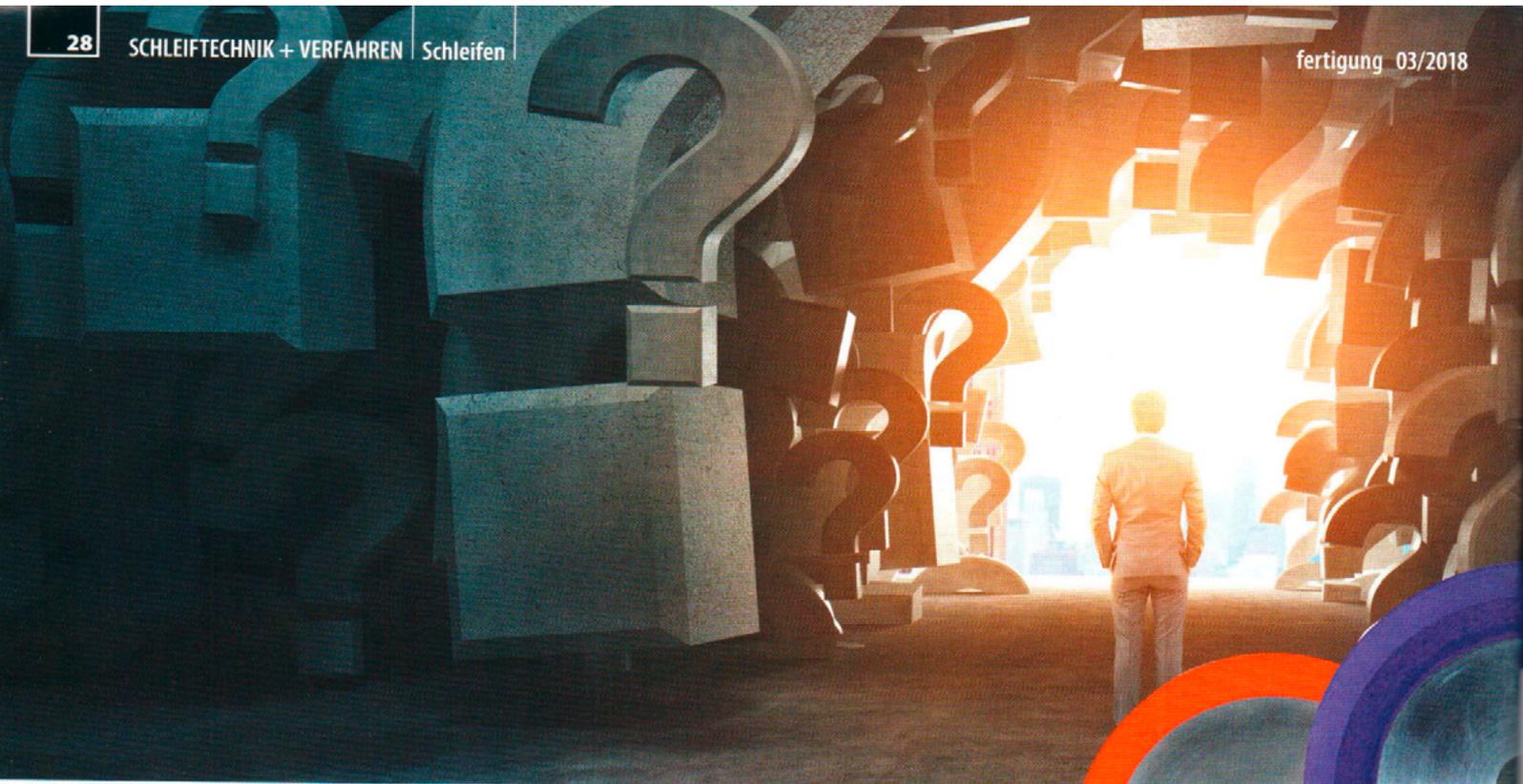


**Tool grinding**

**Breakthrough achieved**



## Tool grinding

### Breakthrough achieved

Together with Artifex, Rothenaicher Schleifwerkzeuge has achieved a breakthrough in the combination of grinding wheels for polishing and grinding. The two recently developed grinding wheel bondings now enable a highly process-reliable grinding of main cutting edge corrections such as K-Land, as well as the increasingly important step correction for step drills. Benefit: Top surfaces with highly precise micro-rounding on the cutting edges.

Cutting edge preparation has long been an established process for enhancing the performance of machining tools in tool production. The cutting edge preparation is used after tool grinding to reduce the micro-defects of the cutting edge resulting from this process and to produce a defined cutting edge form adapted to the subsequent cutting process. The common methods of blast cutting,

brushing and drag finishing are performed almost exclusively on separate machines, requiring a re-clamping of the cutting tool to be produced. However, preparation without changing the machine is an advantage for reducing throughput and non-productive time during tool production. For this reason, the approach to the preparation of tool cutting by means of elastically bonded grinding wheels in the same machine has increasingly become the focus of research. This well-known approach is based on the kinematics for polished chamfer surface of the cutting edge, i.e., the rotating grinding wheel is moved with defined motion along the cutting edge. The comparatively high resilience of the elastic bonding produces a rounded edge shape.

#### At a glance

##### Benefits of a polished and micro-rounded K-land

- Better layer adhesion and prevention of premature buildup and crater wear on the cutting edge
- Increasing edge stability with respect to cutting edge chipping
- The method can be produced with all angles and chamfer widths, depending on the material and application
- The method is process-reliable and controllable
- no rounding of the secondary cutting edges
- Tool comes finished from the CNC machine, no downstream process costs

It was exactly six years ago when we introduced our readers to an innovative cutting edge preparation method in our special issue for the GrindTec 2012 trade fair. In the article "The trick with the disk" we described the method in detail and helped to publicize it.

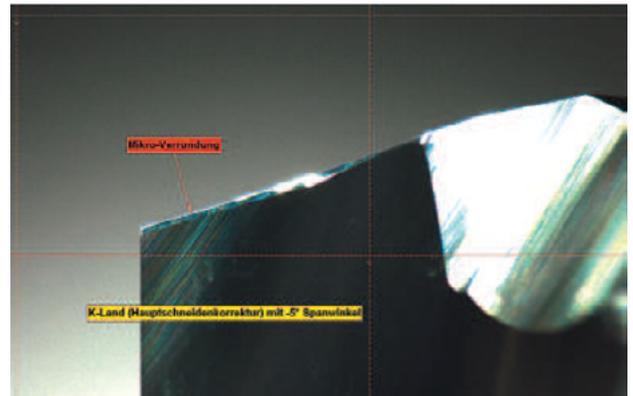
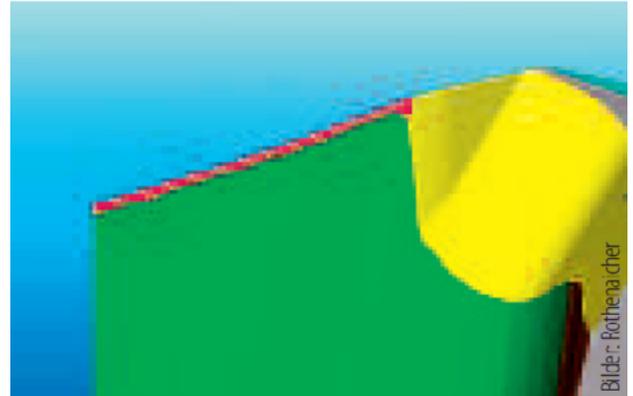
No wonder this method was immediately met with a great response on the market. Meanwhile, Rothenaicher and Artifex have optimized the method under the name of "Drill Polish" and introduced it in series production. Not only is the drill polish easy to handle, but the preparation is also faster and more stable compared to other preparation methods. The rounding sizes are reproducible and relatively uniform even with variations in the process parameters. Now Stefan Rothenaicher and his colleagues, Andreas Huber and Felix Conrad, have achieved another breakthrough with K-Land. The so-called K-land operation is grinding with a rotating diamond polishing rubber disk where a negative correction of up to  $-30^\circ$ , for example, can be precisely defined and ground on the main cutting edge on VHM high-performance drills. During this process, the K-Land rubber-bonded grinding wheel moves to the arcuate chip space and makes a main cutting edge correction with smooth surface on the negative cutting edge. At present, two degrees of hardness of the K-Land grinding wheels are used. At the same time, this process also achieves a micro-rounding, resulting in a longer tool life.

### Process-reliable micro-rounding

"We have virtually brought the process to its final conclusion and, thanks to the good bonding of the substrate to the grinding wheel, we can now achieve an appropriate removal on the cutting edge," explains Stefan Rothenaicher. Without pre-grinding, for example, the Artifex DA 16 HR (color purple) 1V produces the main cutting edge correction (K-land) with a maximum removal of up to 0.3 mm. "Using the somewhat softer red grinding wheel, we can also now define polish the ground surfaces and at the same time produce process-reliable micro-rounding in step corrections", concludes the grinding expert in a nutshell.

German Text version by:  
Jürgen Gutmayr (gt)

Simulation  
K-Land



K-Land on  
the tool



Andreas Huber (left) and Felix Conrad sind are specialists in the field of "K-Land" at Rothenaicher Schneidwerkzeuge.

### Quote

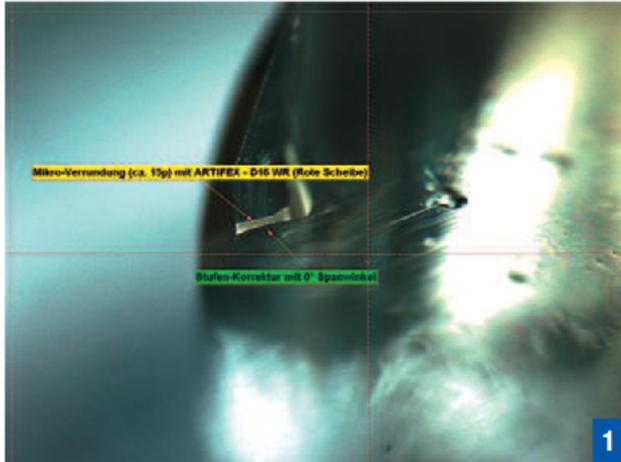
"We have virtually brought the process to its final conclusion and, thanks to the good bonding of the substrate to the grinding wheel, now we can achieve an appropriate removal on the cutting edge."

Stefan Rothenaicher,  
Rothenaicher  
Schneidwerkzeuge

### 1 Generated micro-rounding in the step:

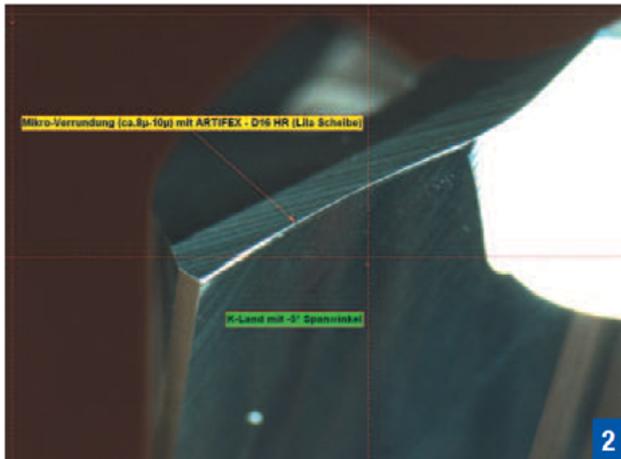
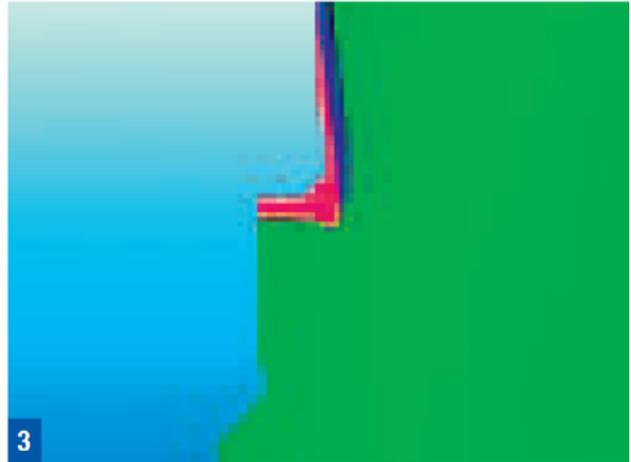
Pre-ground with 1V1

- Ø75-D46, finished with Artifex DA 16 WR (color red) -1V1 - Ø100 - polishing disk, maximum removal of 0.05 mm. Operating values: Cutting speed 25 m/s. Feed: 10 mm/min.



### 3 Simulation

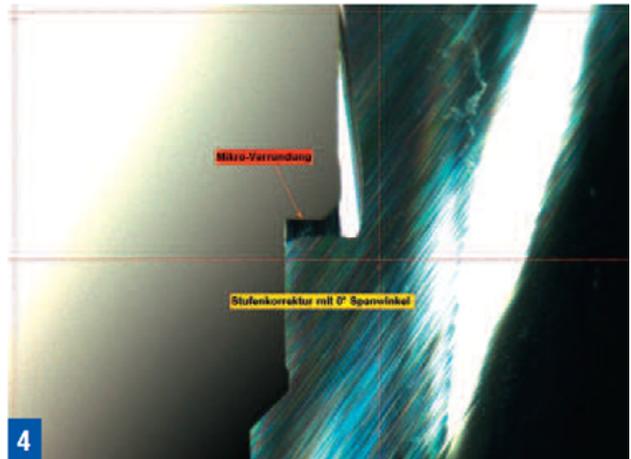
Step correction.



### 2 Generated micro-rounding on the main cutting edge (K-Land):

Without pre-grinding with Artifex DA 16 HR (color purple) - 1V1

- Ø100 - polishing wheel  
- maximum removal of up to 0.3 mm.  
Operating values Cutting speed 25 m/s.



4 Step correction on the tool.

### Contact

Rothenaicher Schneidwerkzeuge  
DE-87746 Erkheim, Germany  
Phone: 08336/80876  
www.rothenaicher-tools.de

Artifex Dr. Lohmann GmbH & Co. KG  
DE-24568 Kaltenkirchen, Germany  
Phone: 04191/935-0  
www.artifex-abrasives.de



German version was published in the magazine:  
Fertigung / SCHLEIFTECHNIK + VERFAHREN  
verlag moderne industrie GmbH  
Jürgen Gutmayr  
Justus-von-Liebig-Str. 1  
DE 86899 Landsberg, Germany  
www.fertigung.de