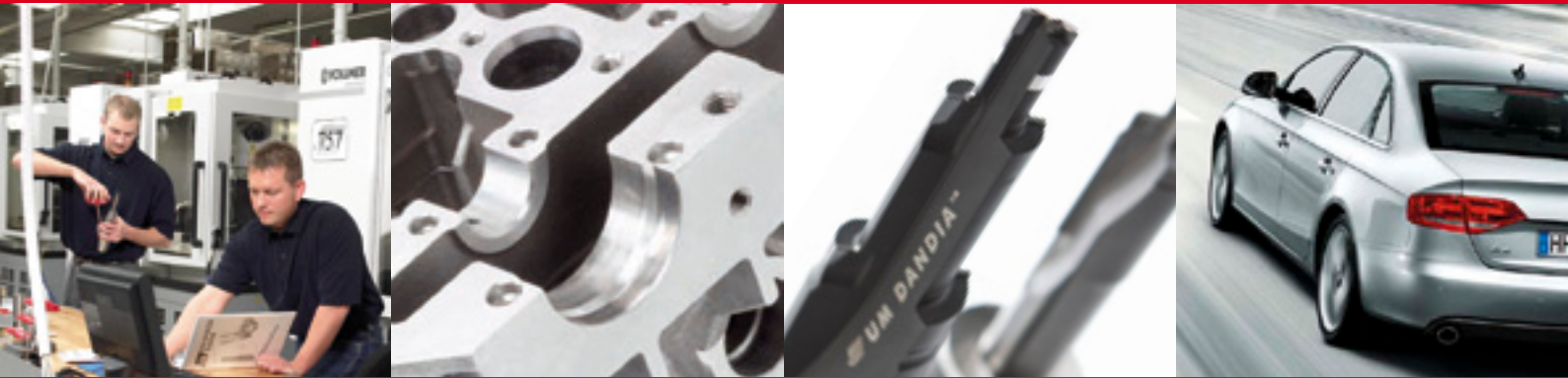


# Valve body

UM DANDIA™ tooling solutions for the automotive industry



# UM DANDIA™ PCD

## ELIMINATE FINE PCD ADJUSTMENT

### No more need for adjustable PCD's!

With the unique UM DANDIA™ guide pad system, fine adjustments of the PCD's are no longer necessary to maintain size and roundness in valve spool bore finishing – not even in interrupted cuts. Our tooling solutions are designed specifically for your application and will allow for firm and constant support throughout the entire bore. Thus, you'll experience vibration-free machining and extra-round bores. In addition, there is no need for fine PCD adjustments each and everytime you replace a tool.

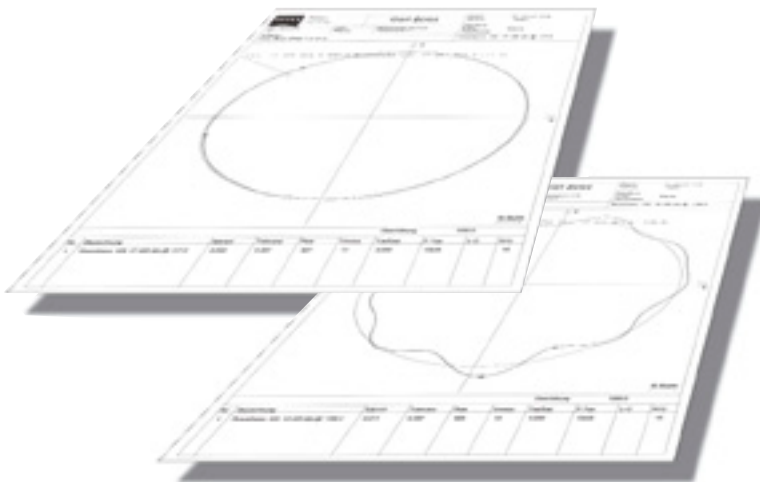
### Effective in machining centers or legacy transfer line environments

Whether you are machining valve bodies in brand-new machining centers or in a legacy transfer lines, UM DANDIA solutions have proven effective for machining smooth and round spool bores. In machining centres, We recommends that the PCD tools be used in conjunction with the UM DANDIA™ adjustable holder to provide one additional level of robustness to the machining process when the spindles begin to loosen. And for the transfer line environment, we will recommend and supply carbide bushings to properly support the tool in the cut.



#### PCD tools and coolant

Our PCD tools are suitable for traditional coolant and MQL (Minimum Quantity Lubrication). Several complete valvebody lines are running production using MQL and UM DANDIA™ reamers.



#### Tired of poor roundness?

– UM DANDIA™ tools produce second-to-none hole roundness.



#### Tired of inconsistency?

– Outstanding process reliability with Cpk's of up to 3.0 or more.

## WHY COOPERATE WITH KYOCERA UNIMERCO?

### The innovative partner

In a very close partnership, we transfer the ideas/new requirements from the market into high performance PCD tooling solutions that benefit our customers in different ways. An example is the MQL solutions which were developed in close cooperation with customers and machine tool builders.

### Increased product quality

The unique guide pad system and the very narrow tolerances in the our tools cause less vibrations and thus less friction. Your benefits include better roundness, more accurate coaxiality and a second-to-none surface quality of holes.

### Increased productivity

Optimised geometries and tool designs made according to the actual application enable the end user to operate the KYOCERA UNIMERCO tools at higher rpm and feed rates. Increased cutting parameters provide a shorter cycle time, reduce friction, increase lifetime and reduce down-time. The result is greatly increased productivity.

### Very short delivery time

Why wait more than 12 - 16 weeks on new tools when you can get a tooling solution designed specifically for you much faster from us? And, of course, we are able to make in-house tests, which we document in a report for you. Your tools will be delivered "ready-to-use".

### Professional technical back-up

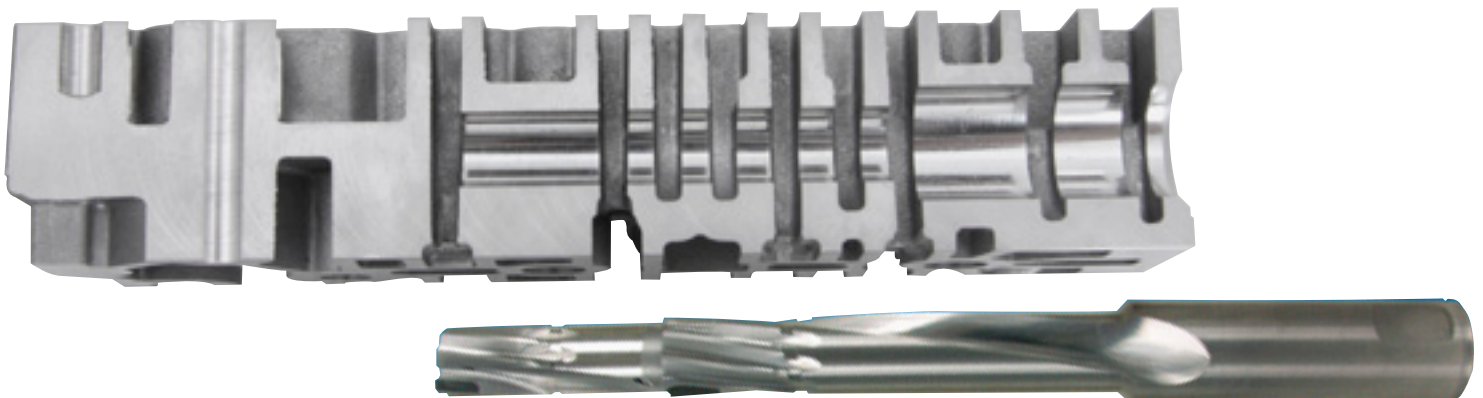
With highly qualified tooling technicians working in close cooperation with the end user, we are ready to help you find the right cutting tools and also the best complete machine environment. In other words, we optimise the tool performance until you get the expected output.

### Not only regrinding but "RE•NEW®"

We regrind your tools with the same attention to detail as when we manufacture new tools. Original tool geometries are secured in our RE•NEW® process. We also RE•NEW® other tool brands with very good results - often better than when you received the new tool.

### 100% repeatability




But of course not even KYOCERA UNIMERCO tools can run forever. Due to a unique internally developed norm system and a highly developed drawing database, we are able to continuously deliver cutting tools with the exact same geometries throughout all future deliveries, regardless of the place of production.



Unsurpassed surface finish with UM DANDIA™ PCD tooling solutions.

# OPTIMISATION IN THE AUTOMOTIVE INDUSTRY

## SPOOL BORE MACHINING

			
<b>PILOTING</b>	<b>PLUG/PILOT</b>	<b>SEMI-FINISHING</b>	<b>FINISHING</b>
<b>MULTI DIAMETER PCD TOOL</b> n = 12,000 rpm fn = 0.4 mm/rev	<b>MULTI DIAMETER PCD TOOL</b> n = 8,000 rpm fn = 0.3 mm/rev	<b>PCD STEP REAMER</b> n = 8,000 rpm fn = 0.4 mm/rev	<b>PCD REAMER WITH GUIDE PADS</b> n = 10,000 rpm fn = 0.5 mm/rev

3 PASS PROCESS STRATEGY

2 PASS PROCESS STRATEGY

1 PASS PROCESS STRATEGY

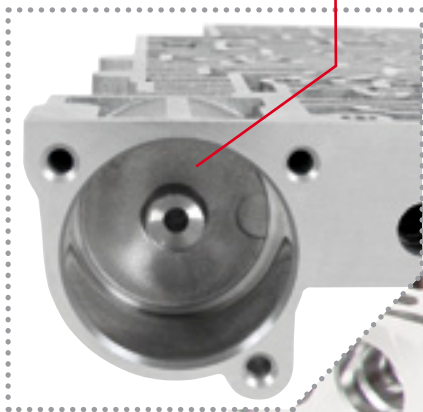
**ACCUMULATOR BORE  
PCD COMBINATION TOOL**

n = 5,000 rpm  
fn = 0.2 mm/rev



**MOUNTING HOLES  
PCD STEP DRILL**

n = 12,000 rpm  
fn = 0.2 mm/rev



**LOCATER HOLES  
PCD STEP REAMER**

n = 10,000 rpm  
fn = 0.4 mm/rev



**FACE MILLING  
PCD END MILL**

n = 15,000 rpm  
fn = 0.13 - 0.25 mm/rev



## SPOOL BORE PROCESS STRATEGY

### Out-of-box solution

KYOCERA UNIMERCO has customers who refer to UNIMERCO spool bore tooling solutions as “out-of-the-box performance”. In short, this means that in cases where the machine spindles are in good order, the toolholder assembly can be taken right out of the box and placed on the machine spindle, and the first part produced will be a good part. We supply the toolholder assembly pre-balanced, gauge length preset and with assembly set runout within 0.002mm.

### Adjustable holder system

The UNIMERCO adjustable holder provides an effective user-friendly method of dialing in tools. Dialing in tools on a machine spindle becomes necessary when the machine spindle is worn or when the part tolerance is very narrow. The UNIMERCO adjustable holder can be set within a matter of minutes, maintaining 0.002mm or better runout. In the long-term, this will improve tool life and robustness, resulting in consistent part quality.

### Life-long traceability of a tool

The UNIMERCO tools/assemblies are delivered in protective wooden boxes with foam surrounding the tools/holders. Additionally, the box contains a measuring report that provides valuable information for the end-user as well as KYOCERA UNIMERCO. We use this information to track tools for quality and rework purposes. For you it provides traceability, thus assuring repeatable performance from the new and renewed tool.

› The padded wooden box provides superb protection against transport and stocking damages and gives immediate access to measuring data and RE-NEW® records.

› Drawing on top of the box ensures quick identification of the tool.



# SPOOL BORE PROCESS STRATEGY

## UM DANDIA – OPTIMUM SOLUTIONS

### Simple and unique design

The user-friendly UNIMERCO tooling requires a minimum of setting-up for the end user. The tool design results in a consistent quality over the entire life span of the tool.

### Cutting parameters

The tooling is designed with two cutting edges, thus allowing for higher feed per revolution – in turn lower RPM is required for meeting cycle times. Lower RPM is also beneficial to the total life of the spindle.

### Robust process

Depending on the design of the part, clamping, etc., it may be necessary to use a robust process. We consider a robust process one that if certain variations are introduced from castings, coolant, etc., the process will still produce a good part, hence a robust process. The robust process consists of the following:

- › Plug drill for core pin flash (optional, MQL and x D dependent)
- › Pilot tool – used to create a round target for the start of the semi-finish and finisher

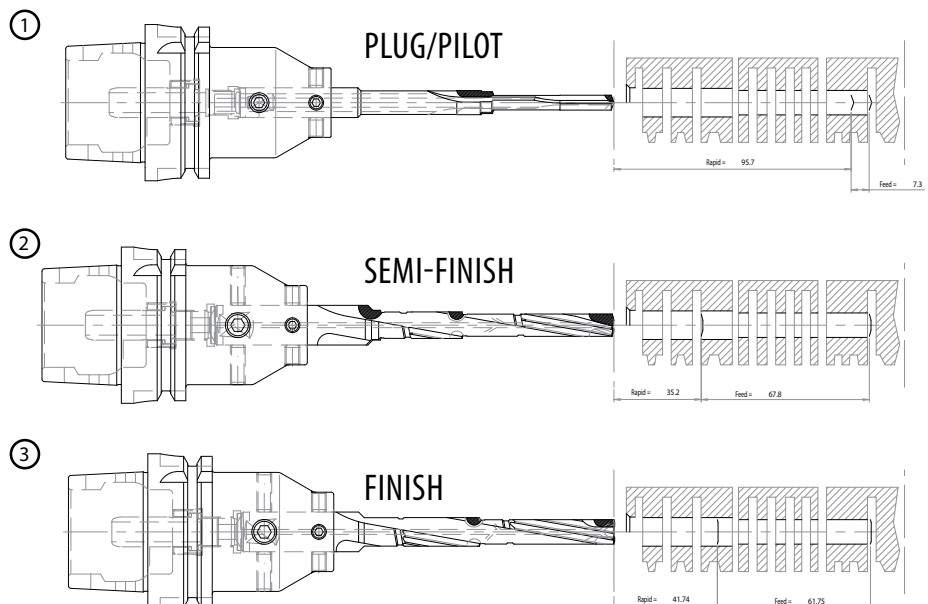
- › Plug drill and pilot tool will often be combined in one.
- › Semi-finish – removes core diameter stock and leaves necessary stock for finisher to generate final features
- › Finisher – generates finish diameters.

### Producing bores in one or two passes

Within UNIMERCO tooling designs, it is possible to produce bores in one or two passes. The following needs to be considered for a two or single pass process:

- › The machined feature tolerance
- › The cast core prior to machining
- › The diameter length ratio of all diameters on the machined feature
- › The number of diameters on machined feature
- › The rigidity of the part structure
- › The rigidity of the fixture
- › The type of coolant, wet or MQL.

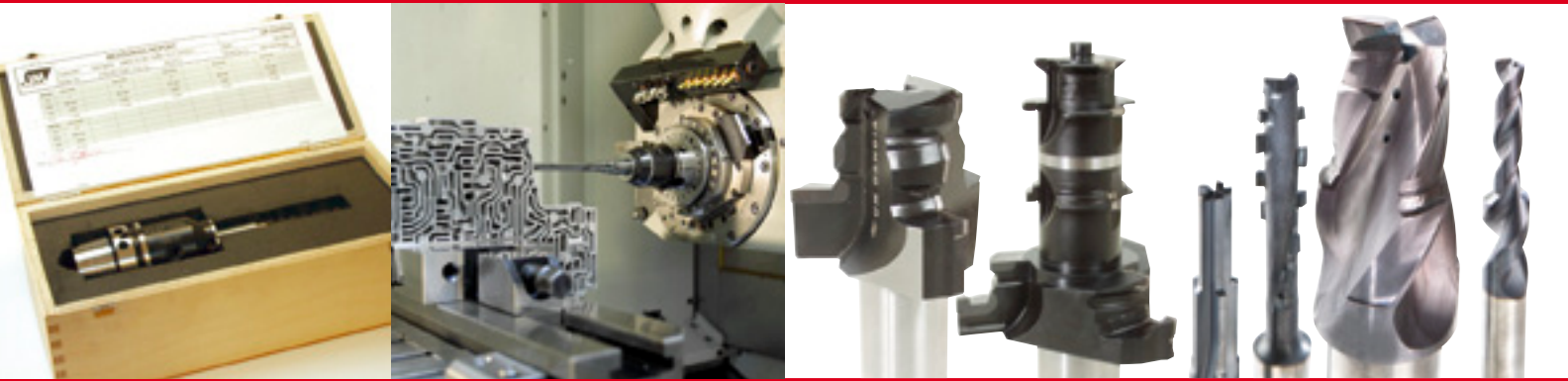
› An example of a three-process strategy for spool bore machining.



## KYOCERA UNIMERCO Tooling A/S

KYOCERA UNIMERCO manufactures, distributes and services tools for machining, as well as measuring equipment for the manufacturing industry. The tooling concept comprises standard and customised tools, RE-NEW® tool maintenance, coating and optimisation guidance. The Danish company was established in 1964 and has product development, production, sales and service in the corporate headquarters, located in Sunds.

The company is part of the KYOCERA UNIMERCO group, founded in Denmark in 1964 and originally named UNIMERCO. In 2011, all activities were taken over by Japan-based KYOCERA. This has created an even stronger company with a larger range of products, a wide network of companies and distributors all over the world, and an ambitious growth plan.



KYOCERA UNIMERCO Tooling A/S

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