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PCD tool solutions – "four wins"

People have a tendency to take many things in life for granted – one of these things is ventilation on board large passenger jets. We at ALMÜ Precision Tools contribute a share to such solutions. Our newest development in the field of PCD tools is used when it comes to working at the shell of cabin ventilation. Using this bell-shaped tool in the style of a brazed PCD monobloc tool, four work steps can be replaced by a single one – which is why we often refer to it as "four wins".

Brazed bell-shaped PCD monobloc tool

As fresh air in the cabin is essential for the survival of passengers on board any airliner, it is important that all of the cabin ventilation's shell components are produced as exact as possible, and with the highest possible quality. In the ventilation system of airliners, the shells are fixed to the pipe system by using clamping flanges.
We were thus asked to develop a special tool for this geometry. What used to be manufactured in four steps should be produced in one go without changing tools.

The problematic aspect when it came to producing the shells while changing tools was nothing less than to observe the tolerances necessary. The cast shell actually features two tapered vents. And just these vents have to be CNC-machined as half clamping flanges. Taking into account this difficult structure, we now apply a bell-shaped tool. Thanks to this bell-shaped technology, the workpiece can be machined in one single step, even up to the rear end.

ALMÜ® IN-HOUSE

Markus Müller

Booming markets, full order books, a lack of skilled employees – those are some of the main headlines that the media confronts us with these days. What are the consequences of such news, after the problematic year of 2009, for the metal business, and especially for ALMÜ Precision Tools? And what can sound planning for a company like ours look like now? Read what Markus Müller, managing partner of ALMÜ, has to say on these subjects:

Insider: The year 2009 was marked by worldwide financial and economic problems. The latest global business data, also in Germany, suggest that this difficult time is over, in other words, the worst times have passed. And the job market seems to be rather robust – a good sign for the future.

Markus Müller: Our company, with its more than thirty employees, had to fight with an exceptional drop in orders, like the entire tool business. However, the field of PCD tools proved to be an excellent pillar for our company.

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The following are illustrations of the four work steps:

1 In the first step, the outer radius is being radially/circularly milled. To avoid brinelling, the tool is approached in a circular movement.

2 The same PCD cutters are working at the phases and...

3 ...the smaller diameter at the neck of the shell.

4 In the last step, the inner diameter and, finally, the axial recess are created

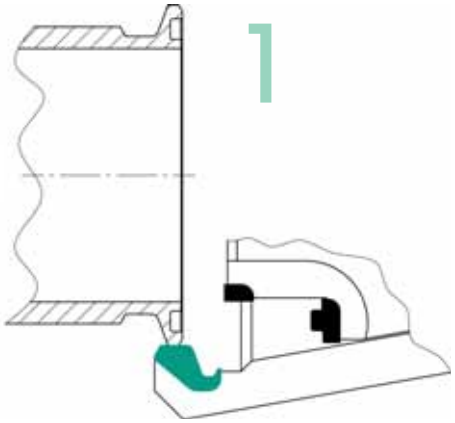
Thus, we were able to comply with the specification to realise all four work steps with one tool in one go.

The bell-shaped monobloc tool also offers other special innovations. To ensure free chip-flow, the windows were adjusted to the axially milling inner cutters. Thus, we prevent a congestion by the chips, which would obstruct the tool from working properly. To harmonize the tow work steps of radially/circularly and axially milling, the two tool components are being bolted firmly together, after the concentricity has been adjusted. These four bolts should not be adjusted any further after the entire tool has been balanced to G2.5. Only such a procedure can ensure its accurate concentricity.

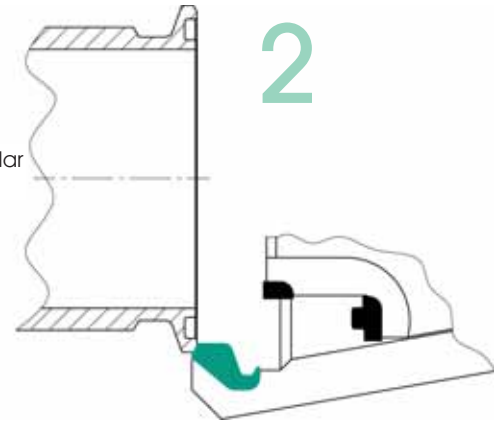
Additional features of ALMÜ tools:
To comply with tolerance requirements – which can be most different according to the machining centre – we define and calculate the actual chipping parameter, each and every time according to the type of machine you use.
If necessary, we can even provide you with an entire CNC program including all processes.

All in all:
This solution is simply a dream – no matter what your tolerance requirements are, and it saves lots of time.

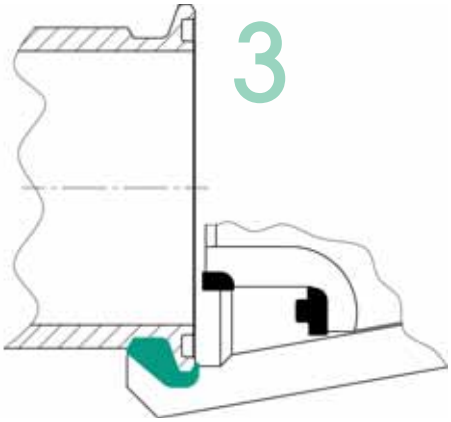
Preparation of radial circular milling

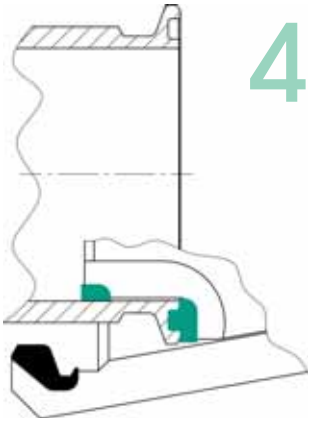


Preparation of circular milling the bevel

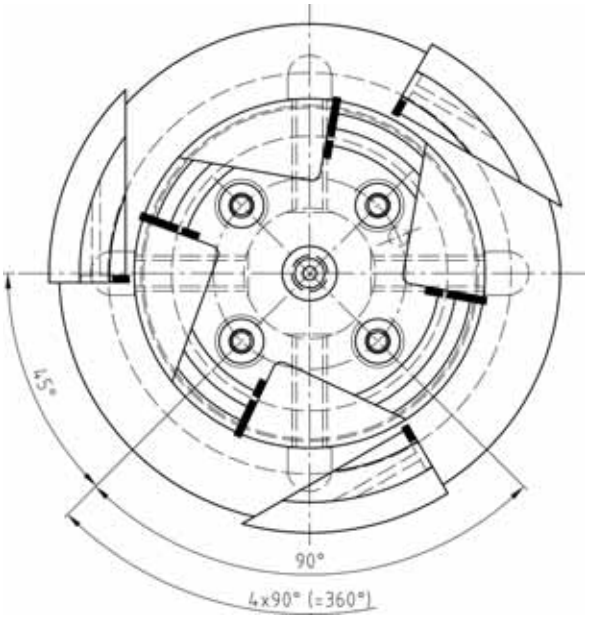


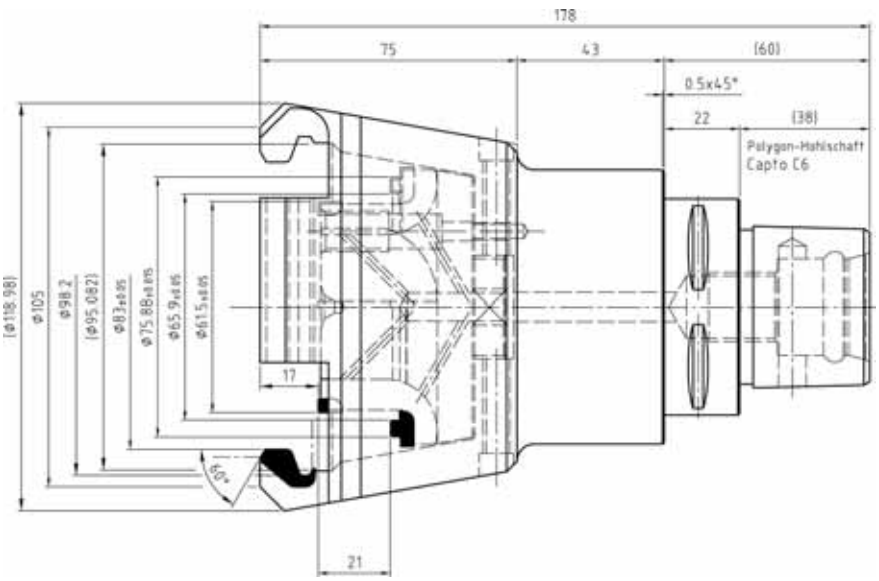
Cutting edge that only works axially





The PCD cutters – general view:





ALMi® FACTS

Vacuum technology

The term of vacuum technology is used for the artificial creation of a vacuum and, generally, the term is used for pressures below the pressure of the environment. According to the application, the level of the vacuum varies. Today, vacuum technology is used as part of a vast number of industrial applications, such as, for example, in production and manufacturing technology.

Source: German Wikipedia

Vacuum flanges

Vacuum flanges are used to create detachable connections of vacuum vessels. According to the specifications regarding impermeability, temperature tolerance, stability, corrosion resistance, and diameter, there are various standardized components at hand. Clamping-flange connections (ISOC) are used similarly to small flange connections, however here, the thrust boring is created by clamping screws or lock bush flanges.

Source: German Wikipedia

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We were actually able to repeat the turnover from previous years. This shows that we have been heading in the right direction, and that we have made a name for ourselves in the market. As well as the vast number of standard solutions in the tool sector we have always offered, ALMÜ Precision Tools will continue developing innovative PCD tools.
In 2009, we had the opportunity to try and test newly developed tools. Thus, we now have the right solutions at hand for our customers. As we have increased our investments, we were able to develop new software packages and machine components, and we could train our skilled employees even better. For those who are interested in our tools, that means we were able to almost double our production capacities to be able to produce according to your demand.

Insider: So what are your current plans for the weeks to come?

Markus Müller: As we, the ALMÜ team, have overcome these turbulent times more or less without damage, we are looking forward to meeting you at the AMB trade fair in September in Stuttgart, Germany. We are sure you will be able to feel the wind of change at our stand, and in the halls of the trade fair in general. Many of our customers have already made appointments to see our latest innovative tool solutions. I will answer all your questions, together with my colleagues Bernd Göppinger and Günther Frank.

Facts & figures about the tool:

Work step 1:
S = 2500
F = 500 mm/min
Vc = 942 m/min

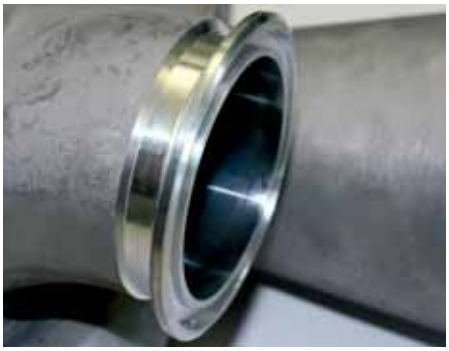
Work step 2:
F = 1000 mm/min
Vc = 942 m/min

Work step 3:
F = 7628 mm/min
Vc = 942 m/min
Total chipping time t = 3.311 sec

Work step 4:
F = 200 mm/min
Vc = 591 m/min

Polygon piston Capto C6

The completed workpiece



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