

## Vibration-damped tool holders

Significantly better surface finish quality thanks to vibration damping

Vibration often occurs during machining. It causes a dynamic instability of the system. Inadequate surface finishes, insufficient accuracy, loud machining noises, reduced tool lives and, in the extreme case, broken tools and cutting edges may be the consequence.

MAPAL takes various approaches to reduce or prevent this vibration. Among other aspects, the company has developed an innovative system for damping the vibration in the tool shank. Particularly tools for boring and milling with very long projection lengths tend to vibrate due to insufficient dynamic rigidity of the system. During the design of the new system, the developers took into account all the factors that result from the interaction of the machine tool, the tool and its clamping, as well as the part. The result: a system for absorbing vibration that is harmonised with all the usual machine rigidities. It can be used for machining different workpiece materials with different tools.

The closed system consisting of auxiliary mass and several steel spring packages acts against the deflection of the body material and minimises this deflection. In comparison to tools without the absorber system, the vibration can be up to 1,000-times lower. Despite a long projection length, quiet, stable running is achieved. As a result it is possible to machine at higher cutting speeds and the material removal rate can be significantly increased.



**Machining data:**  
 DMU 80 | Milling cutter:  $\varnothing$  52 mm z = 5 | 16MnCr5  
 Cutting edges: SNMU120508R-M05-HP975

**Cutting data:**

(Not damped/damped)

$v_c = 160$  m/min     $v_f = 980$  mm/min  
 $f_z = 0,2$  mm         $a_e = 18$  mm  
 $n = 980$  min<sup>-1</sup>       $a_p = 3$  mm

**Surface values:**

| Not damped           | Damped               |
|----------------------|----------------------|
| $R_a = 1,56$ $\mu$ m | $R_a = 0,67$ $\mu$ m |
| $R_z = 7,74$ $\mu$ m | $R_z = 3,93$ $\mu$ m |