

Date: 01.09.2019

High-performance Milling Cutter for the Machining of Structural Parts

For years the precision tool manufacturer has been successful with its tools also in the aerospace industry. Among other aspects, in this industry the machining of structural parts with a large portion of material to be removed plays a major role. MAPAL is continuously further developing and expanding its portfolio to be able to meet all requirements, also during these machining operations, and to be able to offer a complete tool portfolio. Most recently, the company announced new milling cutters in the OptiMill series for machining structural parts. Axel Fleischer, Market Segment Manager 3D Milling, reports on challenges, opportunities and new potential.

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MAPAL has marketed tools for high volume machining for some time. Why completely new milling cutters now?

Axel Fleischer: We have developed new tools made of solid carbide to add to our existing SPM programme (Structural Part Machining). Not only tools, but also machines are subject to continuous further development. Due to the new generation of machines with sufficient drive power and the necessary spindle speeds, high-performance machining of aluminium parts has become more cost-effective due to the time saving.

... and therefore new tools?

The more cost-effective a process, the more it is used and the more refined the technological solutions also become. For machines with higher performance we can therefore use corresponding tools with more potential in relation to machining volume. The challenge here is to find the correct geometry for the tools.

What challenges are there for the tools?

Faster, higher, further is what they say in sport. Transferred to the milling tools in the area of high volume machining, you could say: larger cutting depths, better chip

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removal and a higher material removal rate. Vibration must be avoided to obtain a perfect surface finish, among other reasons. And the heat introduced into the part must be kept to a minimum to prevent the distortion of the part.

Which geometries meet these requirements?

We have developed several new geometries because the requirements of course vary depending on the application. For the finishing of contours and pocket walls, for instance, we have developed a new finishing geometry. Due to this geometry, the OptiMill-SPM-Finish operates without problems even with large wrapping – also in the corners with large tool contact and a high load, the tool remains stable. The optimally designed cutting edge geometry ensures there is no vibration during the machining. The chip spaces are polished; as a consequence chip removal functions perfectly. The special feature of this tool – large depths can be finished in one pass. This saves time and is therefore particularly cost-effective.

And in the area of roughing?

For roughing we have developed a new diamond knurled roughing geometry that is used on OptiMill-SPM-Rough. This geometry is perfectly matched to the machining of structural parts made of aluminium. As a result of the geometry the power consumption during machining is reduced significantly compared to tools with a straight cutting edge. Due to the reduced cutting forces and the excellent plunging characteristics of the tool, the heat introduction into the part is minimal. As a consequence, greater feed-in depths as well as higher feed rates can be used during roughing. The result is very high machining volumes.

Apropos machining volumes – is it only the tool that matters?

Of course, the tool makes its contribution. And all our SPM roughing tools are designed for the highest machining volumes, however, the actual volumetric performance achieved depends on more factors than the geometry of the tool. Often

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the part itself is the limiting factor. For example, the machine cannot exploit its potential in tight pockets or delicate structures for process-related reasons.

What influence does the machine itself have?

The machine itself of course has a significant influence on the maximum possible machining volume. Here above all, factors such as the spindle speed and the related torque play a key role. For effective machining during the machining of aluminium, the greatest possible machining volume, the highest possible spindle speeds combined with high spindle power are a basic prerequisite. Our tools are designed so that the highest volumes can be

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Captions:



Axel Fleischer, right, is responsible for the 3D milling market segment at MAPAL. Dietmar Maichel is the responsible development engineer. Together they develop optimal tool solutions for the machining of structural parts, as shown in the image.

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Axel Fleischer talks about the new high-performance milling cutters from MAPAL

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For finishing contours and pocket walls, even at great depths in one go, MAPAL presents the OptiMill-SPM-Finish with newly developed geometry.

If published, please send a voucher copy
by mail to Patricia Müller
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