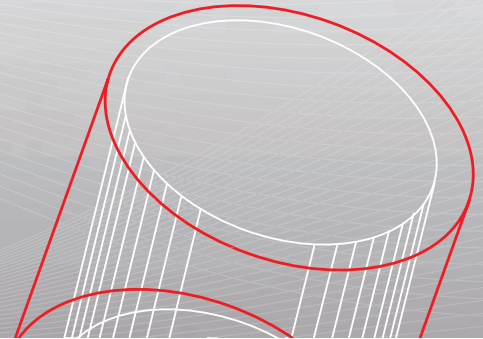
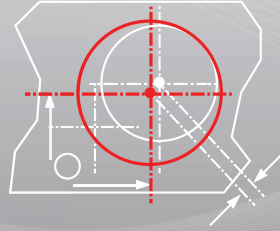
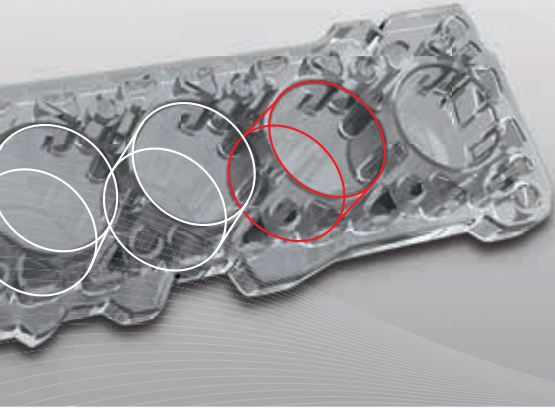


# Position Honing

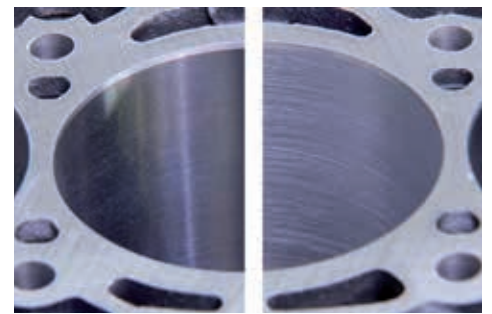


The goal of position honing is to shorten the process chain of cylinder block production without a loss to the end quality. Position honing combines fine boring and honing into one step.

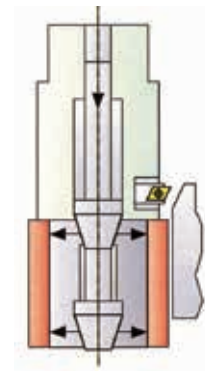
The honing process is adapted to the extended task in that not only dimensional, shape and surface accuracy are improved, but also positional accuracies such as perpendicularity and location. The extended tasks require a high degree of stock removal capacity, tailor-made process components such as tools and machine drives as well as suitable kinematic process parameters.

## Principles of position honing

Position honing improves the dimensional and shape accuracy in addition to the positional accuracy of the bore. For this reason, the tool is taken up by the spindle with high rigidity. The workpiece is positioned by index boring so that the tool axis is transferred to the bore during position honing. The tool then moves into the bore and local cutting is carried out which moves to full cutting in the process of machining the bore and with increased stock removal. The positional accuracy in respect of location and perpendicularity is thus corrected.

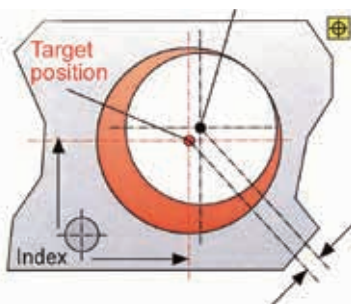


Cylinder bore, left side of picture: Boring position before honing, right side of picture: Boring position at the start of position honing



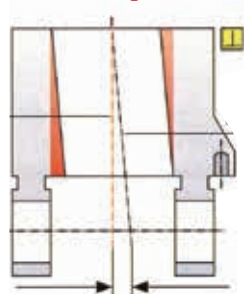
Tool with honing stone and chamfering tool

Actual position (after rough boring)



Positioning correction

Target tilt



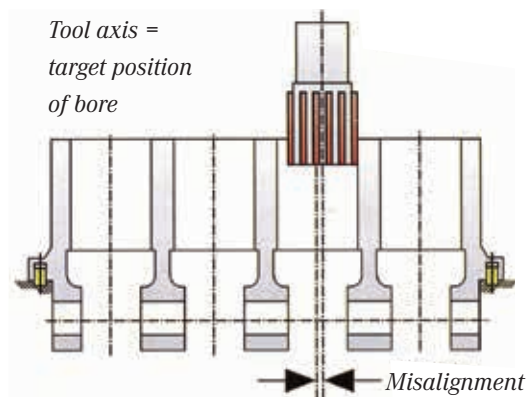
Tilt correction

Actual tilt

Index

Indexing

Tool axis = target position of bore



Actual position (after rough honing)

Misalignment



### Objective of position honing

In the process chain to date, fine boring is carried out after rough boring and then followed by three honing operations. By means of position honing, it is now possible to shorten the process chain to three steps after rough boring. These are position, intermediate and finish honing. A machining allowance of up to 0.8 mm in diameter is required for this, which is however reached in the usual cycle times of  $\leq 30$  s.

### Position honing components

In order to implement position honing from a manufacturing point of view, a rigid spindle design and a fixed workpiece clamping is required. In order to achieve the stock removal, a cutting speed of approx. 440 m/min is necessary. Diamond honing stones with wear-resistant bondings enable economic tool lives. A chamfering tool inside the honing tool provides the chamfered edge at the upper end of the bore.

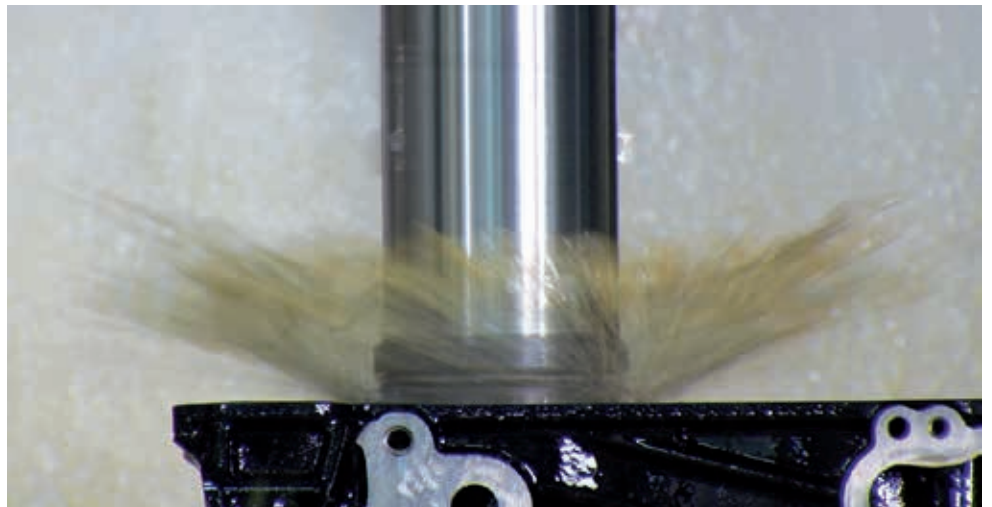
Water-miscible cooling lubricants ensure sufficient heat dissipation.

### Your benefits

With position honing, the complete investment on fine boring in respect of investment and operating costs can be saved. Position honing is particularly

advantageous for machining GGVs which only have a short life when machined conventionally with a defined cutter.

In position honing however new sharpness is generated due to tool wear thus reaching long lives. Despite shortening the conventional process chain, there is absolutely no loss to the end quality.



*Position honing*

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