

THE NEW VALUE FRONTIER



AERO SPACE | **Efficient  
machining**

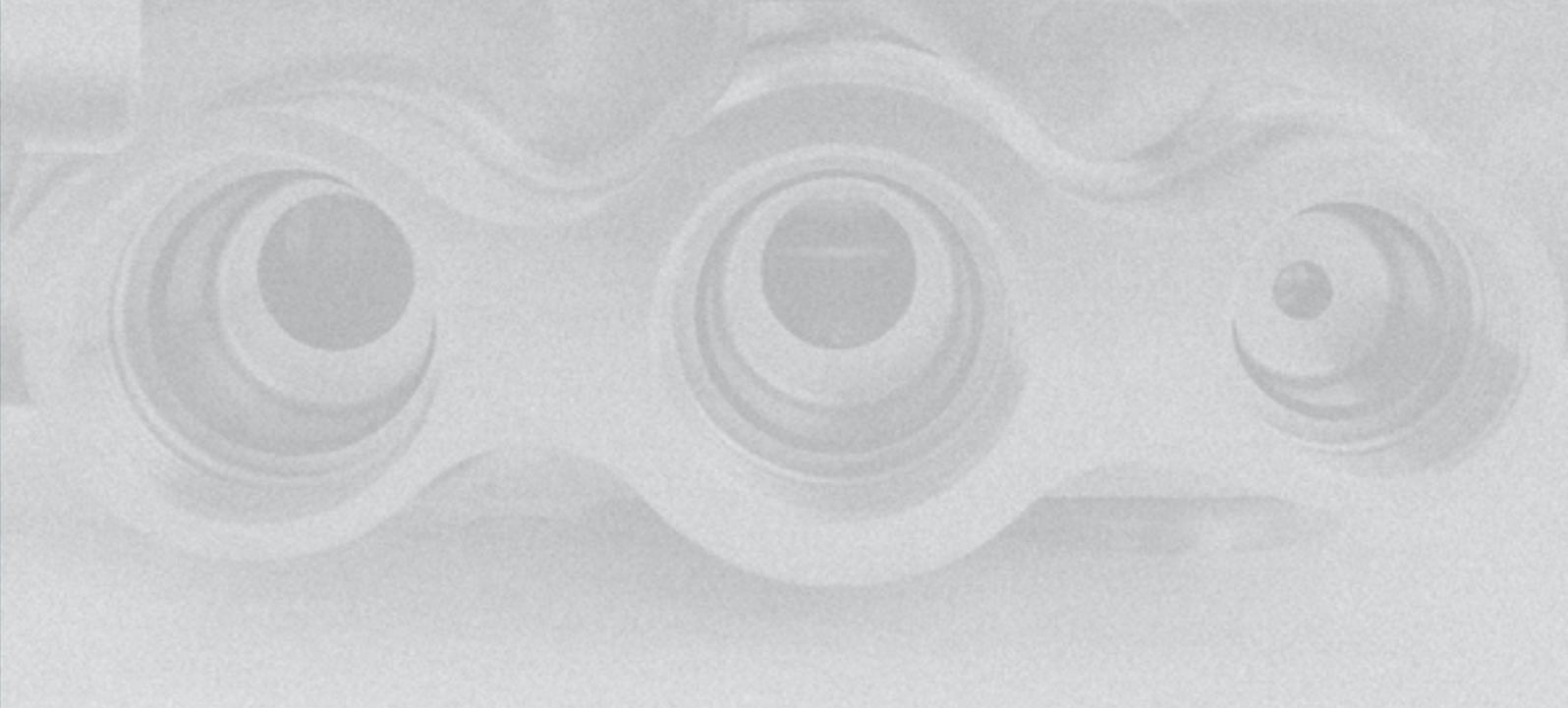
# Efficient machining

of aircraft hydraulic controls components



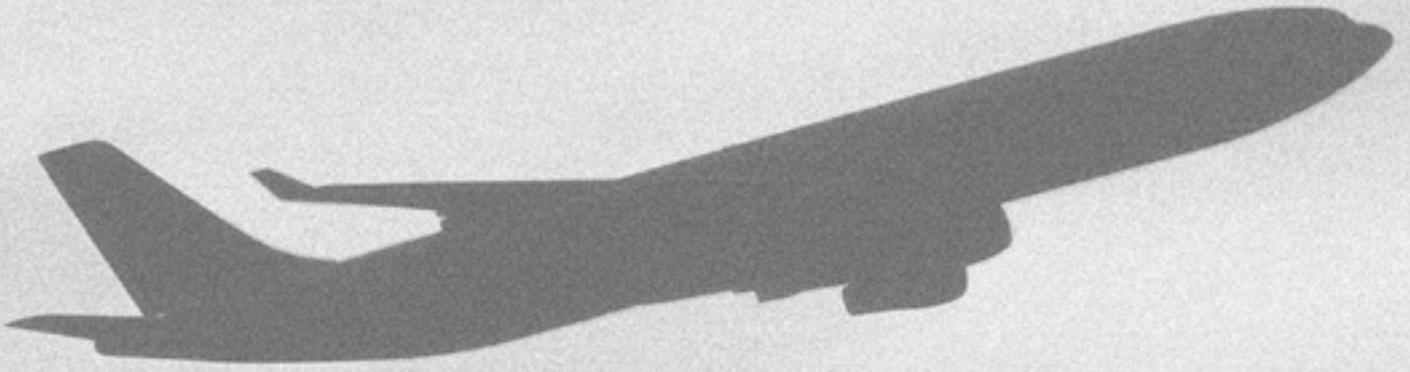
**Optimized machining of hydraulic  
components through efficient tool design.**





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# AIRCRAFT HYDRAULIC CONTROL SYSTEMS





## I n t r o d u c t i o n

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Kyocera-Unimerco supports the manufacturing of components made from Aluminium alloys, Stainless steels through to Titanium. Common features for Hydraulic Control systems components are the requests for close tolerance bores as well as super finished surface quality.

We are market leading experts in designing machining processes which will give you the highest possible return on investment.

Conventional machining; high-speed machining; small diameter/ deep hole drilling; multi-diameter drill/ream/port boring – all part of the complete tooling package which we will tune in, to your demand.

All our solutions carry a heritage of solid craftsmanship in engineering, manufacturing and extensive testing. Thus we are able to document our machining solutions through simulations, which will accurately predict your ROI when adopting a Kyocera-Unimerco solution.

Our skilled manufacturing engineers will assist you during deployment of new tooling. We strive to give you the maximum benefit of using Kyocera Unimerco tooling solutions.



## V a l v e   b o d i e s

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Valve Bodies and Manifolds, commonly made in Aluminium and in some cases Titanium.

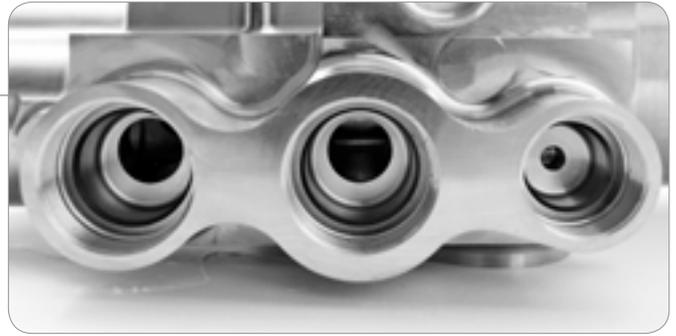
The majority of holes have a threaded entrance.

Many holes are crossed by other holes along the extent of the bore depth. This challenges the tool to produce the requested straightness and surface quality.

Our key product offering for these types of components are the often radical reductions in drilling process time without compromising component quality.

# AEROSPACE HYDRAULIC CONTROLS

VALVE BODIES  
MOTION CONTROLS



## M o t i o n   c o n t r o l s

Motion Controls / Actuator bodies for Aircraft are predominantly made in Titanium.

MS Port holes and Rosan Port holes require stepped drilling and thread milling. Strict requirements to seal-angle surfaces, to withstand peak loads during operation.

Quality requirements for the main bore are tight diameter tolerance; surface roughness below  $1\mu\text{m Ra}$ ; optimal straightness and roundness. Challenging for any finishing tool with a high Diameter/Depth ratio in Titanium.

Kyocera Unimerco are highly specialized in optimizing the sequence of tooling for all processes in the manufacturing of Motion Controls.

Our target is the least possible amount of tools in process, with the highest possible material removal rates.

## CASE STORY • TITANIUM ACTUATION BODY, MAIN BORE



### OPTIMIZED PERFORMANCE AND ACCURACY IN TITANIUM

The following pages illustrate how Kyocera Unimerco have designed the sequence of tools in order to optimize performance and accuracy. Each tool is carefully selected for its unique features.



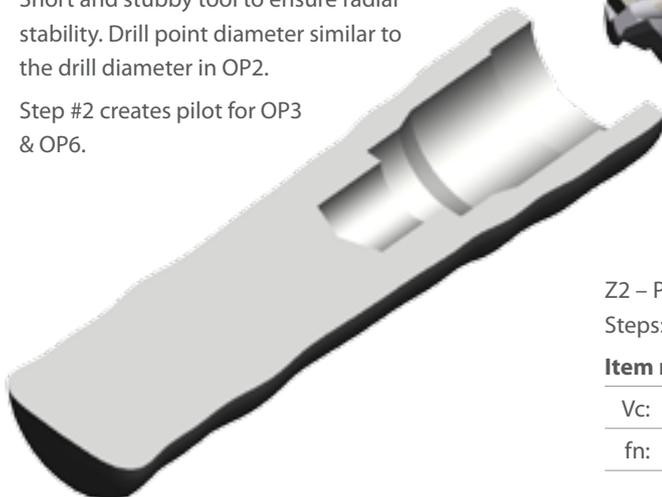
#### OP#1 PILOT DRILL



#### Kyocera Unimerco DRA Drill with indexable inserts on steps

Short and stubby tool to ensure radial stability. Drill point diameter similar to the drill diameter in OP2.

Step #2 creates pilot for OP3 & OP6.

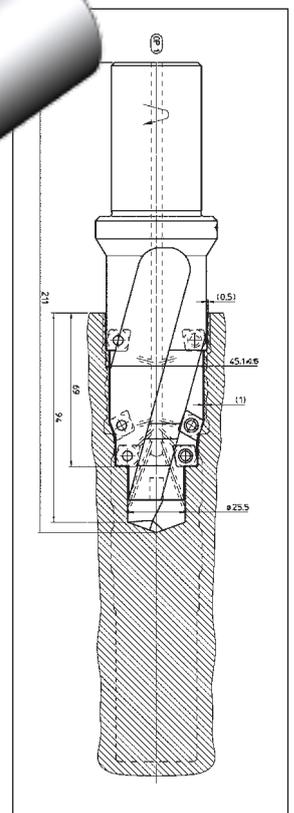


Z2 – Point: DRA DA2550  
Steps: CCMT09T308

**Item number: 211200/000134**

Vc: 40 m/min / Ø25

fn: 0,15 mm/n



## OP#2 ROUGHING DRILL



Kyocera Standard indexable point drill – market leading in material removal rate and directional stability.



Kyocera Modular Drill 8xD

**Item number:**

Body: SS32-DRA250M-8

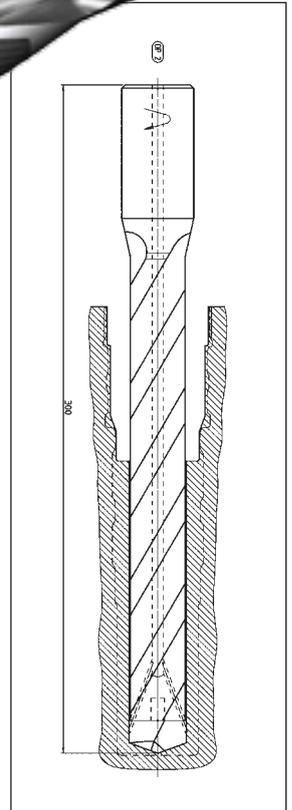
Insert: DA2550M-GM, PR1535

n: 510 rpm

Vc: 40 m/min

fn: 0,15 mm/n

Vf: 76 mm/min



## OP#3 SEMI-FINISHING CORE DRILL



Carbide tipped steel body tool, coated with C7Plus™, Nanocomposite coating (see coating flyer) for optimal wear resistance in Titanium. Helical flutes combined with directed coolant holes, evacuate swarf easily out of the bore.

**Also made as solid carbide.**



Kyocera Unimerco Carbide Tipped Stepped Core Drill, Z3

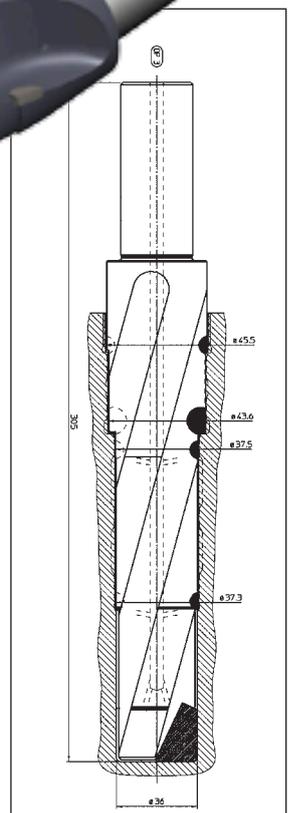
**Item number: 210120/000215**

n: 220 rpm

Vc: 25 m/min. / Ø36 • 31 m/min. / Ø45

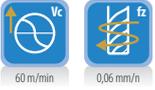
fn: 0,24 mm/n

Vf: 52 mm/min.



OP#4

## UNDERCUT FOR SEALING RING



Optimal combination of Carbide Grade and coating for machining Titanium. Cutting geometries designed for chatter free cutting and numerous cycles of ReNew™ (regrinding).

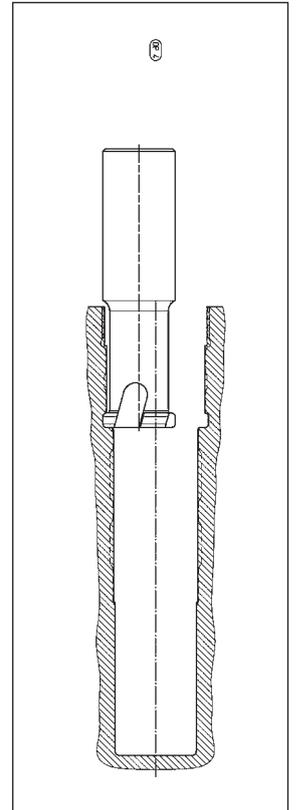


Kyocera Unimerco SC Profile Cutter  
 $\varnothing 32$ , R1.5, Z6

**Item number: 432708/000543**

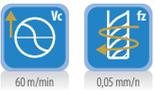
n: 597 rpm

Vc: 60 m/min



OP#5

## UNDERCUT FOR THREADING



Optimal combination of Carbide Grade and coating for machining Titanium. Cutting geometries designed for chatter free cutting and numerous cycles of ReNew™ (regrinding).

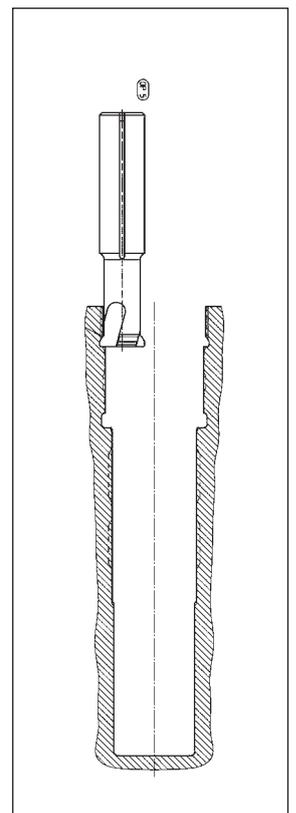


Kyocera Unimerco SC Profile Cutter  
 $\varnothing 20$ , Z6

**Item number: 432708/000407**

n: 955 rpm

Vc: 60 m/min



**OP#6 FINISH REAMING**



Optimal combination of Carbide Grade and coating for machining Titanium. Tool technology enables several ReNew™ (regrinding) passes as well as Re-tipping.

**Also made as solid carbide.**



Kyocera Unimerco Carbide Tipped Step Reamer, Z4

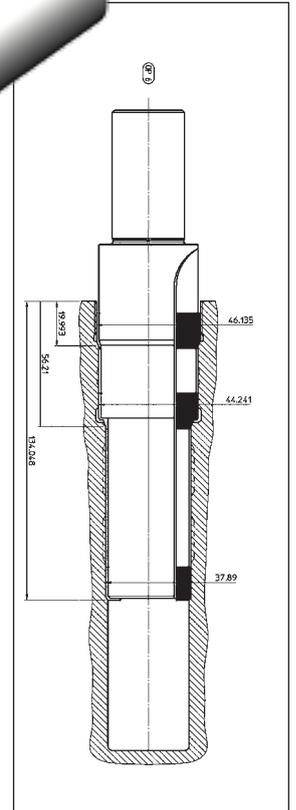
**Item number: 250742/003725**

n: 173 rpm

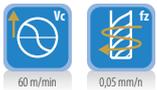
Vc: 25 m/min / Ø37

fn: 0,40 mm/n

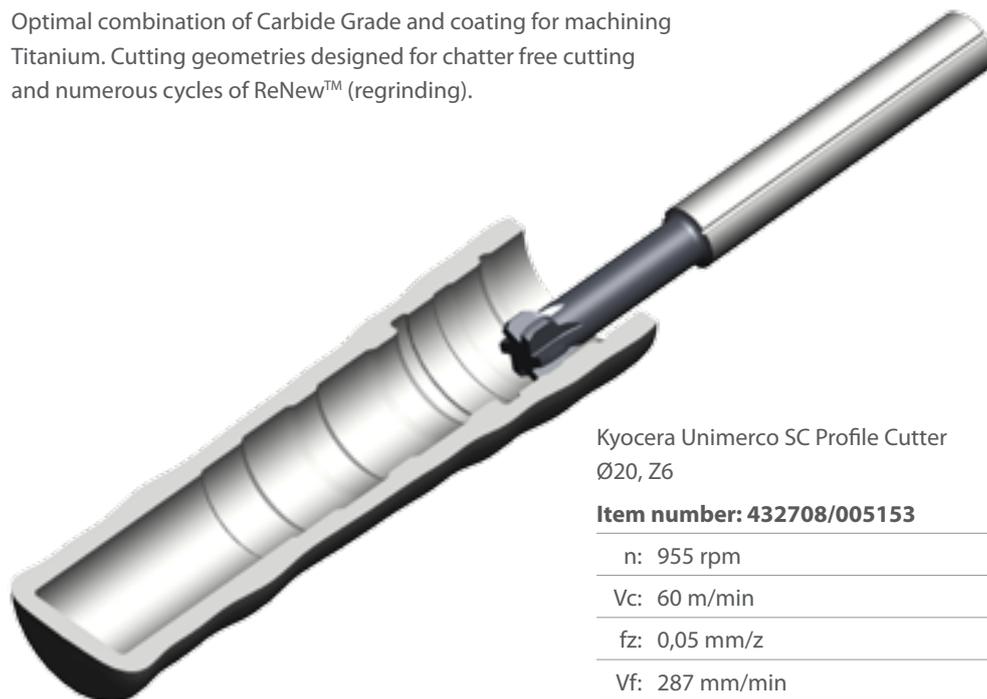
Vf: 69 mm/min



**OP#7 RECESS CUTTING**



Optimal combination of Carbide Grade and coating for machining Titanium. Cutting geometries designed for chatter free cutting and numerous cycles of ReNew™ (regrinding).



Kyocera Unimerco SC Profile Cutter  
Ø20, Z6

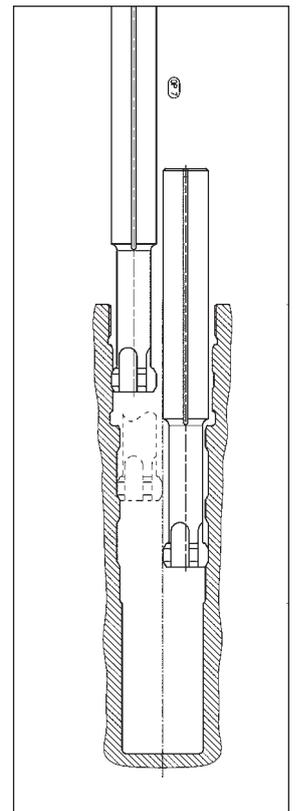
**Item number: 432708/005153**

n: 955 rpm

Vc: 60 m/min

fz: 0,05 mm/z

Vf: 287 mm/min





# OPTIMUM MANUFACTURING PROCESSES

## **PARTNERSHIP**

A good cooperation must be beneficial to both parties. We think of our customers as our partners because we think that efficient and profitable production at our customers is the best foundation of our own long-term success.

## **A DIFFERENT SUPPLIER**

Being a supplier, our principal job is to work towards improving your competitiveness. We analyse and optimise your key processes so that together we can ensure that your production is as effective as at all possible.

We offer advice and guidance on machine and tool investments as well as in connection with running-in of new products.

## **REDUCE YOUR PRODUCTION COSTS**

Even small changes may often provide significant increases in productivity and quality improvements. At the same time, the improvements release production capacity and this means that planned machine investments can often be postponed or even avoided. Considering the cost structure in a typical manufacturing company, this is often very decisive for the unit costs.

## **SYSTEMATIC OPTIMISATION OF PRODUCTION**

UM SOP™ is a method and an optimisation tool which is applied in order to reduce your production unit costs.

The working method includes a systematised approach to the optimisation work which e.g. contains analyses of selected production processes, determination of success criteria, financial feasibility studies as well as choice and implementation of new tooling solutions.

## **SYSTEMATIC WORKING METHOD**

UM SOP™ has been developed by Kyocera Unimerco and is used by all Kyocera Unimerco sales technicians in their daily work.

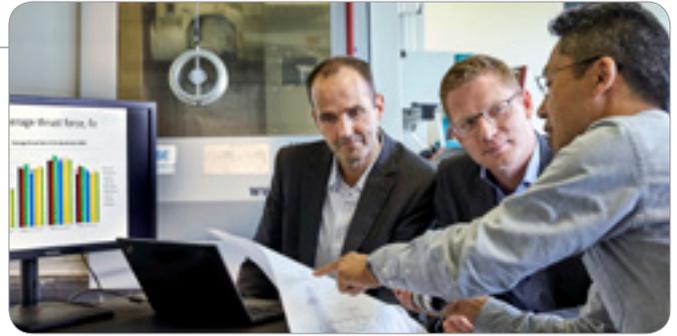
This means that our sales technicians always systematically focus on individual machines or processes when they visit you – even if no actual optimisation is in progress.

This way, all the important production areas of your company will be analysed over time, enabling you to benefit from our total knowhow concerning tools, tooling solutions and production processes.

At the same time, courtesy visits or sales visits are replaced by targeted and beneficial optimisation work.

## SYSTEMATIC OPTIMISATION OF PRODUCTION

- Optimisation models
- Tool maintenance
- Complete tooling programmes
- Tool management systems
- Customised tools
- Training and education



## UNIQUELY COMBINING KNOWHOW AND TOOLS

UM SOP™ combines Kyocera Unimerco optimisation knowledge and knowhow with the best tooling solutions fitted to your individual needs:

- Knowhow systematised in technical and financial models which help us find the optimum tooling solution.
- Tooling solutions, i.e. the best cutting tools and toolholders with the features necessary to create the optimum manufacturing situation.

## OPTIMISATION MODELS

Optimising a process requires extensive knowhow. In depth knowledge of workpiece material, machinery and tools is essential to be able to select the right solution and the optimum machining parameters.

Our optimisation experts apply a number of technical and financial analysis tools to find the optimum solution for any given situation. The models are also used to fully document the effect of the improvements which have been carried out. Good documentation forms the best foundation of the future optimisation work and any future investments in machinery.

## THE RESULTS

The savings are substantial – we are often looking at savings of several thousand pounds or more. Savings may also save investments in new machinery when we increase capacity on the existing equipment. The consequence may also be personnel savings or shutting down of entire working shifts. Or on the positive side – increase of production capacity enabling you to sell more at competitive prices and increased profit margins.

## MUTUALLY BINDING COOPERATION

Carrying out systematic optimisation of production makes heavy demands on our knowhow regarding new technology, methods of production, materials and tools.

In return, we expect that our customers enter into a binding cooperation. On your side, you must secure that the necessary resources are available and you must also make sure that your organisation has accepted the optimisation.

The precondition for a successful optimisation is the joint cooperation aiming to reach the target.

Contact us and learn what systematic optimisation of production can do for the financial position and competitiveness of your company.

## RE•NEW™ - ANYTHING ELSE IS JUST A RE-GRIND

### ...IT'S EASY

All you have to do is pack up your tools and ship them to us at your convenience. When the tools have been through the RE•NEW™ process we will pack them in our special packaging and ship them back to you.

Kyocera Unimerco will pick up and deliver your tools per your request or according to an agreed schedule. We call this UNI•SERVICE™. Our skilled personnel can also advise you of the best RE•NEW™ solution for your tools and help initiate orders for replacement tools as well.

### ...IT'S CUSTOMISED TO FIT YOUR NEEDS

Your tools will normally undergo the standard RE•NEW™ process and be coated, if ordered. Any special requirements for one-off jobs or fixed special agreements for certain tool types will be managed through our computer system to ensure that your orders are always processed correctly.

Kyocera Unimerco has deployed a fully integrated tool vending/management solution.

Our vending systems can be programmed to dispense RE•NEWed tools prior to dispensing any new tooling which may be present. Therefore, the operator will always be issued with a tool which will perform as well as a new tool, but at a fraction of the cost.

### ...IT'S FAST

Generally, you will receive your tools back from RE•NEW™ within 7 days (uncoated) or 10 days (coated) after we have received them. Large orders will be delivered upon agreement.

### ...IT'S CONSISTENT

We have standardised the RE•NEW™ and re-coating processes. Advanced CNC machines, highly trained operators, norm management, databases and integrated routines will ensure that your tools are RE•NEWed optimally – each time.

### ...IT REDUCES YOUR COSTS

You will also save up to 75% of your tooling costs. When you receive your tools from us, their quality and performance properties will be the same – each time. This enables you to continue working at the same high machining parameters, and therefore, you will not experience any productivity reductions.

### PROFESSIONAL ADVICE

We are always prepared to help and guide you with your tool maintenance.

#### Kyocera Unimerco Tooling Ltd

Nanscawen Road, Fradley, Lichfield WS13 8LH, United Kingdom  
Phone: +44 1543 267777



## TOOL MAINTENANCE

### WHY RE•NEW™?

**Our tool maintenance concept is much more than just regrinding.**

**That is why we call it RE•NEW™.**

**Tools given the name RE•NEW™ will perform better than or equal to a new tool – with performance guarantee.**



### High-tech tool processing

When you send your tools for RE•NEW™, they will undergo a managed inspection when we receive them and before we ship them back to you. In the process we will check if it is economical to repair/re-grind your tools. Re-grinding and restoring cutting geometries will be carried out on advanced CNC grinding machines. The optimised process, many years of experience and top-notch technology are just three factors that guarantee superior tool maintenance for you.



### Surface treatment and edge preparation

Coating can boost tool performance, prolong tool life and reduce scrapping in your production. Therefore, it is essential for your productivity that your coated tools are re-coated when they have been reground, in order to restore the original geometries. The high-tech equipment in our in-house coating centre gives you maximum quality and ultra-thin, hard coating – and the coating process will not delay your delivery significantly. Before and after coating we can improve tool life and consistency further with our Power Edge™ preparation technology.



### Standards management

All tools are reground in accordance with the original geometries and/or norms. The RE•NEW™ instructions are developed and maintained centrally, but distributed to all Kyocera Unimerco companies via our international server. This means that all CNC-controlled machines in all companies use the exact same machining data. The result is extreme accuracy and repeatability of original geometries – each time.



### Special packaging

Now that your tools have been RE•NEWed and will perform as good as new ones, we would like to make sure that you receive them undamaged. Our special packaging has been developed to protect your tools during transportation. But it is also a professional and perfect way of storing your tools when they are not being used.

**RE•NEW™**  
– anything else is just a re-grind



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 Lichfield company was established in 1998 and has product development, production, sales and service. In 2011, all activities were acquired by Japan-based KYOCERA, founded in 1959.



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Tel. +44 1543 267777