



# **GENIS**

## EXTERNAL CYLINDRICAL GRINDING WITH VITRIFIED BONDED HIGH-PERFORMANCE GRINDING TOOLS

- Minimum machining times through optimal stock removal
- Maximum productivity through reduction of grinding costs
- Allows for innovative, customer-specific solutions

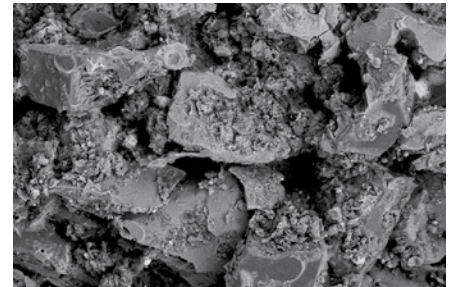


## GENIS - EXTERNAL CYLINDRICAL GRINDING WITH VITRIFIED BONDED HIGH-PERFORMANCE GRINDING TOOLS

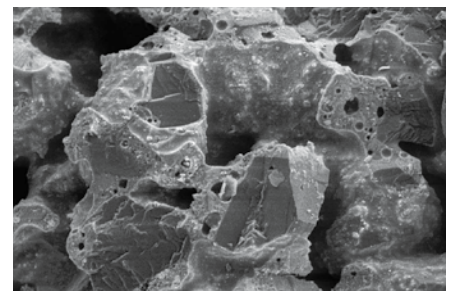
The demands on modern automotive engine and gearbox producers continue to increase. The additional requirements create capacity bottlenecks, and an increased demand for more efficient grinding solutions. TYROLIT faces this challenge in external cylindrical grinding with a new generation of vitrified bonded CBN high performance grinding tools.

After intensive research, TYROLIT has succeeded in developing GENIS, a new bond system that makes it possible to guarantee optimal wetting of the CBN grain even with the lowest levels of bond content. Through careful choice of the composition of the bond components, the crystallization is specifically controlled under selected firing conditions. This makes it possible to achieve porous structures with high mechanical strength that exhibit maximum resistance to the effects of cooling lubricants.

The cool grinding specifications of the GENIS high-performance tools allow a reduction of the grinding forces, and make efficient use of the CBN grain. Decreasing grinding forces are confirmed in practice with a wide range of application possibilities, through minimum tool wear and maximum profile retention.



Insufficient wetting of the CBN-grains



Optimum wetting of the CBN-grains

### Product- and application advantages

- New high-performance CBN grain qualities
  - Optimized chip clearance (porosity)
  - High bond strength
  - Optimal resistance to cooling lubricants
  - High thermal resistance
  - Customer-specific solutions
- High process reliability
  - Optimal profile retention
  - Extended tool life
  - High cutting speeds
  - Maximum breaking strength
  - Optimal transport of cooling lubricantst

### Main fields of application



Camshaft



Crankshaft



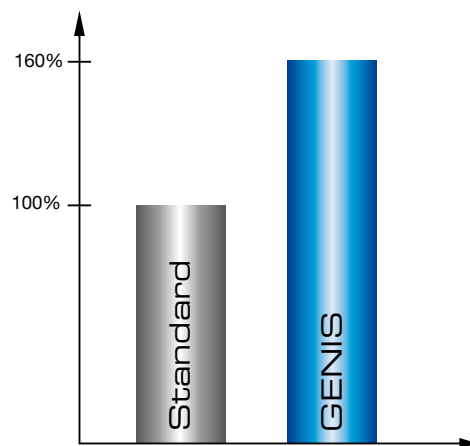
Gear shaft



## GENIS APPLICATION EXAMPLE CAMSHAFT

Finishing of the cam profile	
Material	<b>100Cr6</b>
Hardness	<b>52 HRC</b>
Machine	<b>Schautt ZEUS</b>
Surface speed	<b>100 m/s</b>
Cooling lubricant	<b>Oil</b>
Shape and dimensions	<b>9A1T 74x58x28,1mm</b>
Specification	<b>GEN B107 V</b>

### Results



Increase of the tool life by approx. 60%

Due to the need to increase the service life of the grinding tool significantly, at first the production planners from the customer worked in partnership with Tyrolit engineers to analyse the process requirements. The new bond system of the GENIS product line was then selected as well as the use of a particularly free-cutting CBN grain. Through the optimized bond properties, it was possible to increase the number of grooves per dress cycle from 120 to 190. In addition the power consumed by the grinding spindle, and the internal part stresses were also reduced significantly.



Vitrified CBN grinding tool with neutral zone.

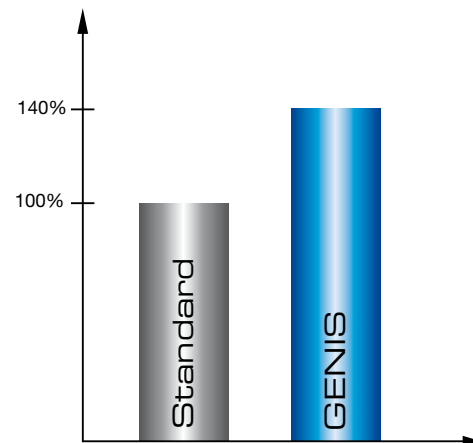
On request CBN grinding tools in the GENIS product line can be produced with a neutral zone. The benefit of a neutral zone is to allow the complete utilisation of the CBN layer.



## GENIS APPLICATION EXAMPLE CRANKSHAFT

Grinding in the main and pin bearing	
Material	<b>42CrMo4</b>
Hardness	<b>54 - 58 HRC</b>
Machine	<b>Junker JUCRANK</b>
Surface speed	<b>100 m/s</b>
Cooling lubricant	<b>Emulsion</b>
Shape and dimensions	<b>3LL1RST 700x47x159,94mm</b>
Specification	<b>GEN B151 V</b>

### Results



Increase of the tool life by approx. 40%



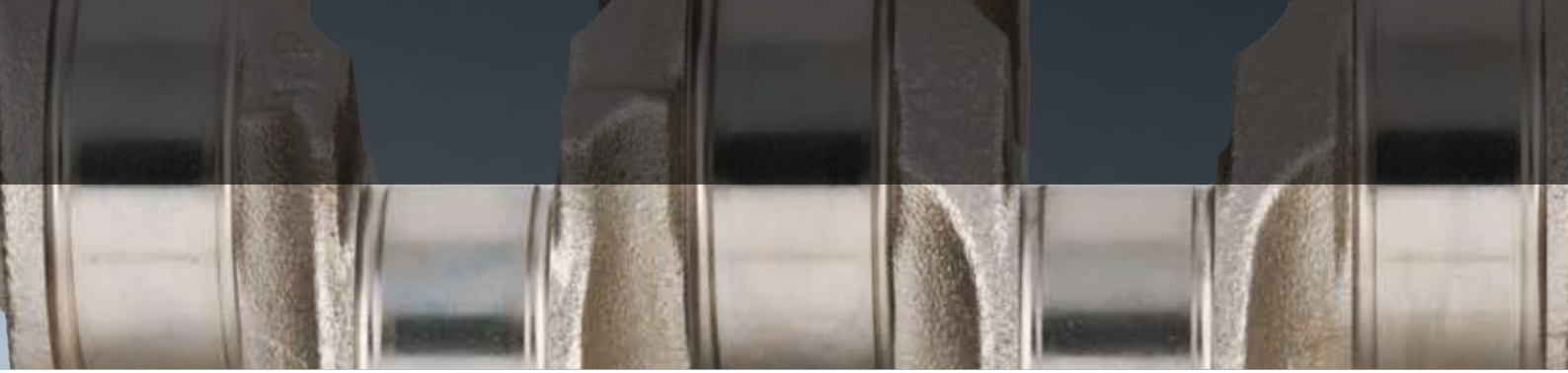
A change to the material used by the customer, as well as a significant increase in the stock to be removed on the bearing surfaces, presented a very special challenge to both the user and the TYROLIT application engineers. After a detailed analysis of the process, a grinding tool was selected from the GENIS product line with a new, especially free-cutting CBN grain quality. The process parameters were changed accordingly for use of the tool. The result: Despite the large quantity of stock to be removed, the tool life of the grinding wheel was increased from 4,200 to 5,900 shafts with good process reliability.

### Dressing

High-performance grinding tools also place higher demands on the dressing tools. As a system provider, TYROLIT offer you a complete selection of rotating diamond dressing tools for these applications.



Diamond copy roller

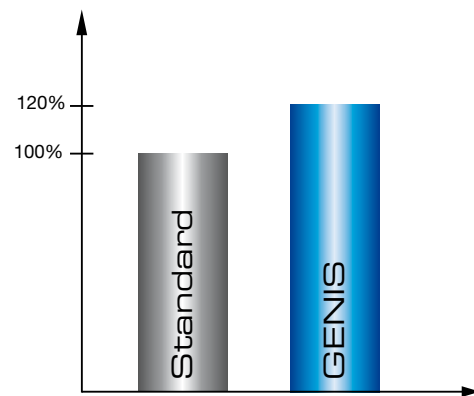


## GENIS

### APPLICATION EXAMPLE GEAR SHAFT

Rough grinding	
Material	<b>16MnCr5</b>
Hardness	<b>63 HRC</b>
Machine	<b>Junker Quickpoint</b>
Surface speed	<b>120 m/s</b>
Cooling lubricant	<b>Oil</b>
Shape and dimensions	<b>3M1S 400x25x126,9mm</b>
Specification	<b>GEN B126 R</b>

### Results



Increase of the tool life by 20%



Customer requirement: Prevention of hidden grinding burns as well as simultaneous increase of the tool life. After a detailed analysis that took into account all influencing factors of the process, the rough grinding zone angle of the tool was redesigned. It was then possible to select a tool from the GENIS product line with a specification of extremely high edge stability with which the overlay rate during grinding could be redefined. After optimization of all process parameters, it was possible to reliably prevent feed marks as well as to increase the tool life from 6,700 to 8,100 parts.

#### Service

Our technical sales force as well as our application engineers are happy to assist in the optimization of your grinding process.

#### Process optimization

- Productivity and cost optimisation
- Implementation of the latest technologies
- Process analysis and system design
- Expansion of your market position

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