OEM

Tools and Service Made-to-Measure

– Process and Tool Planning

– Tool Design

– Virtual and Practical Tests

– Acceptance and Commissioning

– Process Optimisation

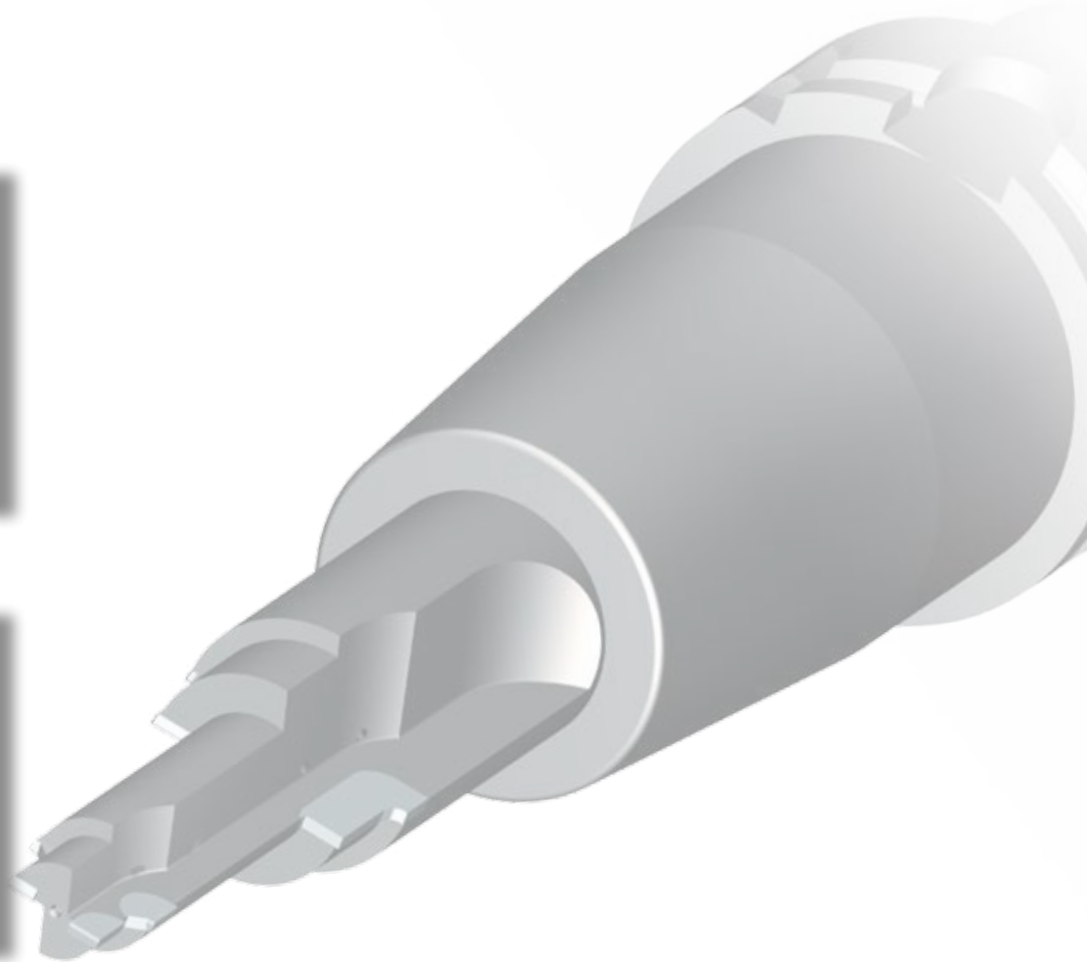
– After Sales Service

GUHRING
The Tool Company

Guhring is one of the world's leading tool manufacturers and is also one of the top addresses for OEM.

Guhring headquarters:
Plant 1 in Albstadt.

New plant 2 in Albstadt:
Investment for PCD production



OEM centre in Geislingen

OEM centre in Mindelheim

Special Service:
In Southern Germany two OEM centres provide direct support to the local machine tool industry. They offer an efficient service during process layout and machine acceptance.

A global partner for OEM

The optimisation of the machining process through intelligent tooling solutions is to your advantage

Project planning is for Guhring a sales and service sector of enormous strategic importance. Therefore, Guhring has invested heavily in this sector to provide customers with world-wide technical support, from optimal tool design to volume production.

Project planning in Laiz: *All under one roof*

The success has proven that the investment was correct. In the first six months of 2004, Guhring was able to provide project planning for in excess of 200 OEM for customers from the metal working industry with the emphasis on the automotive industry and its suppliers.

Headquarters of the project planning department is the plant in Sigmaringen-Laiz. Every function, such as sales, planning, design and testing, including the application technology for a fast communication network are all located under one roof. In addition, two OEM centres, one in Geislingen and one in Mindelheim, provide a competent service to the machine tool industry in matters project planning and machine acceptance. In Germany alone, more than 50 Guhring employees are exclusively working in the OEM department.

Internationally, machine builders and operators can find contacts for project planning in the Czech Republic, USA, Brazil, Japan, China, Korea and India, working in close cooperation with the head office in Laiz. They have up-to-date equipment and facilities at their disposal, guaranteeing the processing of complex projects with the short reaction time and the high quality that is currently demanded. There are a further 130 technical field engineers and their comprehensive know-how at the customer's disposal.

Competent support

As a commited and experienced project partner, Guhring provides support to machine builders and operators during the entire process chain, from process and tool planning as well as machine acceptance with the manufacturer to commissioning and series production with the customer. From the beginning the aim is to optimise the machining process through intelligent tooling solutions and a competent, fast as well as flexible service.

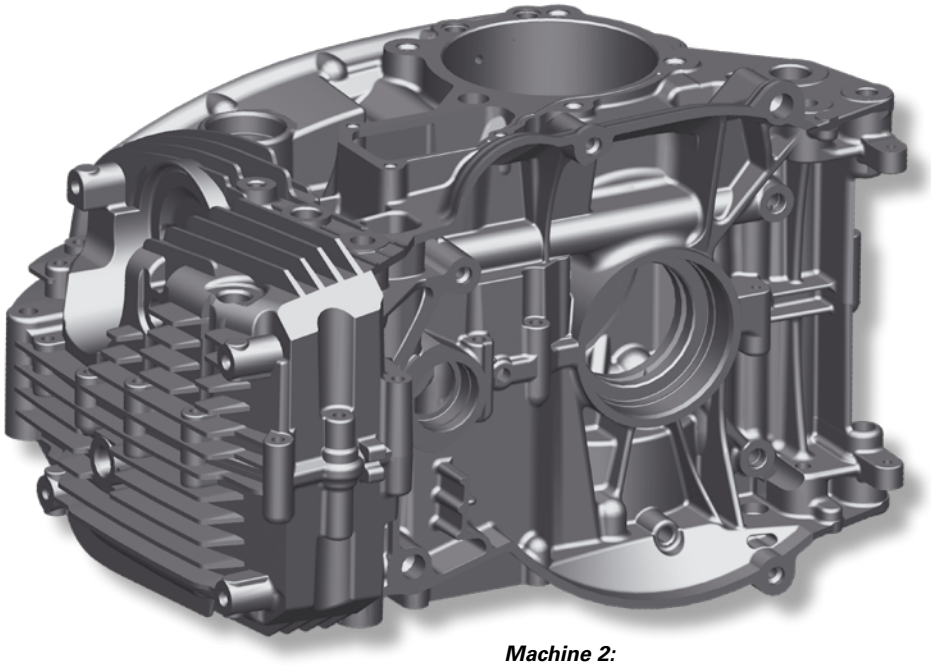
The challenge: Less is more!

Reduction in tooling and production costs thanks to the application of combination tools

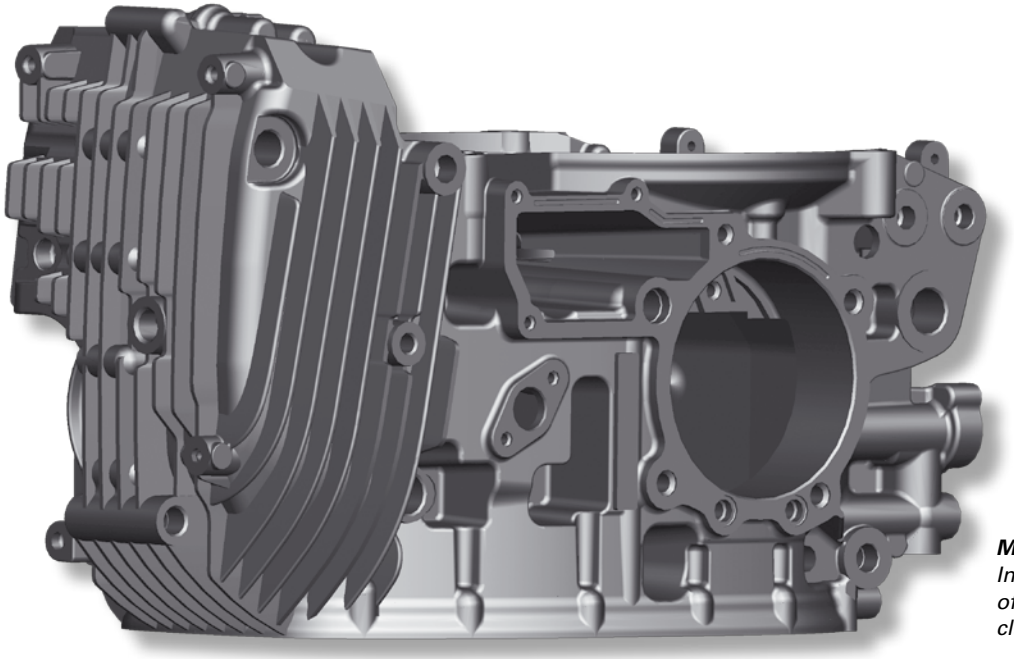
The methodical approach of Guhring's project processing is illustrated by the following process planning example for the machining of an engine block.

Saving one machining centre

The task was a reduction in tools or machines respectively. Thanks to the application of combination tools this demand could be satisfied and the number of machines reduced from three to two:



Machine 2:
Finish machining is carried out when assembled.



Machine 1:
Individual pre-machining of left and right in one clamping.

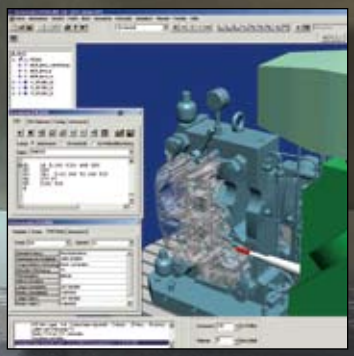
Target orientated:
Team-work by the specialists

Successful co-operation during the concept, design, virtual test and production phases

1. Concept phase:
A detailed analysis of the machining task leads to intelligent tooling solutions.

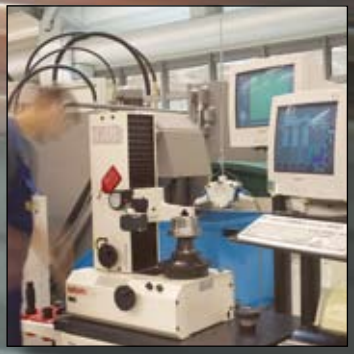
2. Design phase:
Complex tools are designed on up-to-date 3D-CAD work stations.

3. Virtual test phase:
First of all collision tests are carried out in 3D simulations.



4. Production phase:
State-of-the-art manufacturing technology allows the production of the complex tool geometries.

5. Final inspection:
Our quality control ensures that the tools are according to the specifications.



6. On-schedule shipping:
The tools are commissioned, assembled and pre-adjusted prior to shipping.

7. After-sales service:
Support on-site for machine builders and operators by our field service technicians.

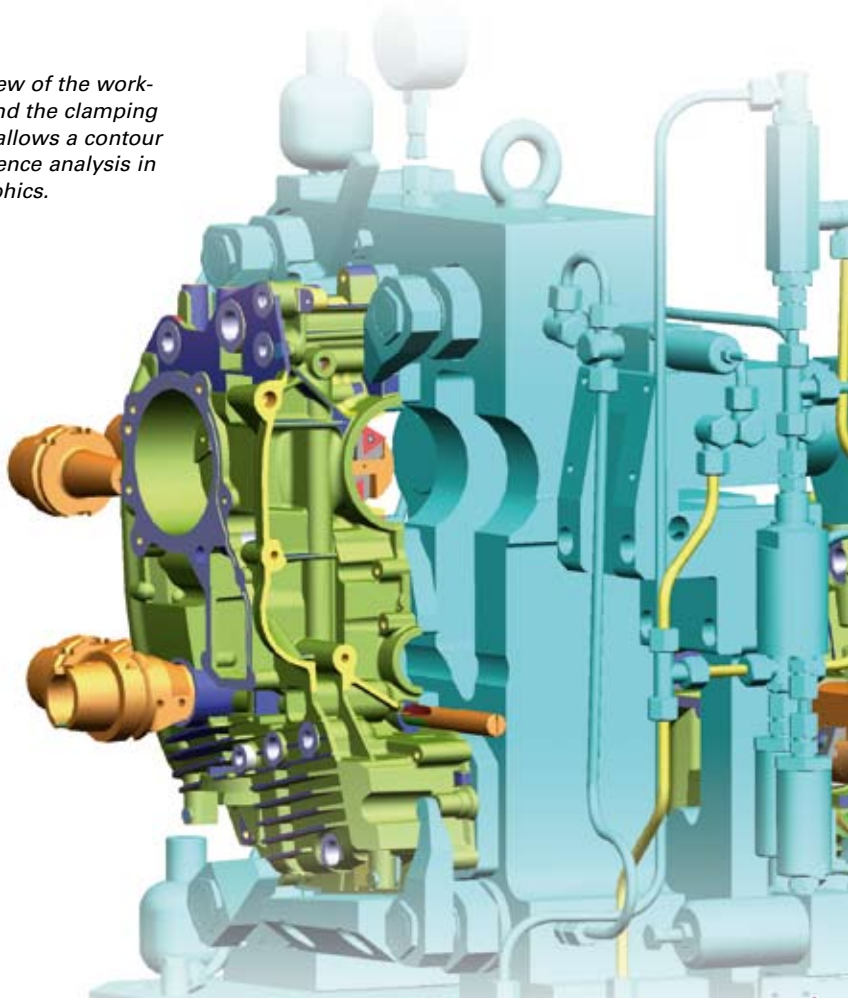
Basis:
Concept and design

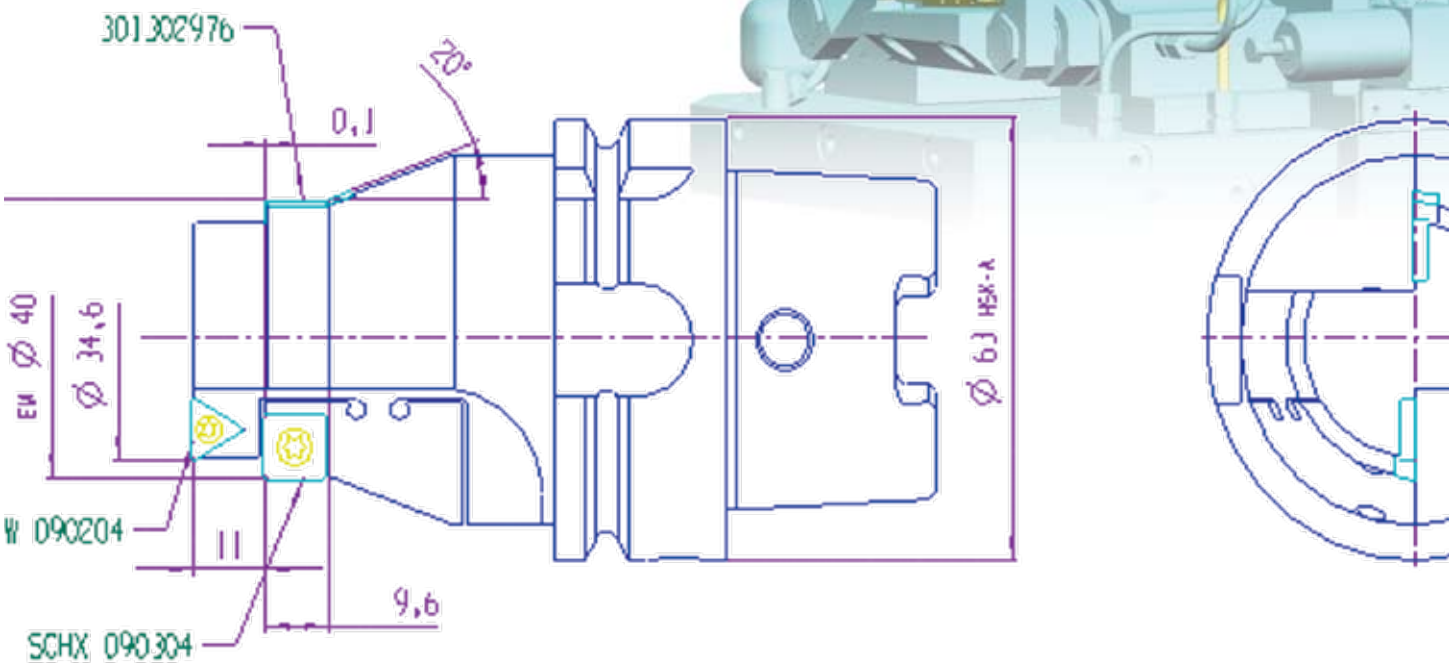
Project analysis with the customer is the basis for the tool design and the collision examinations incorporating the workpiece and the facilities.

The detailed analysis of the machining task in close co-operation with the customer forms the initial phase of the project.

Thanks to the possibility of viewing components in 3D, Guhring can carry out a contour interference analysis in Unigraphics and include the subsequent findings in the design of the tool. On this basis Guhring is able to develop tooling solutions that satisfy and even exceed customer requirements.

Design:
A 3D view of the workpiece and the clamping facility allows a contour interference analysis in Unigraphics.

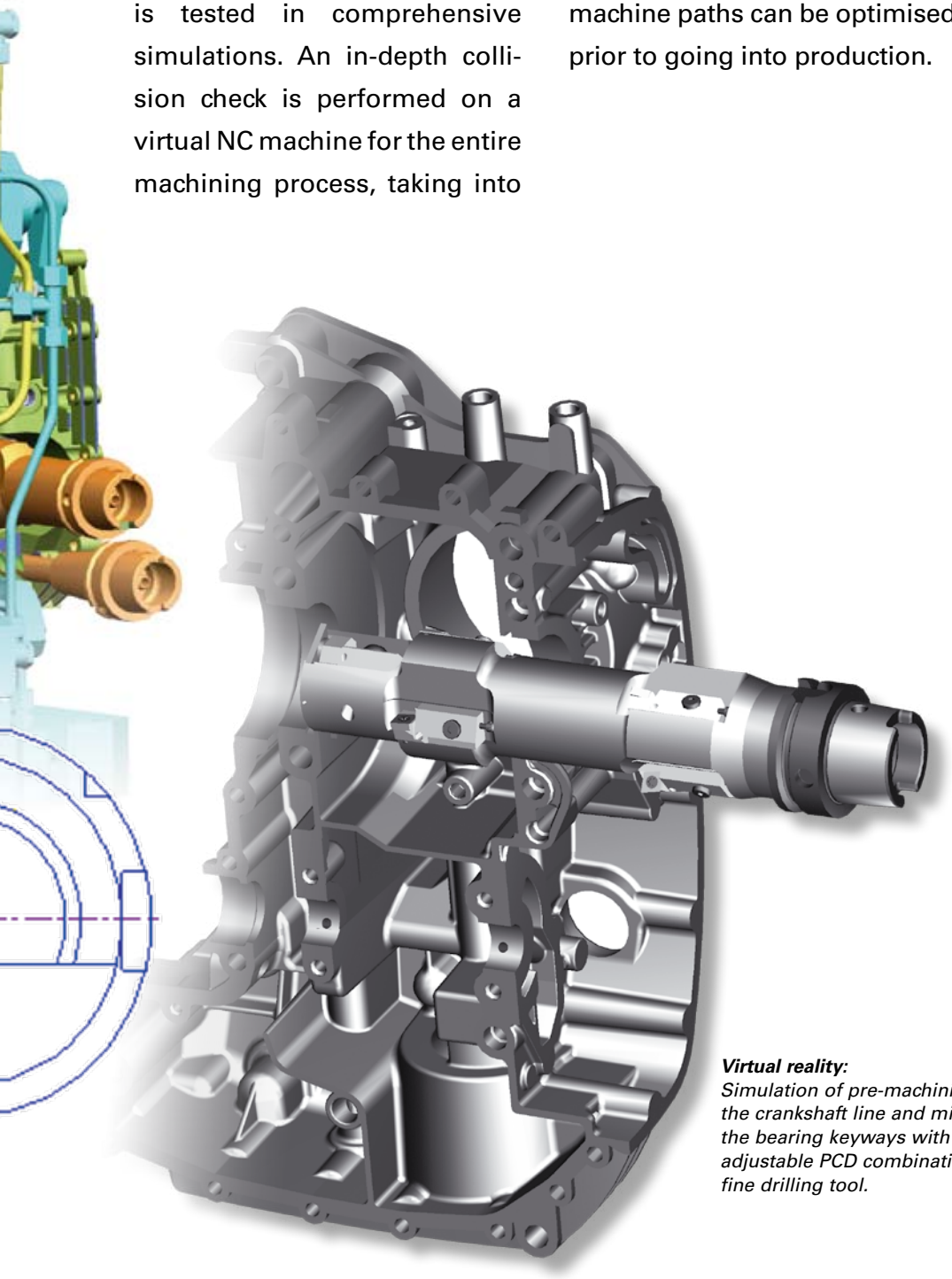




Control:
Virtual function test

Simulating the machining process ensures an optimal process flow and prevents problems when starting-up production.

Following the concept phase and in parallel with the tool design phase, the functionality is tested in comprehensive simulations. An in-depth collision check is performed on a virtual NC machine for the entire machining process, taking into account the complete tool, the machine and the workpiece. Thus, the tool design and the machine paths can be optimised prior to going into production.

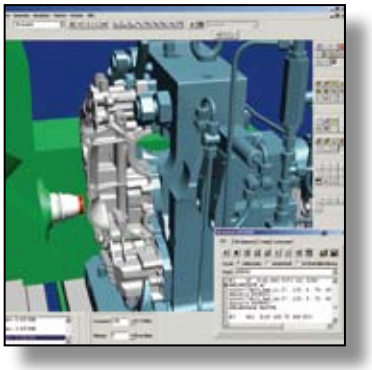


Virtual reality:
Simulation of pre-machining the crankshaft line and milling the bearing keyways with an adjustable PCD combination fine drilling tool.

Simulation phases:
Step by step analysis, e.g. drilling with step drill

Core drilling with combination tool.

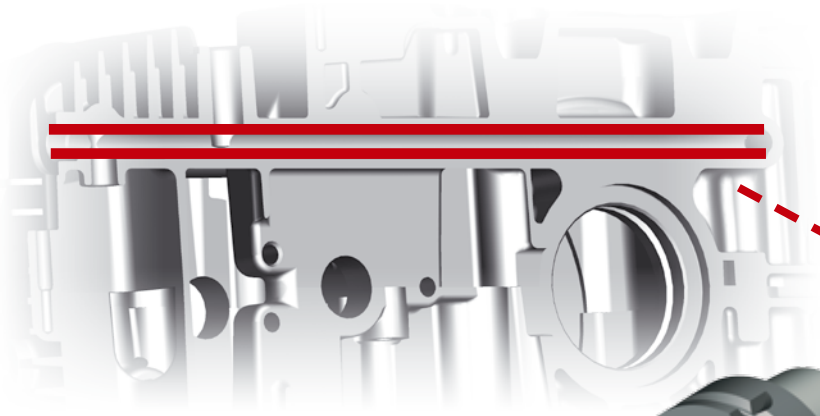
Countersinking with PCD stepped countersink.

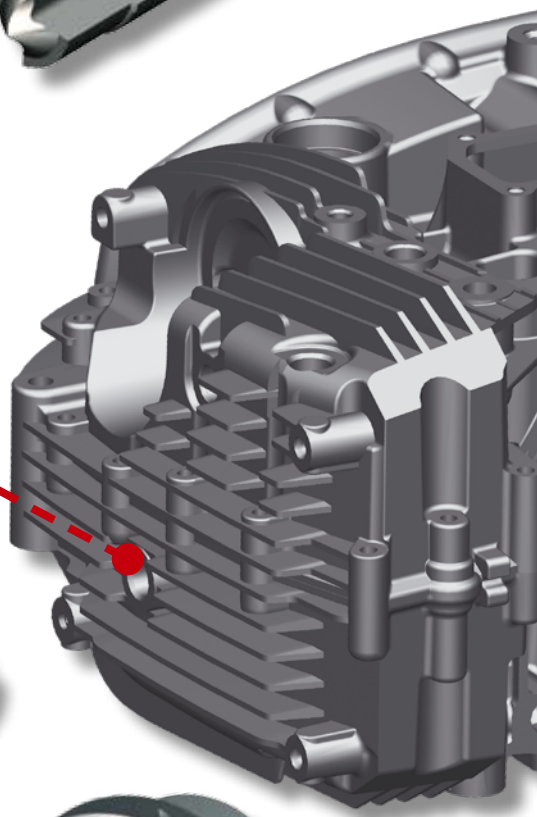


Convincing result: Made-to-measure tools

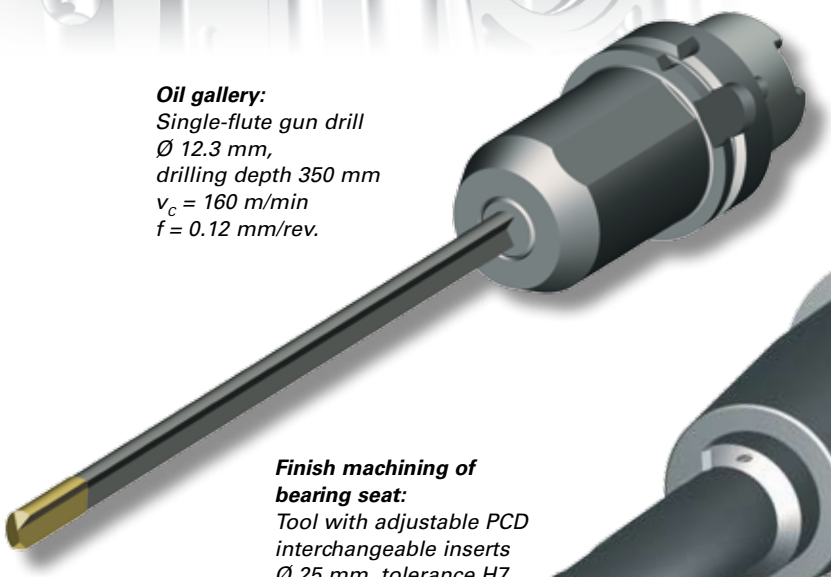
Complete machining examples of a crankcase in AlSi9Cu3, representing a cost-efficient machining method.

Optimised cutting edge geometry for individual applications:
Pre-cast holes, near burr-free machining and oblique hole exits require the application of various cutting edge geometries. In this example, cutting speeds up to v_c = 350 m/min were achieved, double the cutting speed compared to previous machining operations by developing the optimal cutting edge geometry.





Oil gallery:
Single-flute gun drill
Ø 12.3 mm,
drilling depth 350 mm
v_c = 160 m/min
f = 0.12 mm/rev.

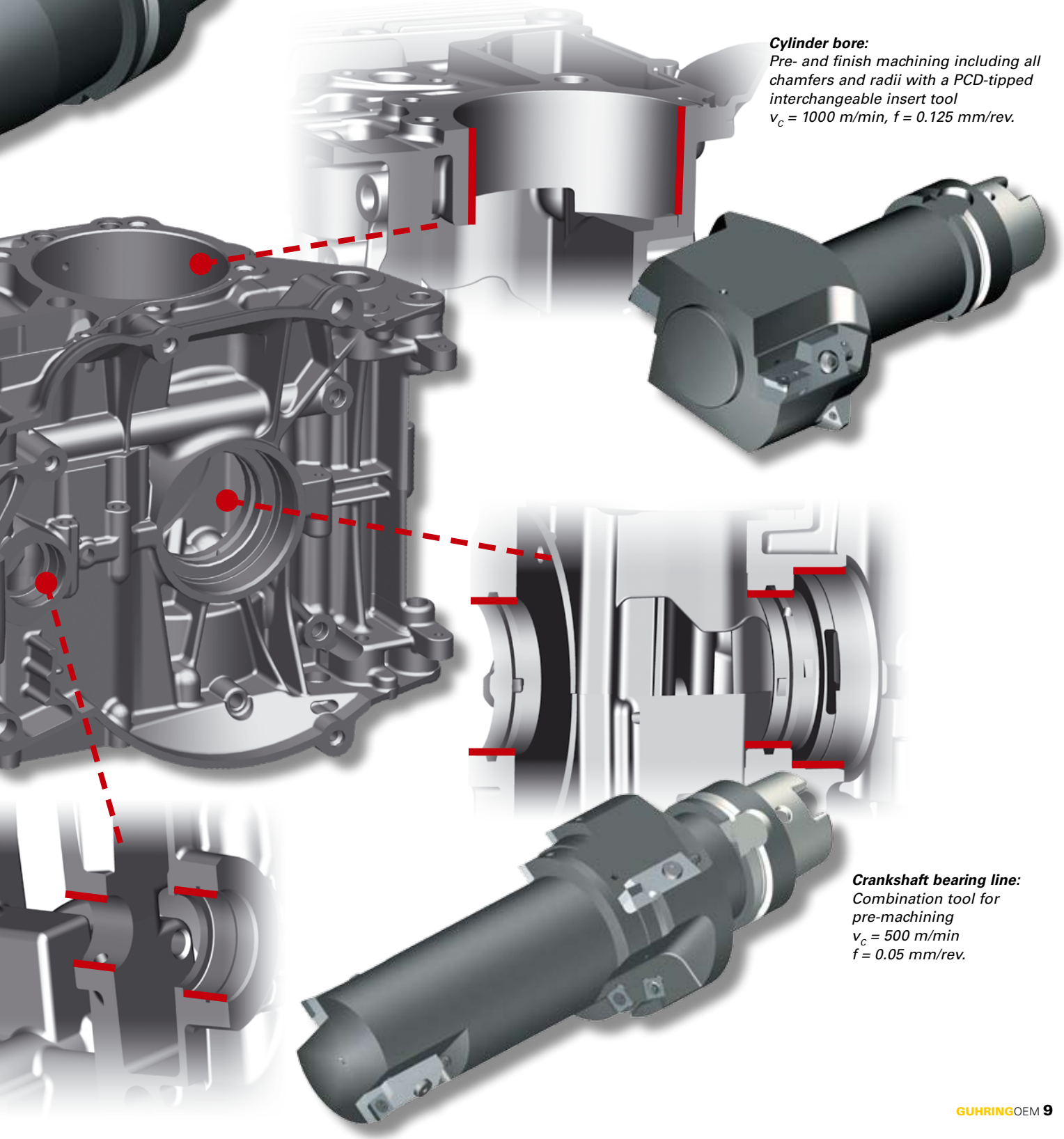


Finish machining of bearing seat:
Tool with adjustable PCD interchangeable inserts
Ø 25 mm, tolerance H7
v_c = 400 m/min
f= 0.05 mm/rev.

High-tech:
Guhring's PCD production.

Precise:
State-of-the-art measuring technolgy.

Service orientated:
On-site customer support.



Cylinder bore:
Pre- and finish machining including all chamfers and radii with a PCD-tipped interchangeable insert tool
v_c = 1000 m/min, f = 0.125 mm/rev.

Crankshaft bearing line:
Combination tool for pre-machining
v_c = 500 m/min
f = 0.05 mm/rev.

Machine acceptance: Permanent support from one company

Guhring provides on-site support with the machine acceptance and installation to the machine tool industry.

Tool development and production are only a section of the extensive range of services that Guhring's project department can offer machine manufacturers and end-users. It is, above all, a comprehensive service that should accompany the entire order processing. Naturally, this also includes supplying tools on schedule and - when Guhring is acting as a system supplier - co-ordinating all processes between the parties involved.

The machine manufacturer's partner

The responsibilities of the project department include the machine installation as well as the machine acceptance on-site with the machine manufacturer. Technical process dependent tool modifications are carried out quickly by our technicians in close co-operation with the machine manufacturer. This service also includes the provision of a comprehensive technical documentation on the agreed date.

Commissioning and volume production: An efficient service for the end-user

Optimising the process under real application conditions ensures perfect production.

Even post-delivery of the machine, Guhring continues to be a competent partner for the customer in all tooling matters.

On-site tool optimisation

On request, the project department's technical field service is present during the commissioning of the machine to, if necessary, provide tool optimisation directly on-site or, should this not be possible, arrange for it to be carried out quickly including all the documentation.

During volume production, Guhring's technical field service is available to the customer at all times to solve problems quickly and customer friendly or to maybe introduce and implement new findings of Guhring's tool development for a continual optimisation of up and running production.

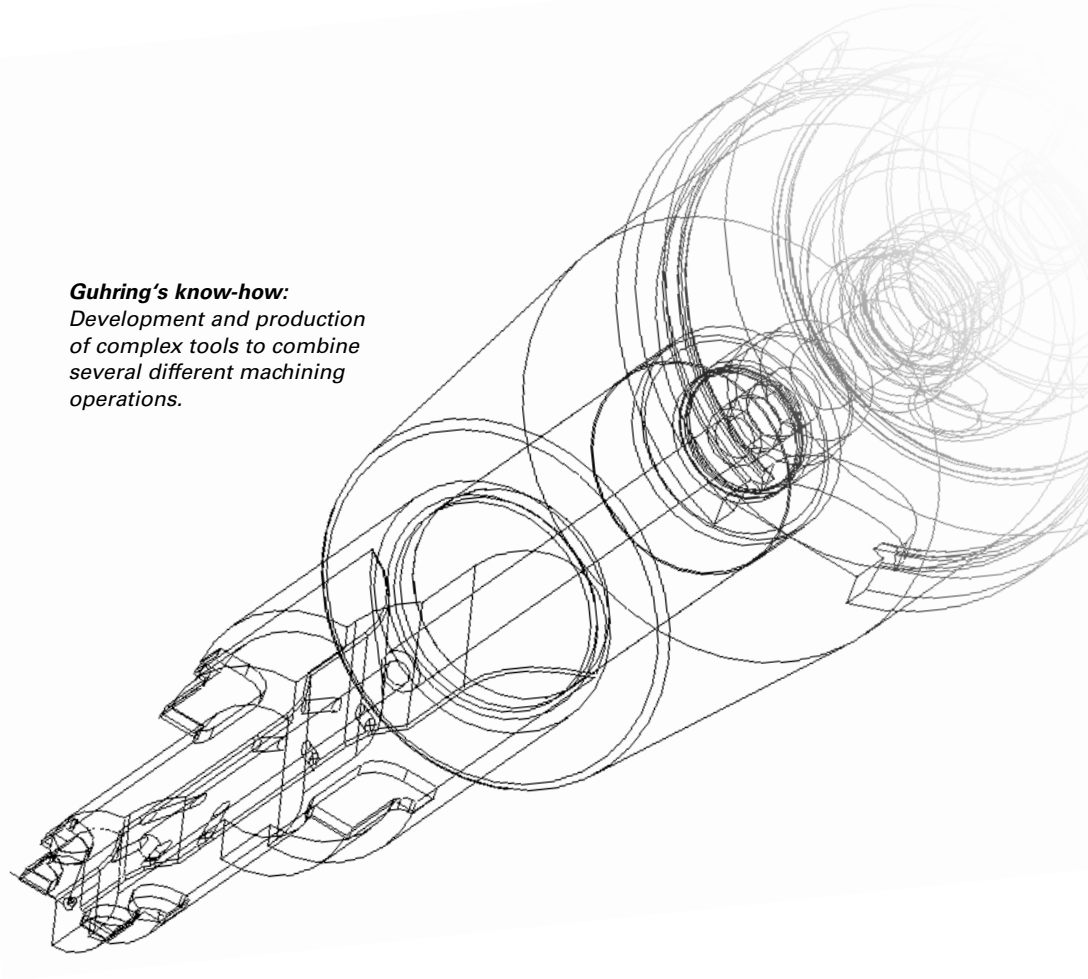
Guhring's project department, however, is not only a provider of OEM services.The department can also assist in the conversion of existing production facilities for the machining of new workpieces.

In addition, Guhring's service department offers various Tool Management Modules, allowing the customer to concentrate on his core competences and to transfer the tooling logistics to a competent partner.

Service: *Continuous optimisation of the cutting parameters...*

... and analysis of the machining results on-site with the customer.

Guhring's know-how:
Development and production of complex tools to combine several different machining operations.



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