized by large grit protrusions and grit retention forces. CBN exhibits positive cutting properties and wear resistance. These are properties that increase form stability and result in a greater number of machined workpieces and longer intervals between dressing sequences. An added advantage is that the tools can be regenerated a number of times by dressing.

Reishauer Engineering determines the profile form of the tools according to the gearing specification. You can rely on the fact that we verify the accuracy of each and every tool prior to shipping.





**Outstanding Performance**

Outstanding performance characteristics:  
That is what we offer our customers with our high-quality, selected and specially treated diamond grit in metal bonds on high precision bodies – with reinforced edges when required.

# ... because our tools dress perfectly



- 1 Single taper disc
- 2 Form roll
- 3 Composite profile roll
- 4 Composite profile disc with rounding roll
- 5 Positive electroplated diamond dressing gear
- 6 Negative electroplated diamond dressing gear
- 7 Diamond gear shaft for grinding and honing

### We make sure the tools are in the right condition

Rotating dressing tools, positive and negative variants, are used to profile, sharpen and clean the grinding zone of our cylindrical grinding worms and profile grinding discs. By utilizing in-house developed software it is possible to precisely calculate the required geometries, such as profile modifications, profile crownings, tip and root reliefs taking into consideration the effects of machine kinematics such as helix angles and lead crownings as well as to simulate macro and micro geometries on single and multi-start grinding worms utilizing a wide variety of different dressing tools. The reprofiling process cleans the grinding worms and removes chips from the grinding area.

A powerful combination designed to fulfil your specific requirements to your total satisfaction: Machines, technology, clamping systems, ceramic grinding worms and wheels as well as diamond dressing tools.





**Three tasks – three strengths that all our cooling lubricants offer**

**Cool:** Remove the heat generated during grinding.

**Lubricate:** Minimize friction between the abrasive grit and the material.

**Flush:** Remove grinding chips and abraded grinding material from the contact zone.

# ... because we keep cool at grinding



## **We leave nothing to chance**

In close cooperation with oil manufacturers and customers we have been able to decisively enhance our cooling lubricants. This ensures they are finely tuned to the high demands of both generating and profile grinding processes. That guarantees maximum lubrication, which in turn reduces cutting forces. Grit wear is as equally reduced as the development of heat at the workpiece. All this results in a positive extension of the interval between dressing cycles for our grinding tools. Damage to the edge zones is kept low.

Our recommended cooling lubricants from renowned manufacturers offer your production processes the best possible properties: corrosion protection, low foaming, resistance to ageing, good wetting and non-hazardous to health.



**Assuring quality**

Workpiece inspection following hard finishing is undertaken in accordance with quality assurance standards ISO 14104 and ANSI/ AGMA 2007-B9



... because we efficiently inspect the grinding result



**When it comes to process stability we take care of the details ourselves**

Reishauer's temper etch inspection system was developed in-house. This process makes it possible to detect changes to the crystalline structure of ground components resulting from grinding burn. The system is distinguished by high levels of flexibility, safety (CE conform) and simple handling characteristics that facilitate the best-possible working processes.

With the right concept and layout our system is suitable for incorporating inline. The systems are equipped with an integrated extraction system. This makes it possible to incorporate temper etch inspection into the process chain for non-destructive inspection of all tested components close to production.





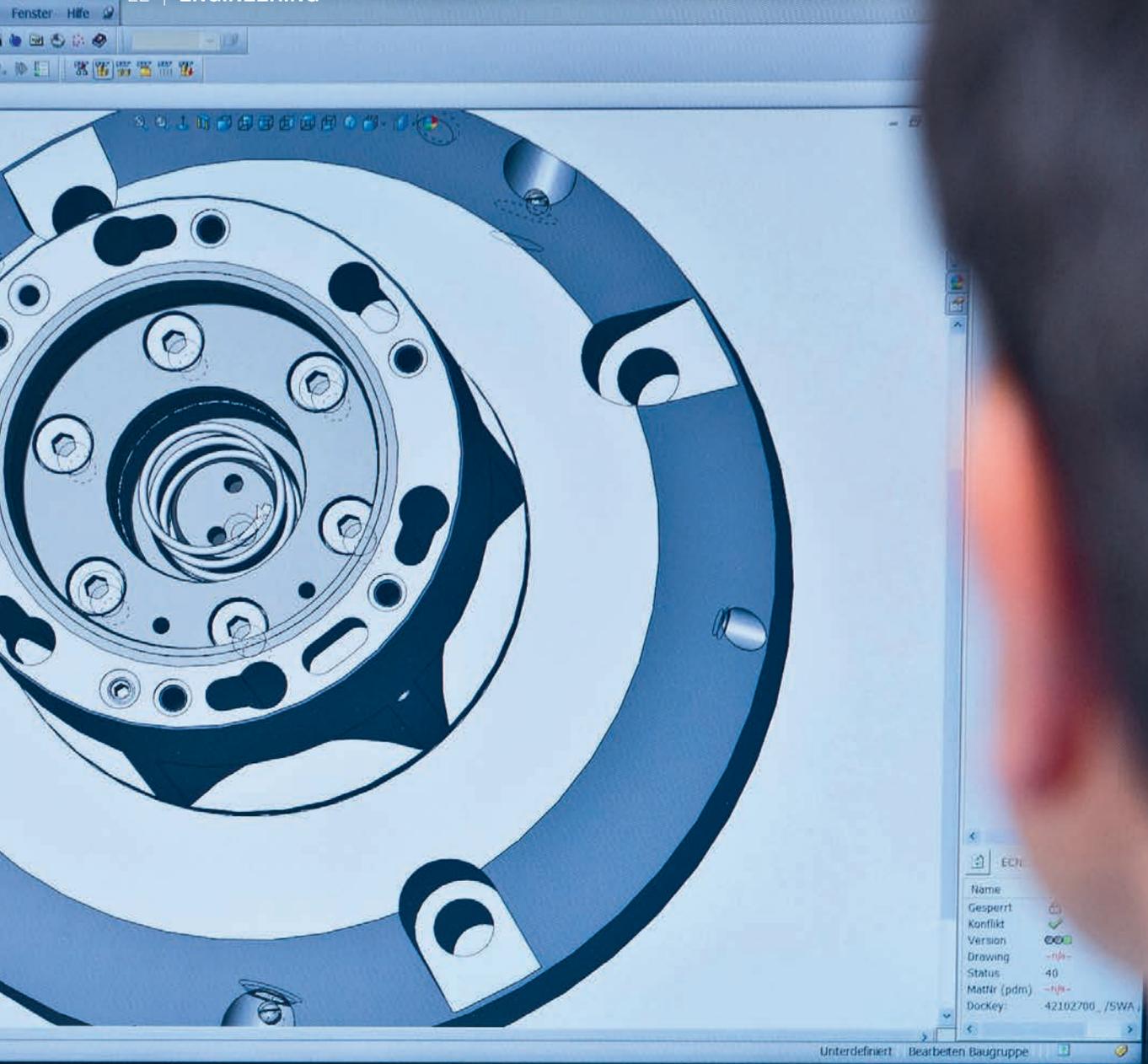
# ... because we assure your quality



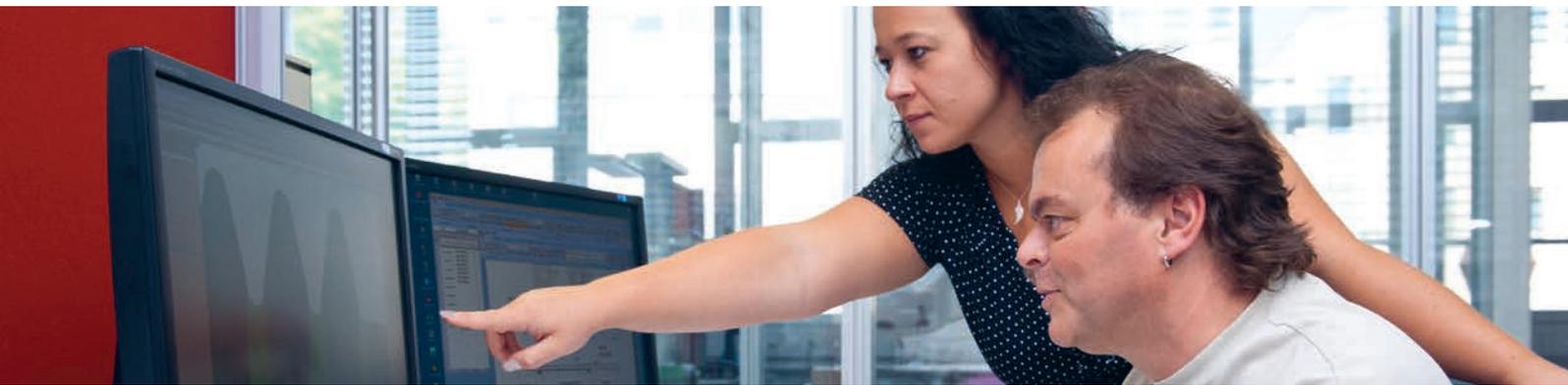
## **People are the source of quality**

We place a great deal of importance on our highly qualified and committed members of staff being personally aware of the importance of quality. Our tool technologies and services are based on the respective highest standards of quality. Every year we invest in the latest measuring equipment and production systems to be able to guarantee the Reishauer standard of quality in the long term.

Reishauer's quality management system is certified to DIN EN ISO 9001 and VDA 6.4 ISO 14001. Regular successful recertification is a sign that we consciously live and continuously strive to improve our high standard of quality on your behalf.



# ... because we develop solutions for you



## **Trust the expertise of our specialists**

Grinding technology means technical performance of the highest level. Mastering this technology is one of our greatest challenges. To do so we develop the finest technical and economic solutions based on your workpiece-specific requirements.

A team of highly qualified engineers with many years of experience versed in the complex maths associated with gearings create 3D designs, FEM simulations and model calculations.

Taking this systematic Reishauer approach we solve processing problems, examine and compare the economic viability of different tool types and applications, and develop complete solutions to fulfil tooling requirements.

At Reishauer theory and practice are closely entwined: we are able to perform test runs on our Reishauer machines, which also make possible additional, comprehensive analyses and assessments. That is how we create tool solutions to meet your specifications.



... because we  
have been leading the  
way for 230 years



#### **We never stop thinking**

Creativity is one of our most important tools. From the idea through to the start of series production we realize innovative tool technologies that offer our customers greater value added. In close cooperation with users and specialists we develop highly functional solutions designed to achieve the best possible customer benefit, cost efficiency and process stability.

At the same time we focus intensely on the fine details to optimize products and processes. That is demonstrated by nanometre-scale diamonds that we manufacture ourselves and incorporate in our dressing tools to serve as protection against wear.

Our problem-solving expertise and high levels of efficiency as well as our high standards of quality ensure that results from research and development are converted into market-leading products from Reishauer Gear Grinding Technology – the best investment in the future you can make.

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