



# SOLUTIONS FOR LARGE DIAMETERS

## Introduction

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## Reamers for large diameters

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# PROGRAMME OVERVIEW

## Multi-cutting edge high-performance reamers for large diameter ranges

To finely machine bores with large diameters within a defined tolerance range, users are often faced with the question: reaming or single point cutting? On the one hand it is possible to work significantly faster with multi-cutting edge reaming tools and they are less sensitive to an interrupted cut. On the other hand the reconditioning of reamers with fixed cutting edges is a complex process.

To optimise the reconditioning process, MAPAL offers two HPR systems:

### HPR300

The cutting edges on the HPR300 are not brazed or bonded instead they are clamped securely in the tool body using clamping jaws and then ground with  $\mu$ -precision. The tools offer the same performance and process reliability as brazed tools. This system permits quick and inexpensive reconditioning without the introduction of heat through to the removal or brazing of the cutting edges in the tool body. As a consequence the number of times the tool can be reconditioned increases.

### HPR400

#### Simple insert change on site

To reduce the number of tools in circulation and the tool inventory, MAPAL offers the system HPR400 on which the customer can change the inserts directly on site. It is not necessary to recondition the tool bodies, it is only necessary to keep the cutting edges required in stock.

### MultiCut

In addition to the HPR programme for large diameters, in the Basic line MAPAL offers the MultiCut program comprising cutting rings and related holders.



HPR300	HPR400	MultiCut
		
<p>Optimised for economical reconditioning.</p> <p>Ø range: 65.00 - 300.00 mm</p> <p><b>Performance</b> LINE</p>  <p><b>P M K N</b></p>	<p>Simple insert change on site.</p> <p>Ø range: 65.00 - 400.00 mm</p> <p><b>Expert</b> LINE</p>  <p><b>P M K N</b></p>	<p>Cutting rings with matching holder range.</p> <p>Ø range: 21.60 - 200.59 mm</p> <p><b>Basic</b> LINE</p>  <p><b>P K N</b></p>
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# HPR300

## Reduced costs due to innovative reconditioning

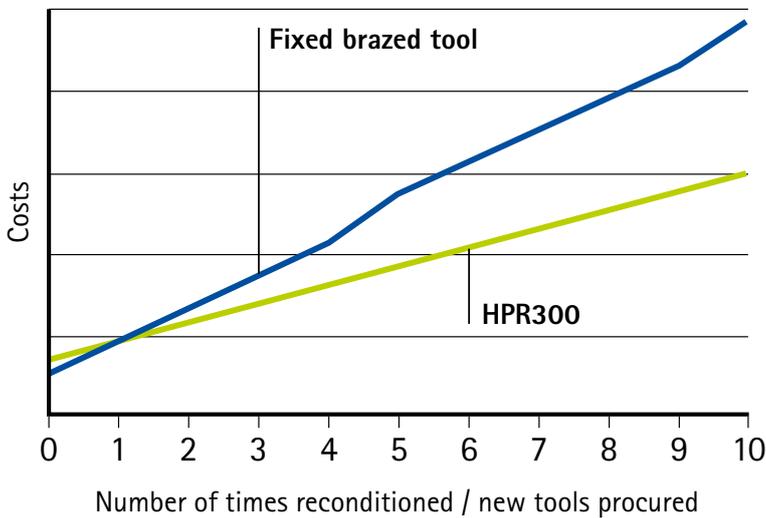
With the HPR300, MAPAL offers a system on which fixed tools can be re-tipped and re-coated far more quickly and less expensively. The cutting edges are securely clamped in the tool body by clamping jaws as blanks. Then the diameter and cutting lead geometry are ground with high precision. For reconditioning after reaching the end of the tool life, the worn cutting edges can be easily and quickly replaced with new cutting edge blanks and again ground to the original quality with  $\mu$  precision.

A further crucial advantage of the HPR300 system is that the tool body and in particular the shank retain their original, high accuracy. On the replacement of the cutting elements, the tool body is not subjected to any thermal loads whatsoever and complex cleaning processes are not required. On average, brazed

tools can be reconditioned a maximum of four times, while the HPR300 reamers can be re-tipped at least ten times. As such the tools pay for themselves already after the first few times they are reconditioned and provide significant cost savings over the entire service life without degradations in the performance compared with brazed tools.

### AT A GLANCE

- Quick and cost-effective reconditioning
- Tools can be reconditioned a large number of times
- High process reliability
- HSK and module connection
- For through bores and blind bores



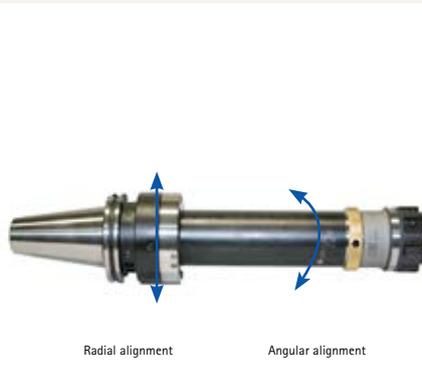


**HPR300**



**Cutting materials**

A large selection of cutting materials can be used through the HPR300 system with innovative cutting edge fastening in the tool. Even delicate cutting materials that cannot be brazed, for example ceramic, can be fastened highly accurately in this system.



**Modular system**

On tools with multiple cutting edges the radial run-out accuracy must be carefully monitored, as the radial run-out errors are transferred directly to the bore. On the HPR300 the radial run-out can be aligned axially and radially via the module connection for larger diameters and large projection lengths.



**Easy handling**

On the HPR300 there is a choice of two shank designs. Depending on the machine type, the tool can be used directly with HSK or alternatively with a module adapter. The axial and angular alignment via HSK and tool extension must be undertaken only once in the machine. During subsequent tool changes, the HPR300 can be inserted in the machine to the  $\mu$ .

# HPR400

## Reaming large diameters with simple insert change on site

Due to special, high-accuracy insert seats on the HPR400, users can change the inserts directly on site using a torque wrench with this system. The inserts cannot be fitted incorrectly, as only one installation orientation is possible and the inserts can be fitted at any position. As a result there is no setting effort, or the need to send tools for reconditioning. Users only need to have the inserts from MAPAL in stock. The quantity of tools required is low, as tool bodies do not need to be reconditioned. With minimal effort and a low number of tools in circulation, the user achieves high-accuracy bores with the HPR400.

The cutting edges are optimally adapted to the material and the machining operation. The HPR400 is available in the diameter range from 65 to 400 mm with an HSK or MAPAL's own module adapter. MAPAL offers various

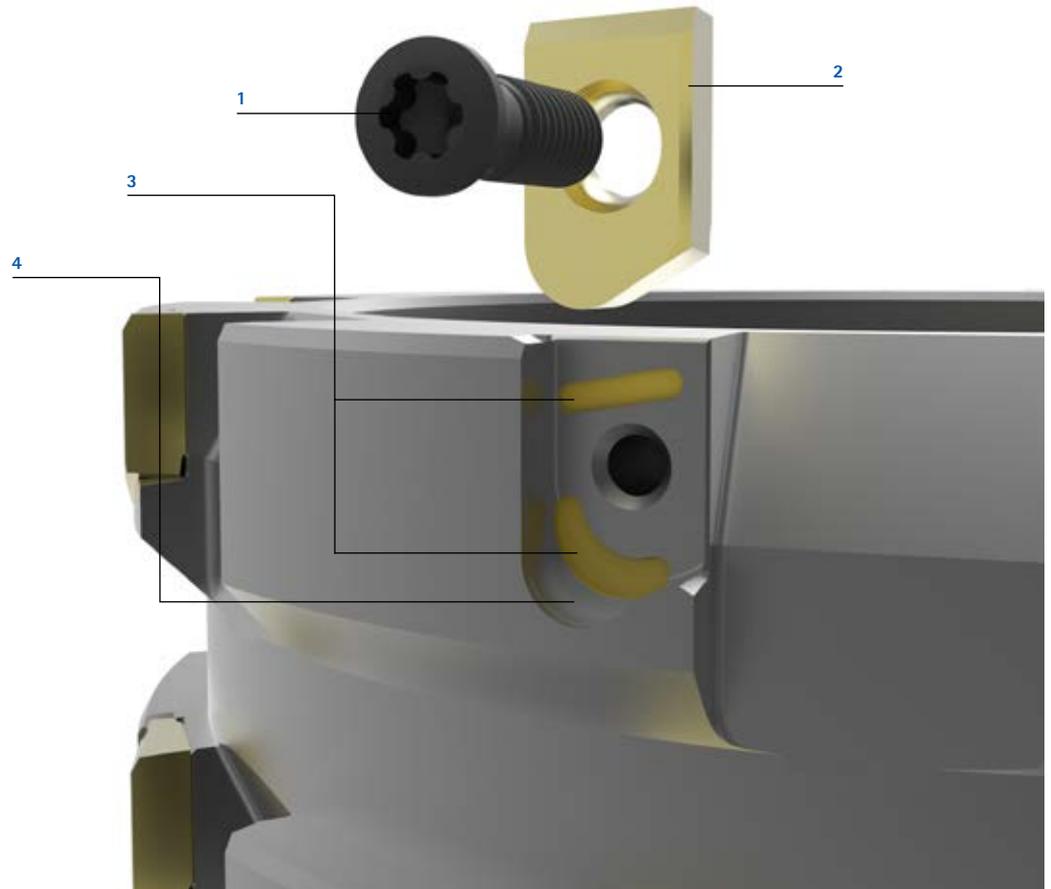
inserts made of carbide without or with CVD coating, made of cermet and tipped with PCD or PcBN.

### AT A GLANCE

- Independent insert change by the user on site
- Insert arrangement independent of the insert seat
- Reduction of the cost per part
- Reduced coating costs
- Reduction of the number of tools in circulation
- All cutting materials can be used
- Tolerance H7
- $\varnothing$  65 – 400 mm



## Tool features in detail

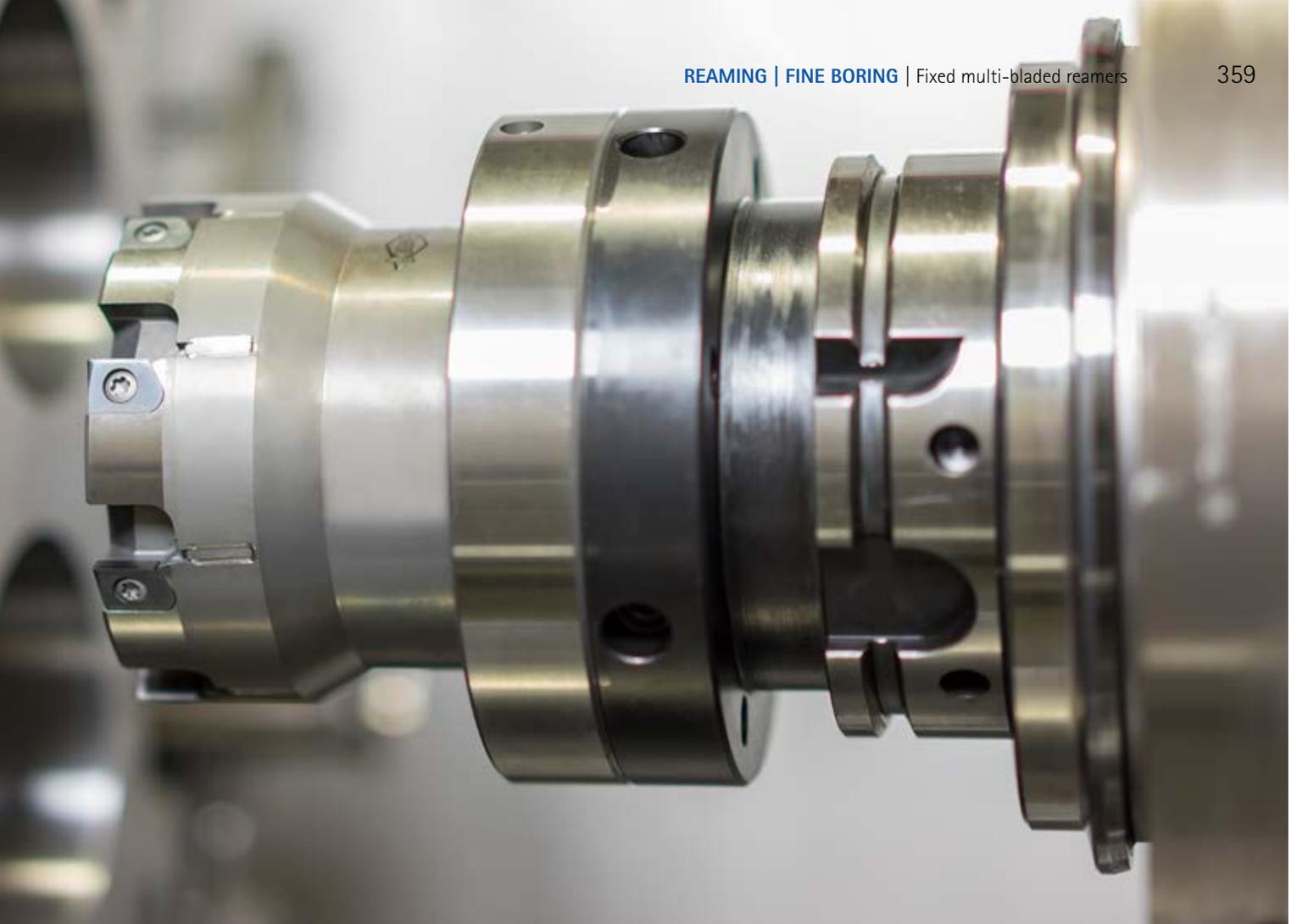


**1 Clamping screw TORX®**

**2 Insert**  
v-block shape for optimal seating

**3 Scraping pocket**  
For removing microsoiling

**4 Insert seat**  
Highly accurate for optimal adherence to tolerances



#### CVD-coated inserts



#### Optimally matched to the reaming of cast materials

The CVD-coated cutting materials available for the HPR400, which have the cutting material code HC, were developed especially for reaming ductile cast materials GJL, GJS and GJV, in difficult machining conditions, for example with interrupted cut. The CVD coating features in particular a significantly higher ductility with good wear resistance. Up to three times the tool life compared to existing PVD-coated inserts can be achieved with high process reliability using the CVD-coated inserts. Due to the clamping system, almost all other cutting materials can be supplied in the HPR400 system.

#### Cost-effective system



#### Simple insert change on site

With the HPR400, MAPAL offers a system on which the inserts can be changed by the customer on site. The replaceable inserts are pushed axially into the insert seat and are fixed reliably and highly accurately in the highly accurate insert seat using a Torx screw. The insert arrangement is independent of the insert seat. The coating costs are reduced with a reduction in the number of tools in circulation at the same time.