**TENDO** E compact
Universal hydraulic expansion toolholder for drilling, reaming, tapping and high-speed cutting.

The TENDO E compact hydraulic expansion toolholder used in the live demonstration performs convincingly in volume up to 300% longer tool life.

Study by the wbk Institute of Production Technology at the Karlsruhe Institute of Technology (KIT) with all tool brands.

The advantages for users in machining:
- Optimal surfaces without chatter marks
- Minimal noise emission
- Reduced tool costs
- Tool change in seconds

*Verified in a study by the wbk Institute of Production Technology at the Karlsruhe Institute of Technology (KIT).*

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*Up to 300% longer tool life*
Example 1, Part A:
Rough machining of surface in synchronization
The TENDO E compact displays its full potential in surface milling of the base surface. While machining with a milling head would require several passes, the TENDO E compact accomplishes this task in a fraction of the time. Another advantage: the outstanding vibration damping from the hydraulic system provides for smooth running while reducing wear on the spindle and significantly increasing the tool life. (Figure 1 and 2)

Example 2:
Rough machining of full slots
For full slot machining, the tool is changed to a TiAlN-coated solid metal T-slot cutter with a diameter of 20 mm and 4 cutting edges, with unequal pitch. With permanent run-out and repeat accuracy of less than 0.003 mm the TENDO E compact produces an optimal surface finish due to an even cut and maximum reproducibility. (Figure 3 and 4)

Example 1, Part B:
Rough machining of outer contour in synchronization
The rough machining of the outer contour is performed by the same toolholder without changing the tool. Since tool change is eliminated, machining can continue with no loss of time. The optimal radial stability due to the robust base body of the toolholder prevents lateral deflection during the machining process. (Figure 1 and 2)

Example 3:
Finish machining of slots and the outer contour
A solid metal T-slot cutter with a diameter of 20 mm and 8 cutting edges is used as a finishing tool for the finish machining of the slots and outer contour. The tool is held by full-surface power clamping. (Figure 1 and 2)

Tools and Cutting Data
TENDO E compact HSK-A 63 Ø 20 mm

Example 1: Rough machining of surface and outer contour
- Tool: Walter HSK-A 63 Ø 20 mm (prototype)
- Coating: TiAlN
- Weldon surface: no
- Length of cutting edge: 32 mm
- Radius of cutting edge: 10 mm
- Speed n [RPM]: 3512
- Feed rate v [mm/min]: 2762
- Tooth feed rate f [mm]: 0.195
- Depth feed rate a [mm]: 20 or 31
- Lateral feed rate a [mm]: 4
- Rate of metal removal Q [cm³/min]: 221

Example 2: Rough machining of full slots
- Tool: Walter HSK-A 63 Ø 20 mm (prototype)
- Coating: TiAlN
- Weldon surface: yes
- Length of cutting edge: 38 mm
- Radius of cutting edge: 10 mm
- Speed n [RPM]: 1938
- Feed rate v [mm/min]: 815
- Tooth feed rate f [mm]: 0.105
- Depth feed rate a [mm]: 7
- Lateral feed rate a [mm]: 20
- Rate of metal removal Q [cm³/min]: 147

Example 3: Rough machining of surface and outer contour
- Tool: Walter HSK-A 63 Ø 20 mm (prototype)
- Coating: TiAlN
- Weldon surface: no
- Length of cutting edge: 38 mm
- Radius of cutting edge: 10 mm
- Speed n [RPM]: 4500
- Feed rate v [mm/min]: 2300
- Tooth feed rate f [mm]: 0.06
- Depth feed rate a [mm]: 7 or 31
- Lateral feed rate a [mm]: 0.2
- Rate of metal removal Q [cm³/min]: 14.3

Blank:
- Material: 42CrMo4
- Tensile strength averaged: 1025 N/mm²