

# GUHRING

The tooling concept of Guhring's ball race milling cutter is simple, practice orientated and highly accurate

- maximum rigidity and stability
- highest precision
- high process reliability
- consistently high manufacturing quality
- simple and quick change of milling head
- minimum machine downtime



## PCBN ball race milling cutters

GUHRING - YOUR WORLD-WIDE PARTNER

# BALL RACE MILLING CUTTERS FROM GUHRING

– the high-performance solution for the machining of homokinetic joints

**Homokinetic joints applied a millionfold in the drive train of automobiles place the highest demands on precision and quality.**

**But also the machining costs play a decisive role.**

**With Guhring's PCBN-tipped ball race milling cutters the user has perfect control of all of the factors.**



## The perfect solution for the hard machining of joints

Ensure maximum quality and a highly efficient machining with short primary process times as well as advantageous tooling costs for the hard machining of ball joints in homokinetic joints.

With the new PCBN ball race milling cutters Guhring provides made-to-measure tooling solutions for maximum cutting values and tool life.

Guhring PCBN ball race milling cutters are convincing thanks to high rigidity and stability. Thus they offer maximum process reliability and a consistently high manufacturing quality and accuracy for the highly-stressed joints.

## Soft machining with made-to-measure tooling solutions

Also for the soft machining of homokinetic joints you can ensure the highly efficient machining with short primary process times and advantageous tooling costs with Guhring's ball race milling cutters.

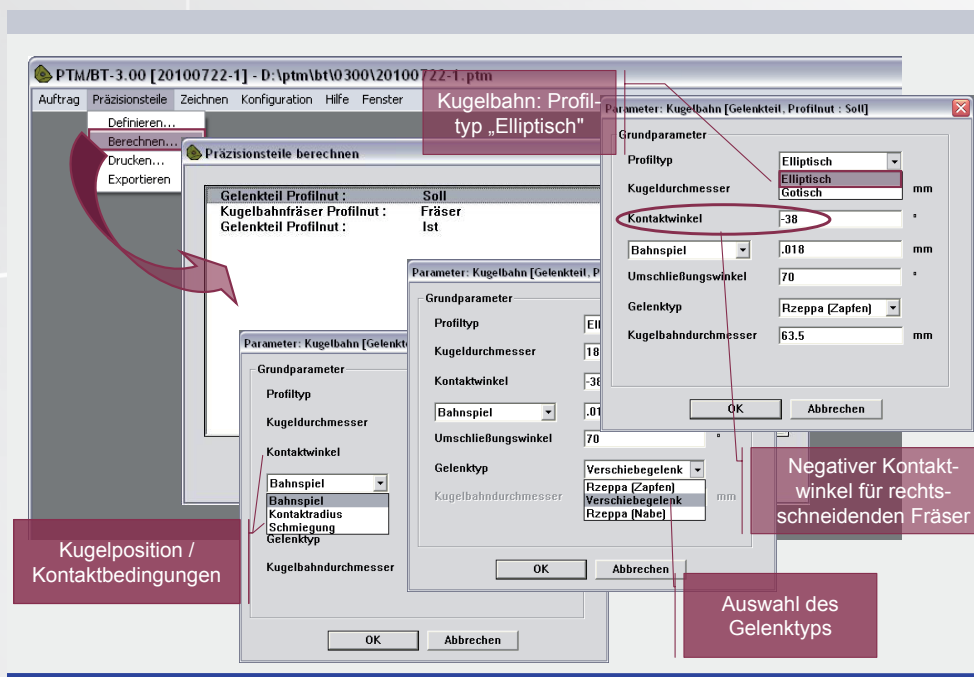
Guhring's ball race milling cutters for soft machining are available 2-, 3-, or 4-fluted in solid carbide or with CBN inserts brazed on to a steel base body.

## Calculating the perfect tool geometry ...

The complex know-how of Guhring's ball race milling cutters is in the calculation of the geometry. For this special software was developed. The perfect tool geometry is calculated based on the forms and tolerances for inner and outer race specified by the user. Essential factors are the contact angle, the race play and the lubrication of the later between inner and outer race positioned balls as well as the approach angle of the ball race milling cutter for the machining operation. Thanks to the software calculation closest tolerances can be maintained.

Their practical suitability for the machining of inductively hardened steel with 58 to 62 HRC Guhring's ball race milling cutters demonstrate in comprehensive simulations and machining tests at Guhring's own research and development centre prior to series application. When applied, the tools not only achieve the required tolerances but manufacture the required contours with a long tool life. For example, a PCBN-tipped milling head with diameter 20 mm achieves a tool life of 2500 components in volume production in the automotive manufacturing sector.

Guhring software  
for the calculation:  
Workpiece / joint part  
parameterisation





## ... corresponding to the user specific requirements

The geometries of the interchangeable milling heads with PCBN-ISO inserts are individually designed according to the specific requirements of the respective homokinetic joint. There are various, perfectly co-ordinated inserts available dependent on application and material.



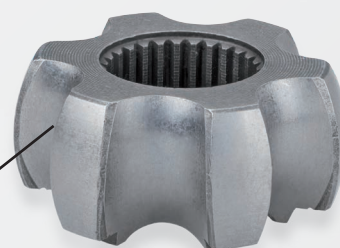
The specially developed software calculates the milling cutter geometry based on the specifications for the contour of the outer race.

Outer Race



The inner race is also perfectly machined with Guhring PCBN ball race milling cutters.

Inner Race

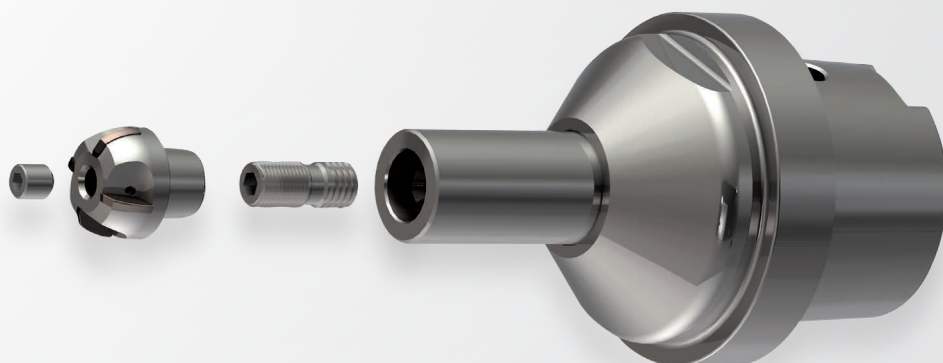


## Simple and quick change of milling cutter head

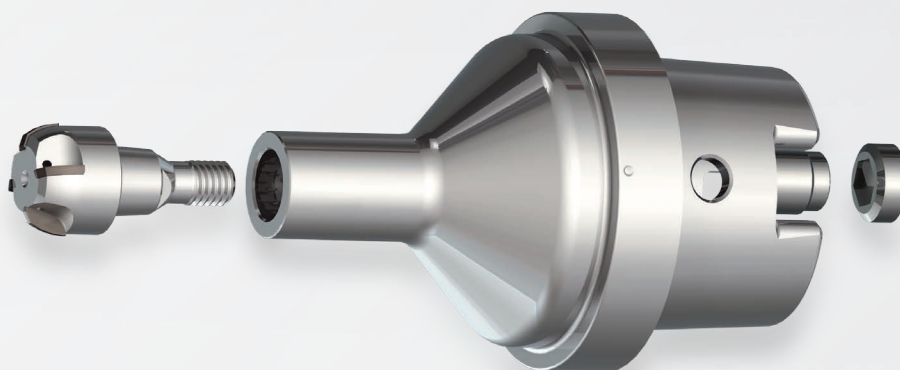
The interface between base holder and milling head enables the simple and quick change of the milling head when the inserts are worn. The user has two options doing this: either to assemble the milling head from the rear through the base body or to assemble the milling head from the front, without the base body having to be removed from the machine.

ISO inserts in solid PCBN or with PCBN cutting edges ensure an economically efficient machining operation. In the event of wear, the user only has to replace the milling head and return it to Guhring to be re-tipped with relatively cost-efficient standard inserts. The long-life base body can be further used.

### Assembly of milling head from the front



### Assembly of milling head from the rear



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FLUTELESS TAPPING

MILLING

REAMING

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# GUHRING

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