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High-volume machining of aluminium materials

MAPAL is launching two new products for high-volume milling of aluminium for the EMO 2023, thus expanding its portfolio for the aerospace industry. The two milling cutter series in solid carbide and with indexable inserts are particularly suitable for use on high-performance machines.

With its new solid carbide roughing cutter OptiMill-Alu-Wave for aluminium materials, MAPAL is taking full advantage of the performance of the quickest machines available on the market, thus achieving a material removal rate of up to 21 litres per minute. At the same time, it is of course also possible to use the high-volume milling cutter on less powerful machines. The tool manufacturer is thus taking into account the fact that aeroplane parts are often manufactured on machines with spindle outputs between 40 and 80 kW, for which there was previously no suitable milling cutter in the portfolio.

The template for the new aluminium milling cutter was the cord roughing cutter OptiMill-Uni-Wave, which is successfully used in steel machining. For optimum chip formation when machining aluminium, the roughing cutter has large, flat waves. Polished chip flutes facilitate chip removal. The cutter with three cutting edges is fitted with central cooling and a modified face geometry, which enables ramp angles up to 30 degrees. In order to prevent imbalance in high speed ranges, the developers have dispensed with pull-out protection and recommend the hydraulic clamping technology of MAPAL. For applications in the limit range, there is the option to use the Safe-Lock™ pull-out protection from Haimer.

**MAPAL Präzisionswerkzeuge
Dr. Kress KG**
Postfach 1520 | D-73405 Aalen

Contact:
Andreas Enzenbach

Phone: +49 7361 585-3683
Fax: +49 7361 585-1019
E-mail: presse@mapal.com

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The OptiMill-Alu-Wave is not only ideal for aerospace structural parts but is also suitable for applications in the automotive field and general machining. For the product launch from the EMO trade fair onwards, diameter ranges from 12 to 25 mm with projection lengths of 3xD, 4xD and 5xD are available. A configurator makes further variants possible, which also supports close-contour roughing.

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The new indexable insert milling cutters NeoMill-Alu-QBig are a highly economical solution for larger diameters. In order to achieve as large a material removal rate as possible of up to 18 litres per minute, the new aluminium volume milling cutter is designed for use at spindle speeds of up to 35,000 rpm (with a diameter of 50 mm). For a tight fit despite high centrifugal forces, screws with increased tensile strength are used to hold the indexable inserts firmly in the prismatic seat. In addition, countersinks on the indexable insert ensure weight savings. MAPAL has fitted the tool body with a fine balancing system. Four threaded bores enable precise adjustment in order to protect the machine spindle at high speeds and achieve the highest possible surface finishes.

In addition, focus was placed during development on low cutting forces and highly precise indexable inserts. High chip volumes with very high achievable surface finishes of R_a 0.8 μm and R_z 4.0 μm for rough and fine machining can thus be achieved with the tool. For the main application, machining wrought aluminium alloys, MAPAL uses uncoated cutting edges with a highly positive rake angle and polished chip guiding stage for low frictional resistance. This reduces the amount of heat generated. For this purpose, PVD-coated indexable inserts for machining Al-Li alloys and CVD-

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diamond-coated indexable inserts for the automotive industry and general machining are available in the portfolio. The maximum stock removal is 12.5 mm. Internal cooling and very large chip spaces ensure optimum heat dissipation and chip removal. MAPAL produces the tool bodies in a diameter range of 32 to 63 mm for hollow shank taper or shank taper as well as mounting tool variants.

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With the solid carbide milling cutter OptiMill-Alu-Wave and the NeoMill-Alu-QBig indexable insert milling cutter, MAPAL showcases a complete range of products from 12 to 63 mm for high-volume machining of aluminium materials at EMO 2023.

Images:



Image 1: With the OptiMill-Alu-Wave and the NeoMill-Alu-QBig, MAPAL showcases a complete range of products for high-volume machining of aluminium materials at EMO 2023. ©MAPAL

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Image 2: The new solid carbide roughing cutter OptiMill-Alu-Wave for high-volume machining of aluminium materials achieves a material removal rate of up to 21 litres per minute. ©MAPAL

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Image 3: A highly economical solution for larger diameters: the indexable insert milling cutter NeoMill-Alu-QBig is designed for large material removal rates with low cutting forces and high surface finishes. ©MAPAL

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If published, please send a voucher copy by mail to Kathrin Rehor or by e-mail to kathrin.rehor@mapal.com.



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Short profile MAPAL Dr. Kress KG

MAPAL – tooling the customer's success

MAPAL Präzisionswerkzeuge Dr. Kress KG is one of the leading international suppliers of precision tools for the machining of practically all materials. The company founded in 1950 supplies leading customers from the automotive and aerospace industries and from machine and plant engineering. With its innovations the family-owned company sets trends and standards in production and machining technology. MAPAL sees itself as a technology partner, supporting its customers with the development of efficient and resource-conserving machining processes using individual tool concepts. The company is represented with production facilities, sales subsidiaries and representatives in 44 countries worldwide. The MAPAL Group generated sales of EUR 558 million in 2022 and has around 5,000 employees.

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