



A view into a TBT two-spindle ML200 for drilling workpiece shanks. From left to right: Device, drill bush carrier with immersion sleeves, spindle head. For drilling depths >200 mm, the user retrofits the drill bush carrier to the sealing case process. In this case, a steady can be mounted as well.

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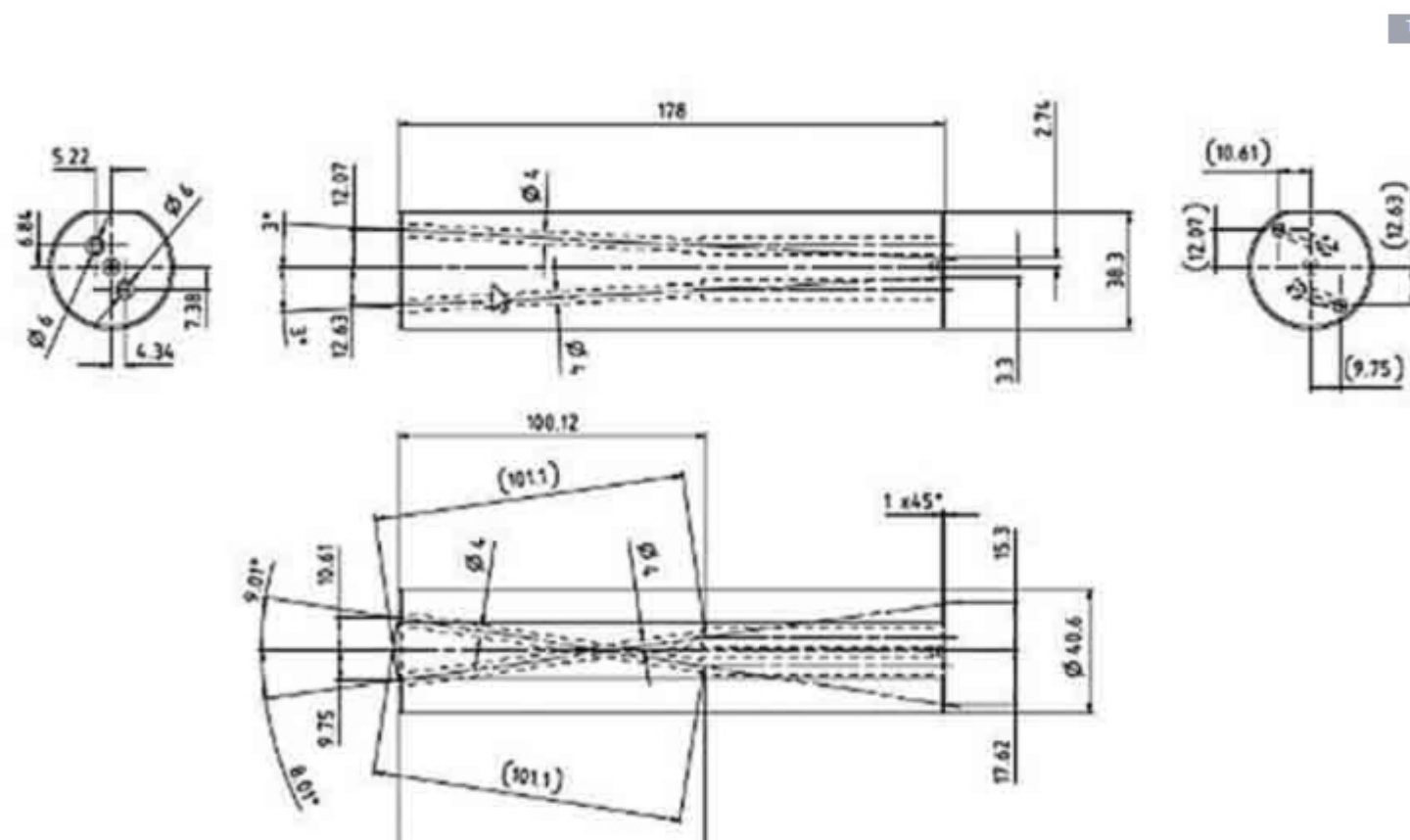
The diameters of the coolant holes vary with each tool for which they are intended, ranging mostly from 1.5 to 6 mm. This results in rather large length-to-diameter ratios. The technology for deep-hole drilling with single-lip drills is best suited to this task, as single-lip drills are much better than conventional spiral drills regarding deviation and straightness — and hence offer more process reliability.

Because the tool-shank manufacturer was already using several TBT ML 200 deep-hole-drilling

TBT Tiefbohrtechnik also provides consultation for questions about deep-hole drilling, including machine choices and set-ups. The tool shank manufacturer requested a solution that could be adapted to the new, different workpiece versions and fit accurately with the intended ML200 in a two-spindle variant.

Deriving a highly flexible solution in this instance was challenging: The drilling device had to provide four degrees of freedom: 360° rotation of the workpiece around the middle axis, height adjustment, cross adjustment and angle adjustment for the inclined holes in horizontal direction. Cross and angle adjustment could be synchronous for both spindles.

However, the rotation and height adjustment for both workpieces had to be adjustable separately for each spindle



This drawing shows one variant of the workpiece to be processed. Inclined coolant holes with different distances to the axis meet parallel, eccentric drill holes approximately in the center of the workpiece. The inclined position of the d1 drill holes can be achieved by using the four degrees of freedom of the device - rotation of workpiece, vertical,

“Our claim is to supply complete and 100% functioning solutions, consisting of deep hole drilling machines, drilling tools and all other machinery components,” explained TBT sales manager Andreas Schlegel. “Beside this, devices that may include components for automatized production. In this case, the customer decided against an automatized solution but rather to purchase individual components.”

Frequently, the diameters of coolant holes in a tool shank differ. For drilling from both sides, the user embraces the workpiece. A stop ensures exact positioning. A clamping screw fixes the cylindrical shanks, which are equipped with a milled groove for this purpose. In the variant shown here, the drilled hole with d_1 proceeds inclined and outside of the middle axis. In the mid of the workpiece, it meets the drill hole with d_2 , which also is eccentrically

The difficulty is that the slanted d1 drill hole must meet the d2 drill hole exactly at this

Due to significant variance of drilling depths for different workpieces, the manufacturer uses the drill bush carrier in two ways: For depths up to approximately 200 mm, immersion sleeves are used to achieve the contacting movement of the drill bushes to the workpiece by using springs. For higher drilling depths, the user disassembles the immersion sleeves and uses a sealing case. In this case, there is also the possibility of installing a tool steady for the support of the deep hole drilling



“Our solution includes a lot of ingenious details,” Schlegel said. “All deflections can be adjusted quite simply and with the sufficient precision in using either scales or digital

Since even small angle deflections will cause a large transverse offset in long workpieces, the available space in the ML200 was initially a topic of discussion. However, the engineers were able to combine all the requirements, quality, and available space. The customer didn't have to invest in a larger machine - which was one of his main concerns. "And for all drilling processes the standard safety guard can still be closed," Andreas Schlegel added.