



★ 56 years of quality & innovation ★



The company

leading manufacturer of diamond cutting tools

Cruing

Over 50 years
of know-how

- 1964** Cruing is founded in Roseto degli Abruzzi (Italy) by Serafino Colleluori
- 1993** The company passes under the guidance of the sons and the actual CEO, Adelco Colleluori; the internationalization phase starts
- 1999** Creation of the Canadian subsidiary FS Cruing Diamond Corp. specialized in manufacturing cutting tools for the main Automotive companies in US and Canada
- 2004** Creation of Cruing UK, specialized in PCD tools for the Aerospace and Composite industries
- 2005** In Denmark is established the 3rd subsidiary of the Group
- 2010** Cruing Germany, active in the Automotive sector
- 2014** Celebration of the 50th anniversary



Cruing

Thinking beyond

- «**Thinking beyond**» means to be thrust **forward**, being able to **anticipate** and translate the needs into **new products and solutions**
- **5%** of annual turnover is dedicated to **R&D activity**, in collaboration with the main **European Institutes** and **Universities**



Cruing

Research & Innovation

- Every year 3 new **industrial patents** are put on the market
- Production plants and R&D facilities in Europe and North America enable to supply **tested** and **award winning products** worldwide

CHALLENGERS



WINNER 2008



JEC europe



JEC americas



Cruing

Machines inventory

- **11** Walter & Volmer EDM (**Electro discharge machining**) units
- **3** Studer **grinding** machines
- **3 CNC milling** machines (1 specific for machining solid carbide)
- **3** Mori-Seiki **CNC turning** machines
- **1 vacuum brazing** system for PCD

Cruing

Quality control

- Quality control on **100%** of production with:
 - 1 Zoeller Genius
 - 3 profiles projectors
 - 1 electronic microscope for honing control
 - 1 Shunk balancing machine

Cruing

Awarded together
with the leaders



JEC europe 2013

- Category «**Machining & Tools**»:

Cruing Italy



- Category «**Automotive**»:

Group PSA



- Category «**Special Prize**»:

Group BMW



Cruing

Awarded together
with the leaders



Experience Composites 2016

- Category «**Aeronautics & Aerospace**»:

Cruing Italy



- Category «**Automotive & Transport**»:

Mercedes-AMG



AMG
MOTORSPORT

Cruing

Service

- **Tool Management:** a software that allows to monitor the status of **tool stock**, displaying both codes and serial numbers, to **organize the service** and replacement and to **optimize budgets**
- **Price Maker:** a software that simulate the functioning of an expert system, giving information about whether the tool is feasible or not, and **evaluating the savings** which can be attained when producing in large lots

Cruing

A steady growth

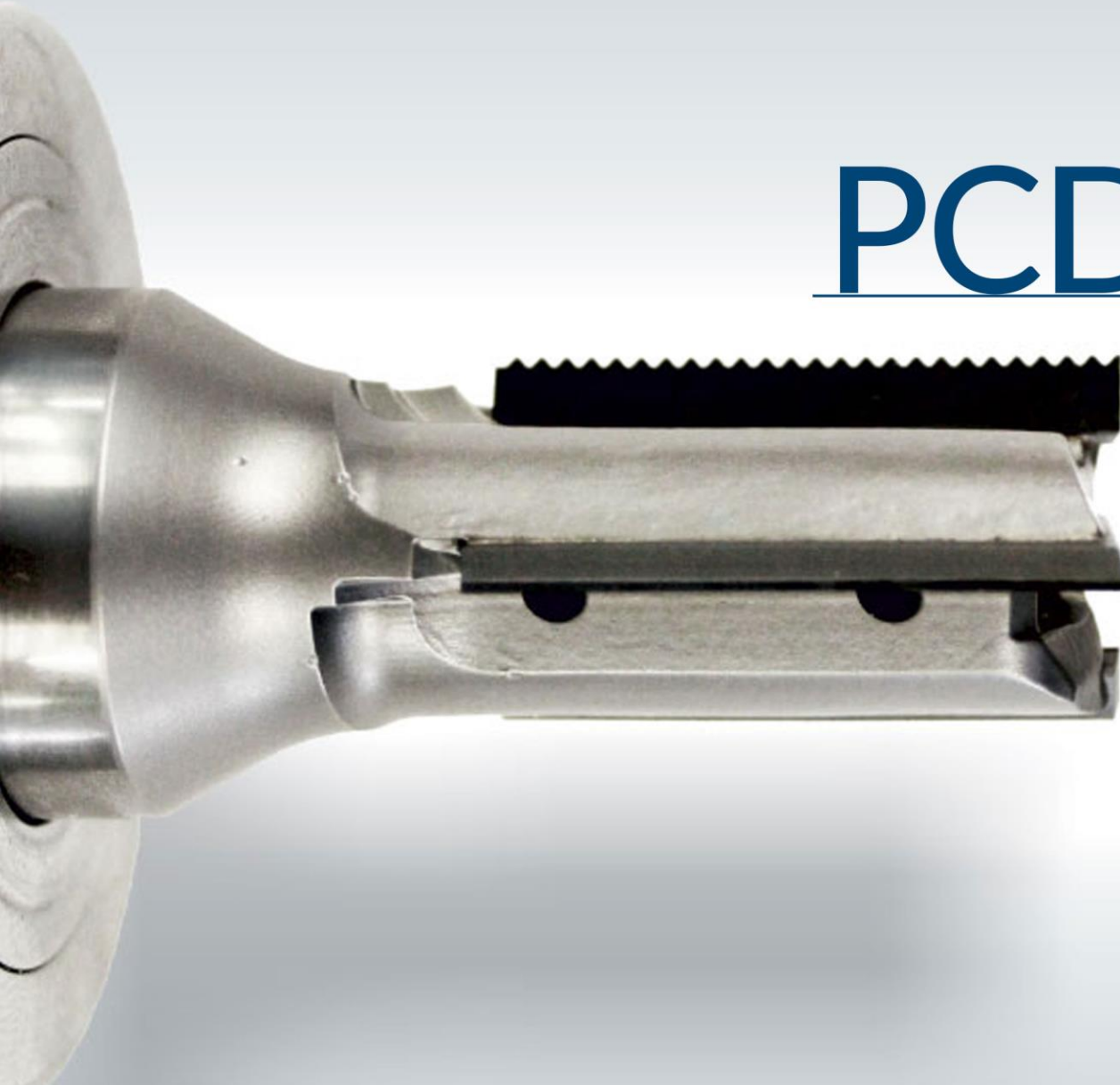
- The Group has increased its turnover by 40% in 5 years





PCD drills

Composites



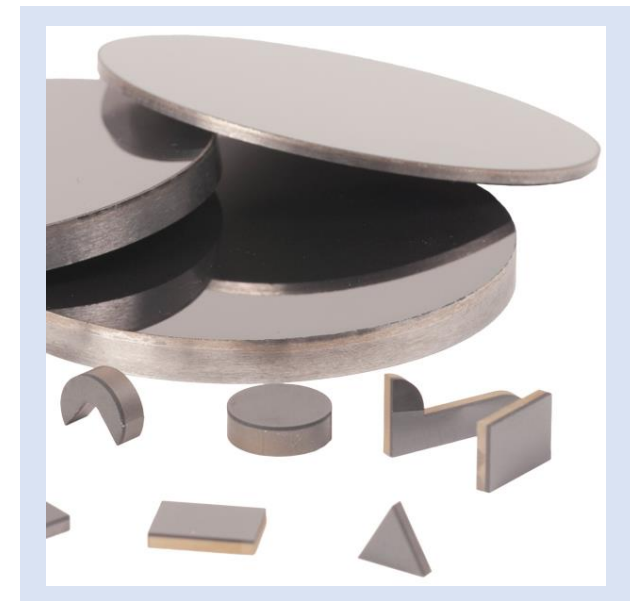


- A **new generation of PCD tools** accelerates production in CFRP
- The ability to **mill and drill CFRP faster, more cleanly, at lower temperatures** and with lower tool forces means CFRP airframe components can be produced **more efficiently and rapidly**
- That means finished components can be delivered for assembly with **shorter lead times**, allowing airplane manufacturers to **deliver to customers on shorter schedules**



Features:

- SUPERIOR WEAR RESISTANCE
- **PCD is the hardest man-made material** in industrial use. Its wear resistance far exceeds that of tungsten carbide



Features:

- LONGER TOOL LIFE WITH CONSISTENT PRECISION
- The use of PCD **extends tool life** by a factor of at least 10 times*
- Moreover it maintains optimum sharpness throughout the life of the tool

* The University of Birmingham, UK



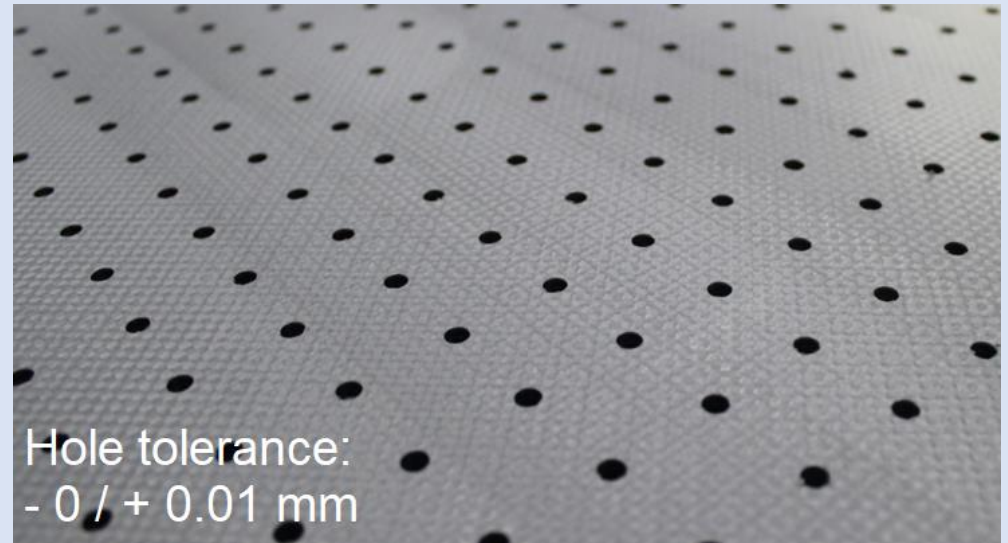
Aerospace grade CFRP

Thickness 10.00 mm
Cut at 12.000 RPM
F 3.6 m/min.
Ra value 2.57



Advantages:

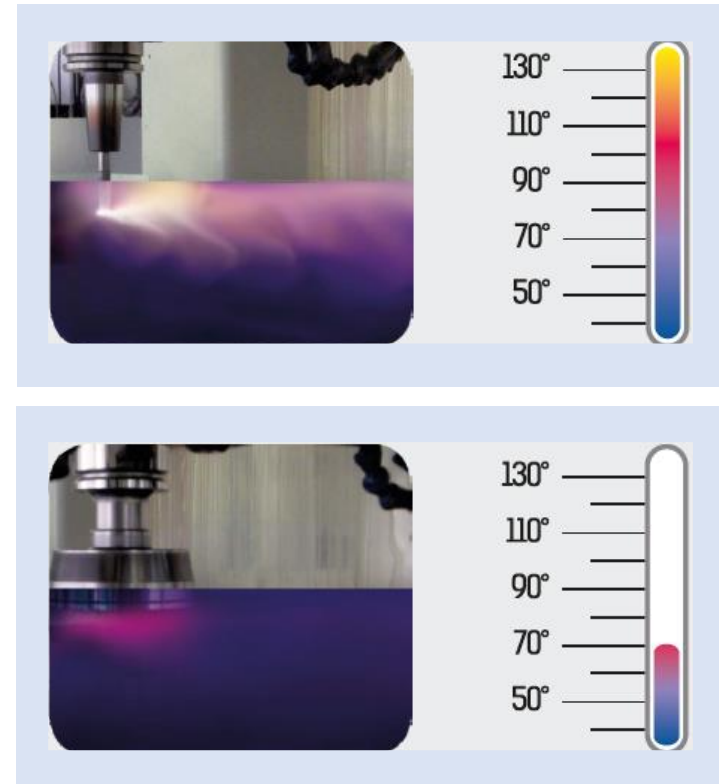
- FLUTE ANGLES THAT CUT FIBRES MORE CLEANLY
- PCD drills and end mills **produce consistent hole and edge quality** for significantly longer than coated carbide tools



Advantages:

- FASTER TOOL OPERATION WITH BETTER TEMPERATURE CONTROL
- **Tools can run faster** with PCD as it has sharper edges and less friction, combined with excellent thermal conductivity
- CFRP stacks with aluminium and titanium can be **drilled twice as fast** without the problems associated with the work piece overheating*

* Advanced Manufacturing Research Centre, Sheffield UK





Advantages:

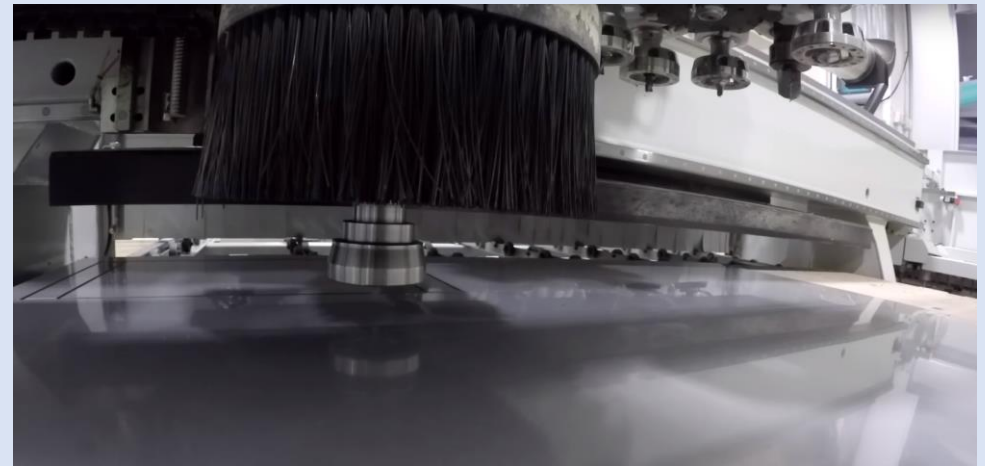
- REDUCED RE-WORKING AND DOWNTIME
- Long intervals between tool changes and the elimination of time-consuming reworking of holes and edges **reduces machine downtime significantly**





R&D:

- Continuous **partnership** with OEMs and tier 1 manufacturers



AeroDrill range:

Drilling

The AeroDrill series offers unique designs for PCD drills in 2 and 3 flute configuration, Countersinks and One-shot drill and countersink, all qualified by leading Aerospace manufacturers



AeroDrill 101

  Ø:3-16mm
Z2 PCD Straight Drill



AeroDrill 101-V

  Ø:3-16mm
Z2 PCD One-shot Drill & Countersink



AeroDrill ST2

  Ø:2,5-4,5mm
Z2 PCD Twist Drill



AeroDrill ST2-V

  Ø:2,5-4,5mm
Z2 PCD One-shot Drill & Countersink



AeroDrill NX2

  Ø:4,51-16mm
Z2 PCD Twist Drill



AeroDrill NX2-V

  Ø:4,51-16mm
Z2 PCD One-shot Drill & Countersink



AeroDrill 801

 Ø:10-17mm
Z2-Z3 PCD Countersink with integral pilot



AeroDrill 802

 Ø:10-17mm
Z2-Z3 PCD Countersink with interchangeable pilot

AeroMill range:

Milling

The AeroMill series covers the complete range of PCD cutters commonly used within the Aerospace and Composites industries for milling CFRP, composites and light alloys



AeroMill M11



Ø:9-25mm

Z2 PCD End Mill (HMTA body)



AeroMill M12



Ø:6-12mm

Z2 PCD End Mill (solid carbide)



AeroMill M13



Ø:12-16mm

Z2-Z3 PCD End Mill



AeroMill M18



Ø:14-20mm

Z3 PCD End Mill



AeroMill M19



Ø:14-20mm

Z3 PCD End Mill



AeroMill M21



Ø:10-20mm

Z2 PCD Ball Nose (HMTA body)



AeroMill M22



Ø:6-20mm

Z2 PCD Ball Nose (solid carbide)



AeroMill M23



Ø:10-16mm

Z2 PCD Ball Nose End Mill



PCD Tools for

Metalworking



PCD tools



Application:

- Automotive & Aerospace industries
- Metalworking molds
- Aluminium and ISO **N** metals ; non-metallic materials (plastics, resins, etc.)



PCD tools



Features:

- Superior wear resistance and long tool life
- High dimensional tolerances (from 0,003 mm on tool diameter)
- Excellent surface finish



PCD tools



Product range:

- A complete range of drills, cutters, reamers, countersinks
- Full customization based on customer's requests (geometry, shank, lubricant, etc.)
- Delivery time: 4÷5 working weeks



PCD tools



Case study 1 (Aerospace):

- Old tool: Competitor's solid carbide Z4 cutter
- New tool: PCD Z2 cutter

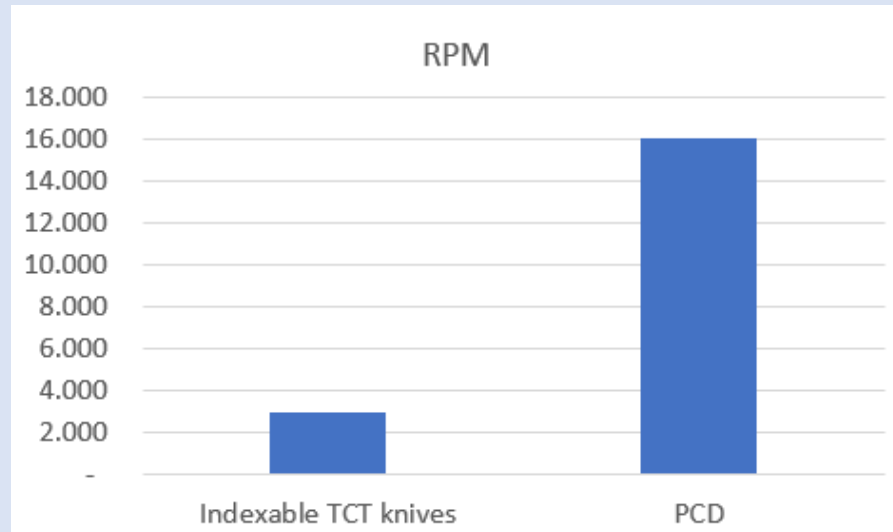


PCD tools



Case study 1 (Aerospace):

- The implementation of the PCD ball-nose cutter allowed the manufacturer to **raise the machine RPM** from 3.000 to 16.000

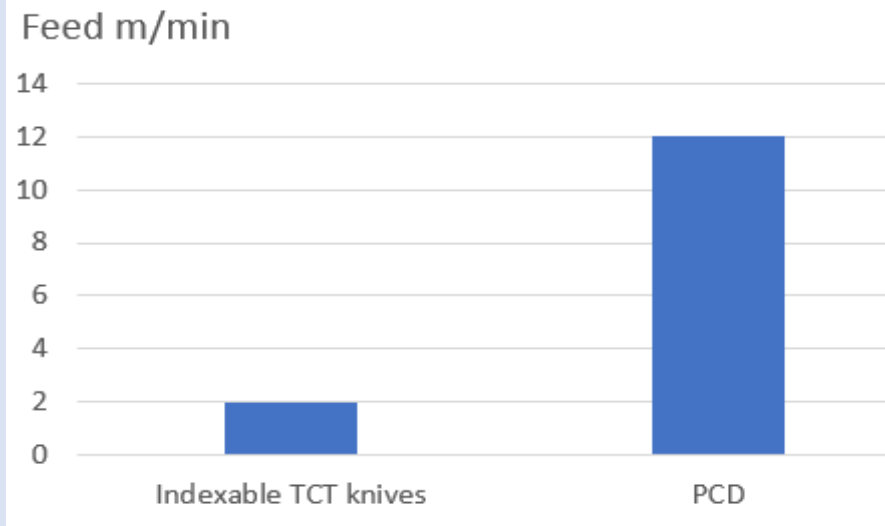


PCD tools



Case study 1 (Aerospace):

- Then **raising the feed speed** from 2 m/min to 12 m/min

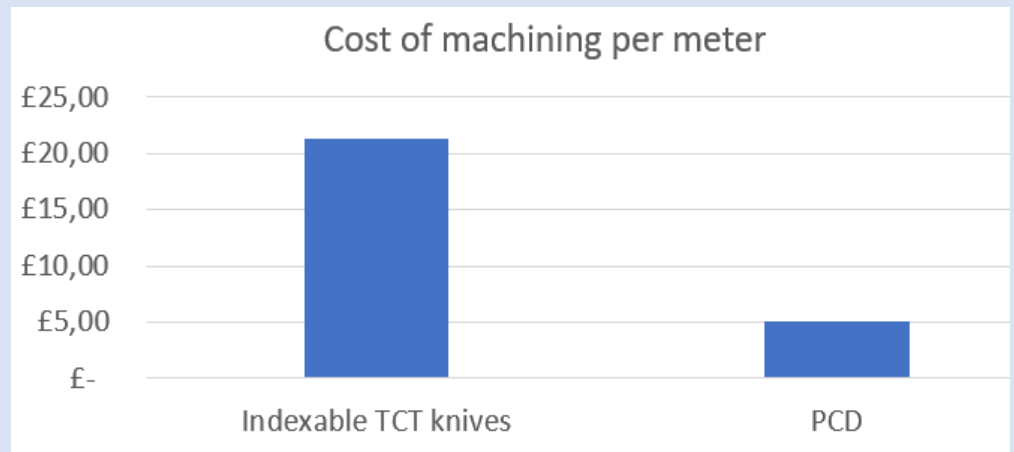


PCD tools



Case study 1 (Aerospace):

- This **reduced the machining costs** by 76% with a forecast saving of more than 1.000.000 €



PCD tools



Case study 1 (Aerospace):

- Cruing's tool has been **approved** and **qualified** by the Aerospace OEM

OUT

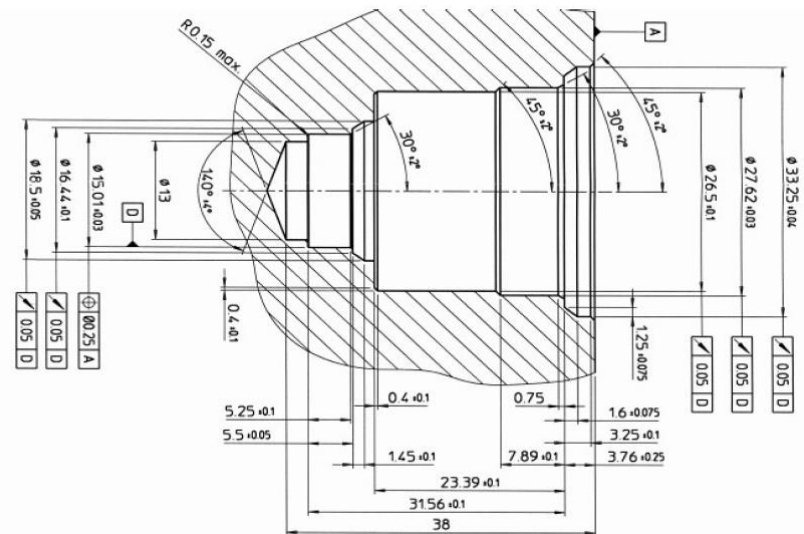
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Case study 2 (Automotive):

- Machining of ABS valve body (AA4010)
- Drill ABS control hole (finish operation)
- Customer's request:
 - Increase tool life
 - Reduce cycle time and machine downtime

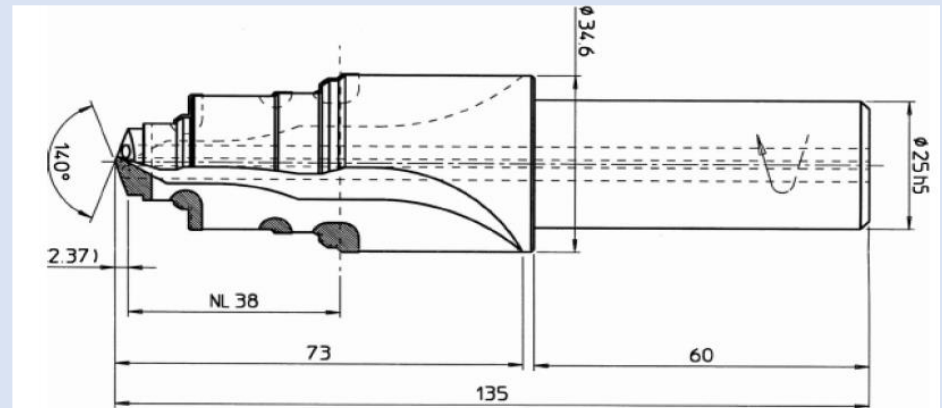


PCD tools



Case study 2 (Automotive):

- New proposal: PCD Step Drill with internal cooling (48 bar)
- Cutting parameters:
 - $N = 6.000 \text{ rpm}$
 - $V_f = 1.800 \text{ mm/min}$
 - $F_n = 0,3 \text{ mm}$



PCD tools



Case study 2 (Automotive):

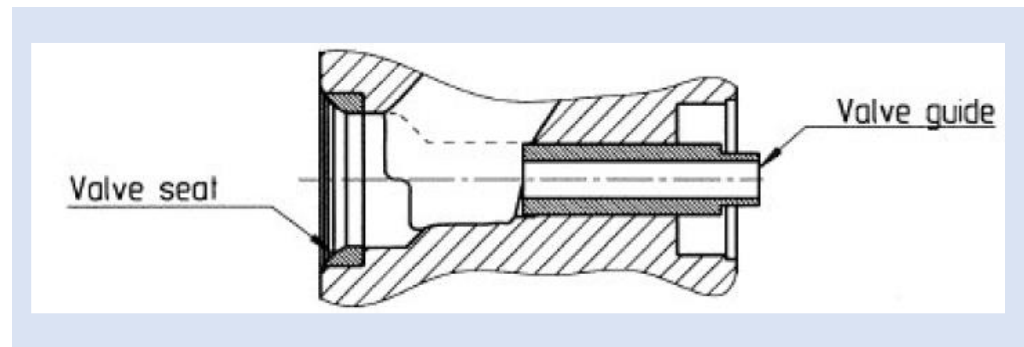
- Results:
 - Improved efficiency by 290%
 - Achieved 40,000 holes tool life
 - Better surface quality (Ra 0,2)

PCD tools



Case study 3 (Automotive):

- Finish reaming of cylinder valve guide (sintered powder metal)
- Customer's requests:
 - Increase tool life (target 8.000 holes)
 - Meet new tolerances (+0,006/-0,004)

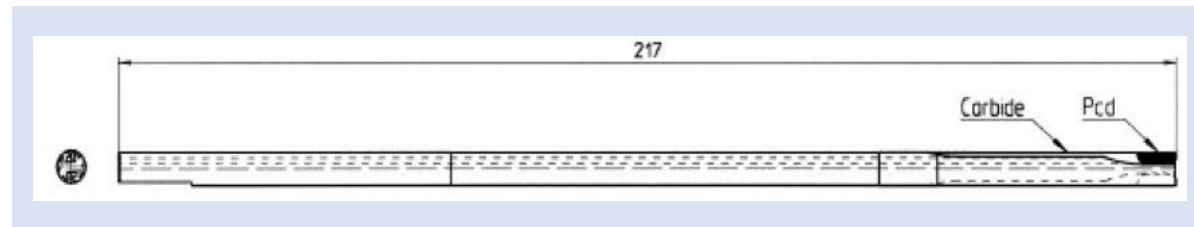


PCD tools



Case study 3 (Automotive):

- New proposal: PCD Z2 Reamer with guide pads
(previous tool: Z4 carbide reamer)
- Cutting parameters:
 - $N = 2.000 \text{ rpm}$
 - $V_f = 540 \text{ mm/min}$
 - $F_n = 0,27 \text{ mm}$



PCD tools



Case study 3 (Automotive):

- Results:
 - Improved efficiency by 400%
 - Achieved 15.000 holes tool life (target 8.000)
 - Respected new tolerances



Aerotech

Composites





Innovation:

- Cruing is a company solution-oriented
- The Aerotech System is probably the main expression of this innovative nature



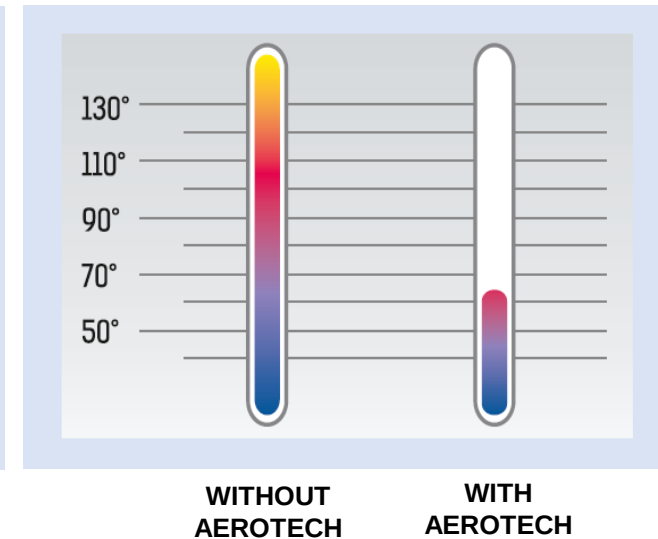
Aerotech® System
Air cooled dry cutting





Features:

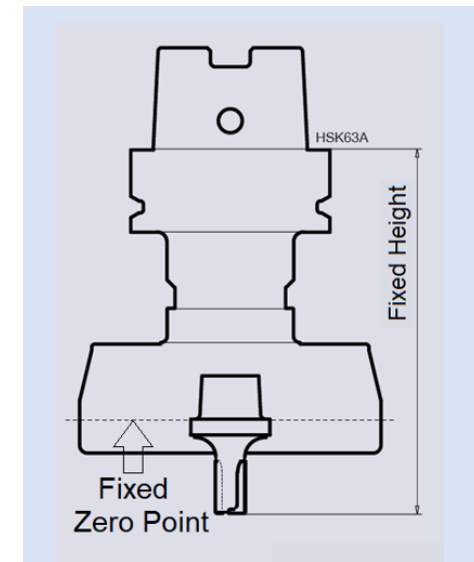
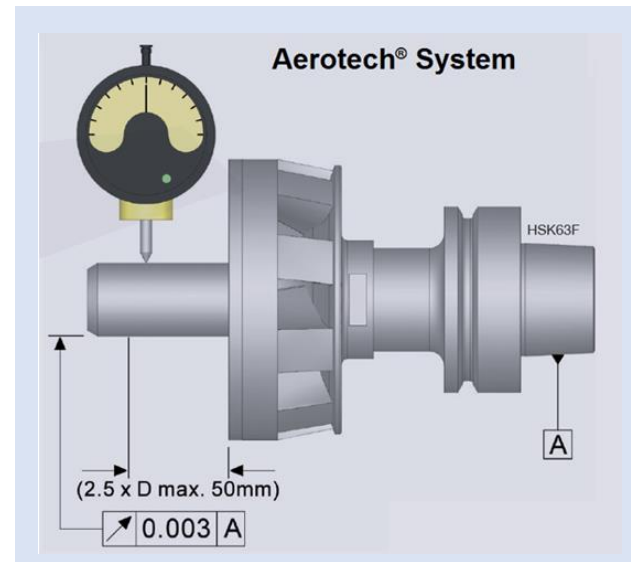
- It is a tool holder that **evacuates hot dust** produced during cutting operations
- By air cooling the cutter and material, it significantly **reduces machining temperatures**





Features:

- The Aerotech uses dedicated cutting tools with HSK cones, providing **exceptional axial and radial accuracy** and a **fixed zero point**





Advantages:

- It allows the **dry cutting** of composites and provides an alternative to machining with coolants





Advantages:

“During our laboratory test, we analyzed the surface quality of CFRP after the milling process and measured the temperature during the cutting operation. For these tests we compared a conventional tool with the same tool but with the Aerotech System”



Dr. Marco Schneider

Fraunhofer Institute for Manufacturing, Engineering and Automation IPA



Advantages:

“The advantages of using an Aerotech System for cutting CFRP are found in the removal of dust and chips from the cutting zone and the cooling effect on the tool and workpiece”





Advantages:

“This is important because in every cutting process it is an economical advantage to avoid fluids as coolants and lubricants. The processing and disposal of used fluids is extremely expensive. That’s why in many metal cutting processes Minimal Quantity Lubrication”

