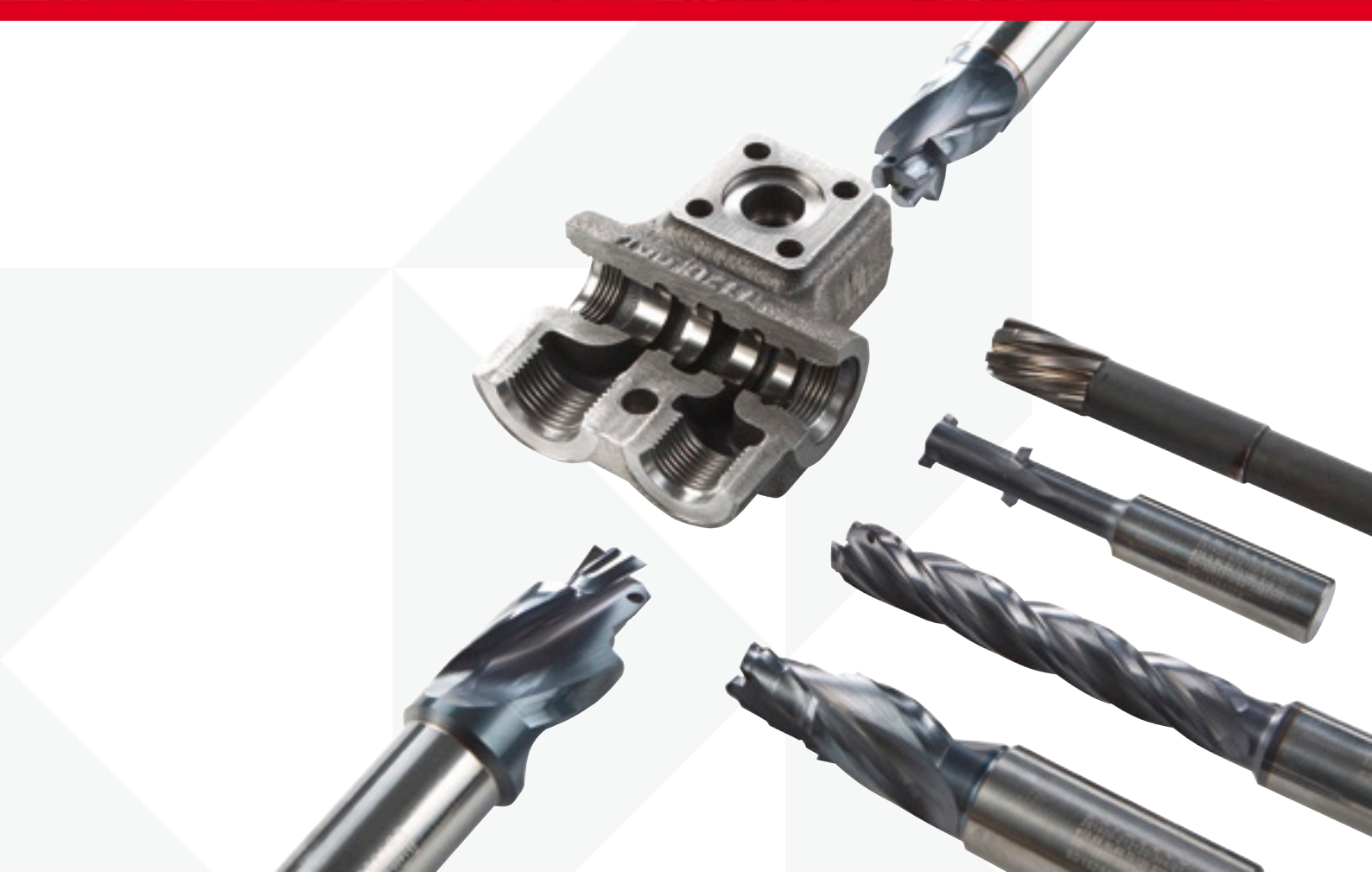
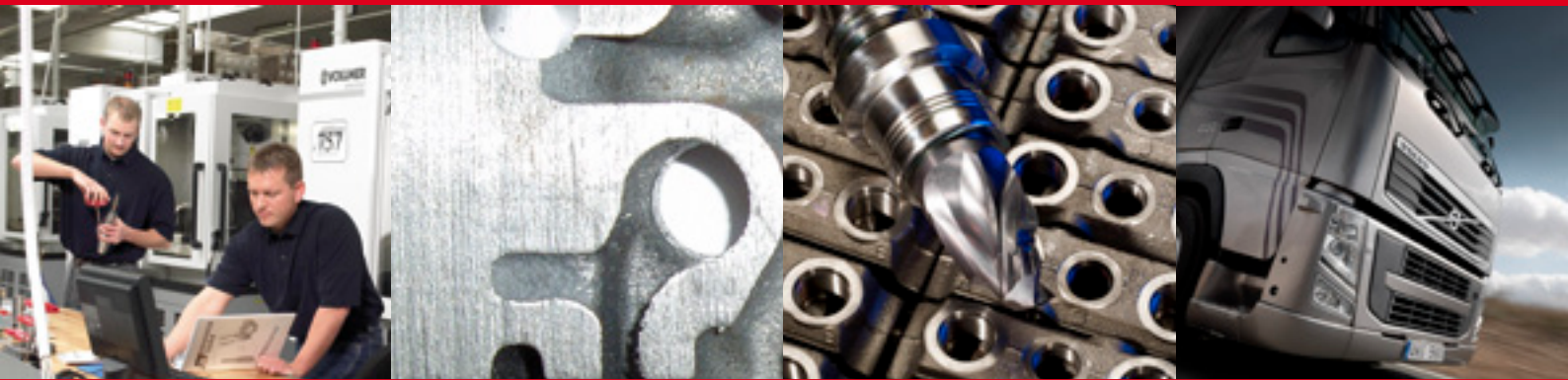


Hydraulic Valve Body

Intelligent tooling solutions – cutting your costs



Benefit from our knowledge

Introduction

Hydraulic valve bodies in many varieties are one of the most widespread industrial components in cast iron. The majority of manufacturers of these components often face the same challenges in the machining process.

RING-FREE MACHINING™

Rings produced in the bore by the rough pass reamer is a common problem when machining spool bores. The following manual removal of these rings prior to finishing/assembly is a time consuming and costly process. A new patented process and tool technology eliminates the rings, and results in considerable savings for our customers.

Cutting tool solutions for hydraulic valve bodies

This brochure focuses on tooling solutions for the machining of hydraulic valve bodies in cast iron. KYOCERA UNIMERCO strives to constantly be at the forefront of product development and to meet the increased customer requirements of high quality and long tool life.

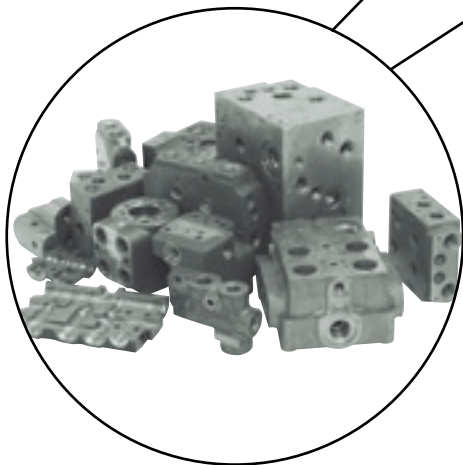
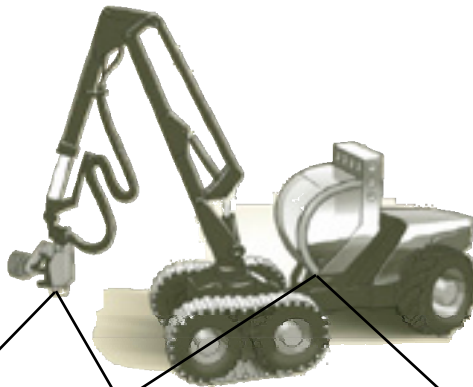
At the cutting edge

Our intensive research and development continuously improve the tool solutions for the benefit of our customers. Therefore make sure to keep in close contact with your sales technician to benefit from the latest technological developments that will keep your unit costs at a minimum.

BENEFIT FROM OUR KNOWLEDGE TO
OPTIMISE YOUR PRODUCTION
AND REDUCE YOUR UNIT COSTS

Competitiveness through reduced production costs

Through higher product quality and reduced machining time, we can lower your production costs. Learn more about our unique tool solutions, which are known to significantly increase productivity.



Valves

Optimisation
Total reduction of cycle time

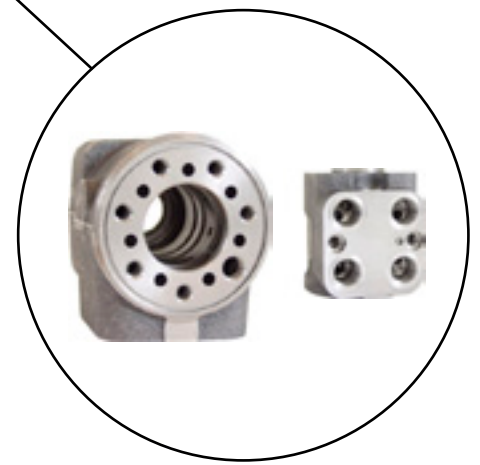
35-70%



Motors for work functions

Optimisation
Total reduction of cycle time

25-50%



Steering units

Optimization
Total reduction of cycle time

25-50%



Article no. 212891/999999

C7 PLUS



Article no. 212851/999999

C7 PLUS



Article no. 432355/999999

C7 PLUS



Article no. 289411.0400

C7 PLUS



UNIMERCO SC DEEP HOLE DRILL



Article no.



Article no.



1

SPOOL BORE HOLES

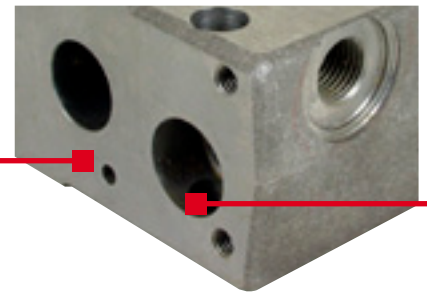
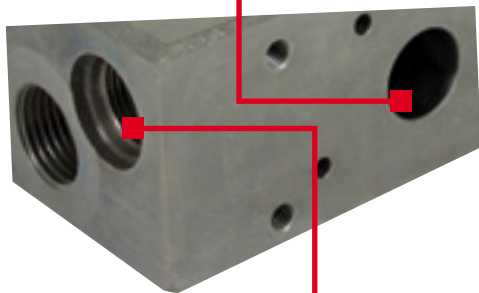
2

OIL HOLES

3

O-RING

Tool overview



6

SHOCK VALVE HOLES

7

SHUTTLE VALVE HOLES

8

COMPEN

Article no. 12861/999989

C7 PLUS



Article no. 256910.12x150



Article no. 212851/999998

C7 PLUS



Article no. 252741/999998

C7 PLUS



Article no.



Article no.



Article no.



Article no.



212861/999992




212861/999991




HOLES

Article no. 212890/999999 **C7 PLUS**




Pre드릴 standard or customised


Solution A: Article no. 212120/999999 **C7 PLUS**



Solution B: Article no. 212891/999998 **C7 PLUS**




Solution C: Article no. 212120/999998 **C7 PLUS**




4

CAVITY HOLES

Article no. 212850/999998 **C7 PLUS**

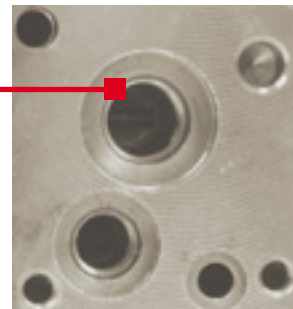
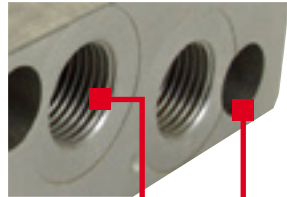
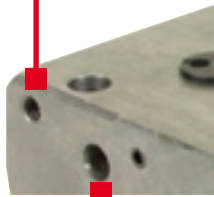


Article no. EH0620



5

THREAD HOLES



SATOR HOLES


289412.1200



212891/999999 **C7 PLUS**



212851/999999 **C7 PLUS**



212120/999997 **C7 PLUS**



9

PORT HOLES

Article no. 212891/999997 **C7 PLUS**



Solution A: Article no. EH1480.554



Solution B: Article no. 256938.12x014



10

RELIEF VALVE HOLES

Article no. 212850/999999 **C7 PLUS**



Article no. 252742/999997 **C7 PLUS**



Article no. EN1270096



Optimising the process strategy

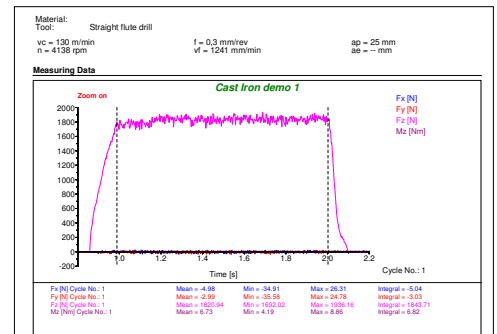
Increasing cutting data with helix tools

One of the general optimisation principles is to replace straight fluted tools with helix tool solutions. Combined with the C7 PLUS™ coating it is often possible to increase the cutting speed considerably while maintaining the same tool life time and machine wear.

1. Original solution



Straight flute drill
(C7 PLUS™ coated)



n=4138 rpm Feed 1241 mm/min Thrust force 1820

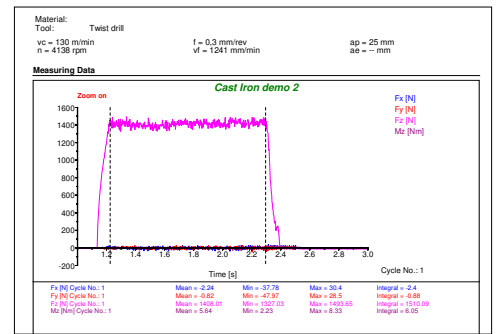
Revealing the potential

Measuring the thrust force of each solution when running at the same cutting parameters reveals the optimisation potential. Applying the same cutting parameters, the thrust force is much lower when using the twist drill than the straight fluted drill. However, the correct running in of the tools is a precondition for getting the optimum benefit of the improved tool solution.

2. Replacing the straight flute drill with a twist drill



Twist drill
(C7 PLUS™ coated)



n=4138 rpm Feed 1241 mm/min Thrust force 1408

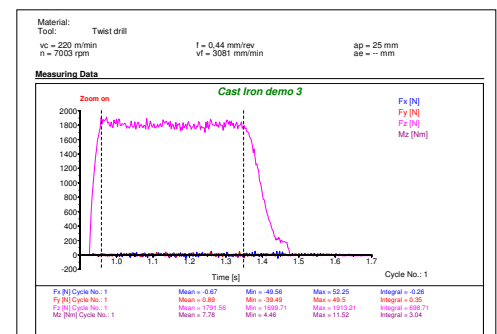
Increasing the cutting data

The cutting parameters of the twist drill are increased until the thrust force is equivalent to the original straight fluted solution. The result is that the cutting data can be increased by up to 248% (Vf 3081 mm/min. / Vf 1241 mm/min.)

3. Increase the cutting data



Twist drill
(C7 PLUS™ coated)



n=7003 rpm Feed 3081 mm/min Thrust force 1791

Even though the cutting parameters are increased by 248% the thrust force is now at the equivalent level of the original tool solution

(vf = 3081 mm/min / vf = 1241 mm/min = 2.48)
Feed increased by 248%

Contact us to learn more

What would a similar optimisation do for your production capacity and unit costs? Contact your optimisation expert to learn more.

Examples of tool solutions

1 SPOOL BORE HOLES

Objective

To eliminate rings produced in the bore by the rough pass reamer. In the typical process these rings need to be removed manually prior to finishing/assembly.



Result

- › Excellent size consistency
- › A straight hole free of rings
- › Huge cycle-time reduction (50%)
- › 15 minutes saved per part



Machining process

Pilot drill



Article no. 212851/999999
n = 2000 rpm
fn = 0.4 mm/rev.

C7 PLUS

Ring-free reamer



Article no. 212891/999999
n = 1415 rpm
fn = 0.25 mm/rev.

C7 PLUS

Grooving Land



Article no. 432355/999999
n = 1990 rpm
fn = 0.06 mm/rev.

C7 PLUS

2 OIL HOLES

Objective

To reduce the often very long machining time of the deep holes in small diameters with no diameter tolerance (in oil connection holes). In many cases, HSS deep hole drills are still used.

Result

Solid carbide drills with C7 PLUS™ coating ensures increased speed and feed and reduce the cycle time considerably while giving increased life time. Very narrow hole tolerances and a completely safe process.

Machining process

Pilot drill



Article no. 289411.0400
n = 9550 rpm
fn = 0.2 mm/rev.

C7 PLUS

Solution A

SC deep hole drill



n = 6000 rpm
fn = 0.3 mm/rev.

Examples of tool solutions

4 CAVITY HOLES

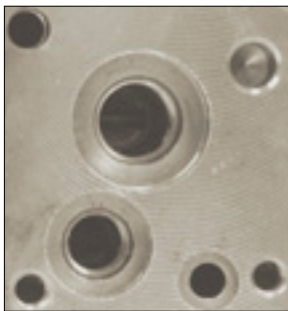
Objective

To reduce the number of tools needed by combining more operations in one. Machine without vibration to obtain narrow diameter tolerance and perfect surface roughness.

Result

Reinforced core diameter and extra guide pads on the solid carbide drills with helix perform extremely well.

- › Reduced machining time
- › No vibration
- › Safe process
- › Surface quality: Ra 0.8
- › Hole tolerance: H7-H8
- › A straight hole



Machining process

Pre-drill, standard or customised



Article no. 212890/999999

n = 1530 rpm

fn = 0.5 mm/rev.

C7 PLUS

Solution A

C7 PLUS

Solution B

C7 PLUS

Solution C

C7 PLUS

Core drill



Article no. 212120/999999

n = 1075 rpm

fn = 0.4 mm/rev.



Article no. 212891/999998

n = 1911 rpm

fn = 0.3 mm/rev.



Article no. 212120/999998

n = 1911 rpm

fn = 0.3 mm/rev.

Sublands available

Note: If you experience chipping problems on the spot-face cutting edges, due to poor chip evacuation, you should consider if Subland can be applied to your current tool.

6 SHOCK VALVE HOLES

Objective

A fast and reliable process ensuring that the tolerances are achieved in the most efficient way. A typical challenge is to meet the demands for a good surface quality.

Result

One shot drill with extra guide pads and C7 PLUS™ coating creating a straight hole with excellent surface quality while maintaining high feed and a long tool life. The C3 coated thread milling cutter ensures a reliable threading process.



SC step drill



Article no. 12861/999989

n = 1794 rpm

fn = 0.35 mm/rev.

C7 PLUS

Thread milling cutter



Article no. 256910.12x150

Examples of tool solutions

8

COMPENSATOR HOLES

Objective

To reduce the often long machining time while achieving a high degree of size consistency. To eliminate rings in the bore, produced by the rough pass reamer, that are often stuck in the component and need to be removed manually.

Result

The new process strategy and technology replace straight fluted tools with helix tools to eliminate the problem with rings. The reinforced core diameter and extra guide pads give a straight hole with excellent size consistency. In addition, the cycle time is often reduced by more than 50%.



SC twist drill



Article no. 289412.1200

n = 3881 rpm

fn = 0.25 mm/rev.

SC core drill



C7 PLUS

Article no. 212891/999999

n = 2000 rpm

fn = 0.4 mm/rev.

SC Ring-free reamer



Article no. 212851/999999

n = 1415 rpm

fn = 0.25 mm/rev.

SC drill



Article no. 212120/999997

n = 2158 rpm

fn = 0.35 mm/rev.

C7 PLUS

Examples of tool solutions

9 PORT HOLES

Objective

The large diameter must be created in a drilling operation. Must be machined without vibration to obtain narrow diameter tolerances and perfect surface roughness.

Result

The step drill in pre-form carbide with special internal coolant and centre point makes it possible to increase cutting speed.

- › Reduced machining time
- › No vibration
- › Safe process
- › Excellent surface quality
- › Long tool life



Machining process

SC step drill



Article no. 212891/999997

n = 1675 rpm

fn = 0.4 mm/rev.

C7 PLUS

Solution A

UM tap



Article no. EH1480.554

Solution B

UM thread mill



Article no. 256938.12x014

10 RELIEF VALVE HOLES

Objective

To create a straight hole meeting high tolerance and surface demands. To reduce the machining time while keeping a reliable process.

Result

The process strategy with a solid carbide step drill and step reamer reduce the process time and produce a straight hole with tight tolerances and an excellent surface finish. Due to the C7 PLUS™ coating, tool life time is prolonged considerably.

SC step drill



C7 PLUS

Article no. 252742/999997

n = 2580 rpm

fn = 0.22 mm/rev.

Step reamer



C7 PLUS

Article no. 212850/999999

n = 2546 rpm

fn = 0.35 mm/rev.

HSS tap



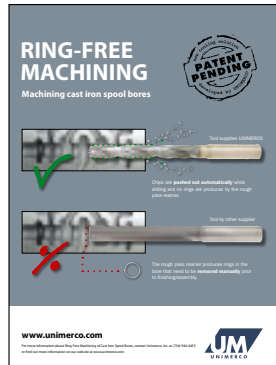
Article no. EN1270096



Further information



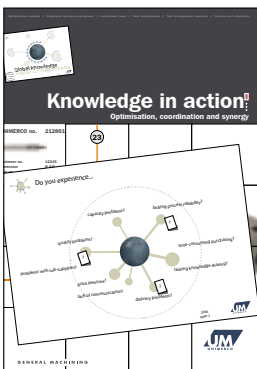
RE-NEW®



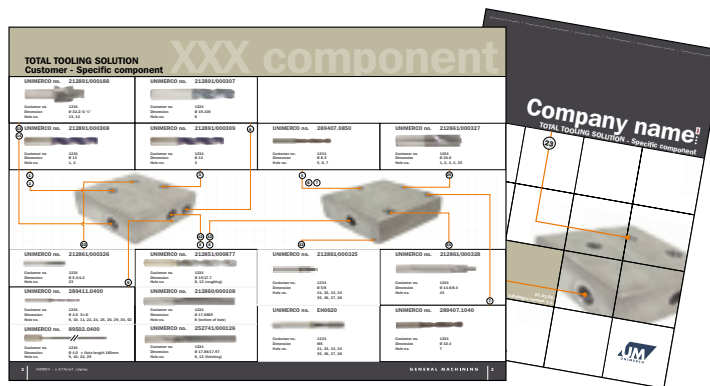
RING-FREE MACHINING™



C7 PLUS™ Coating



Global knowledge sharing



Example of a total tooling solution for a specific component resulting in an optimum and uniform manufacturing process at several production sites

Good cooperation has more than one winner

We believe in close and long-term cooperation with our customers. By means of mutual knowledge sharing and development efforts, our customers receive more than just a top quality cutting tool. Our optimisation experts thoroughly analyse the manufacturing set-up in a detailed and methodical way in order to improve the manufacturing process. We call this 'Systematic Optimisation of Production'.

The aim is to reduce your unit costs

By implementing improved tool technology and by reducing the number of tools needed, the part quality will be improved and machining time will be reduced while maintaining a secure process.

KYOCERA UNIMERCO Tooling Ltd.

KYOCERA UNIMERCO manufactures, distributes and services tools for machining, primarily for the metal, woodworking, automotive, aerospace, power generation and fluid power industries. The technology centre in Lichfield focuses on effective solutions for production. The tooling concept comprises standard and customised tools, RE-NEW® tool maintenance, coating and optimisation guidance. The Sheffield branch specialises in supplying inserts, standard tools and related tool solutions to the industrial market in the UK, including the general machining, aerospace, offshore and medical industries.

The company was established in 1998, services all of the UK, and is part of the KYOCERA UNIMERCO group, founded in Denmark in 1964 and originally named UNIMERCO. In 2011, all activities were acquired 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.



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