

Press Release No.: 2017-08-18

Date: 18.08.2017

## Process reliability for the aerospace industry - dry machining of CFRP aluminium stacks

The fuselage, wing, flaps as well as the horizontal and vertical tail of the latest generation of aircraft are produced out of CFRP aluminium stacks. For the assembly of aircraft, innumerable bores including countersinking are drilled in these components for the rivet connections. In most cases drill feed units are used for machining. The dimensional accuracy of the bores is crucial. The bore must feature exactly the same diameter in both materials. Drilling always takes place from the outside to the inside - bore entrance and countersinking in CFRP, bore outlet in aluminium.

Previously minimum quantity lubrication (MQL) was applied for this manufacturing step. After machining, the components had to therefore be disassembled, cleaned and remounted. In addition machining was often carried out in several successive machining steps. Different tools were used for drilling, reaming to the final diameter and countersinking. The complete process was therefore time-consuming, costly and the required dimensions were often not reliable. For example, the bore and countersinking often did not align on one axis.

To optimise this process, MAPAL has developed a drill with countersink step for dry machining. The special geometry of the tool ensures that the heat caused by machining is not transferred to the component. As a result, MQL can be eliminated and neither the component nor the working environment are contaminated with coolant.

The drill two cutting edges made of solid carbide combines the properties of a drill for machining aluminium with those of a drill for CFRP machining. It also has a double point angle. This ensures good centring of the drill and minimum burr formation at the bore outlet. Reliable removal of the chips is ensured by the specially designed chip

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

Contact:  
Andreas Enzenbach

Tel.: +49 7361 585-3683  
Fax: +49 7361 585-1019  
E-mail: [presse@de.mapal.com](mailto:presse@de.mapal.com)

Press Release No.: 2017-08-18

Date: 18.08.2017

spaces. Any delamination and fibre protrusion is to be avoided for the countersinking in the CFRP. MAPAL achieves this with a rake face correction at the countersink step. As CFRP is an extremely abrasive material, the drill is diamond-coated. This means that eight times the tool life is achieved compared with an uncoated drill.

The drilling/countersinking tool for the dry machining of CFRP aluminium stacks has been successfully used by customers. A speed of 5,000 rpm and a feed of 0.1 mm are applied. The tool is not only impressive in practice because of the results with regard to process reliability, tool life and the machining result, but also because of the steady boring process. The drill is available with a diameter between 4.1 and 11.11 mm with the associated countersink step.

Caption:

The drilling/countersinking tool from MAPAL for dry machining CFRP aluminium stacks combines the properties of a drill for machining aluminium with those of a drill for CFRP machining.

Words:	414
Characters:	2,169
Characters with spaces:	2,579

If published, please send a voucher copy  
by mail to Patricia Hubert  
or by e-mail to [patricia.hubert@de.mapal.com](mailto:patricia.hubert@de.mapal.com).

## Short profile of 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 in particular from the automotive and aerospace industries and from machine and plant engineering. With its innovations the family-owned company sets trends and standards in manufacturing and machining technology. MAPAL sees itself as a

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

Contact:  
Andreas Enzenbach

Tel.: +49 7361 585-3683  
Fax: +49 7361 585-1019  
E-mail: [presse@de.mapal.com](mailto:presse@de.mapal.com)

# PRESS RELEASE



Press Release No.: 2017-08-18

Date: 18.08.2017

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 outlets and representatives in 44 countries. In 2016 the MAPAL Group had 5,000 employees, generating sales of EUR 575 million.

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

**Contact:**  
Andreas Enzenbach

Tel.: +49 7361 585-3683  
Fax: +49 7361 585-1019  
E-mail: [presse@de.mapal.com](mailto:presse@de.mapal.com)