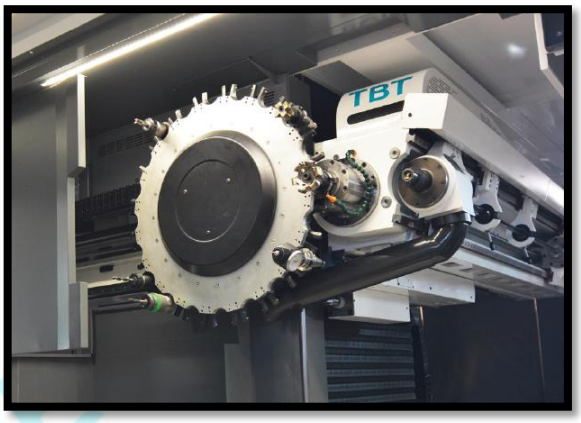
Deep-hole drilling on Machining Centers

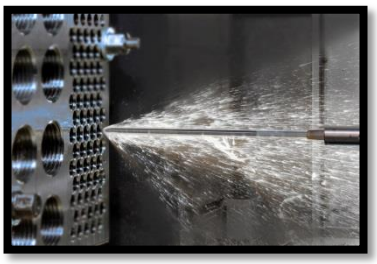
The trend towards multi-station machining has resulted in single-lip drills being used increasingly on conventional machine tools, for example on machining centres. With its combination of precision and superior drilling performance, the single-lip drill is also used for short and intricate holes.

The user demands for complete machining (all in one set-up) led to increasingly on modern machining centers, drilling with drilling depths with more than 40 x Ø carried out.



Prerequisites for a successful deep-hole drilling on a Machining Center

1) An efficient coolant and filtration system.
2) Suitable coolant should be in sufficient quantity and pressure exists.
3) A pilot drill must be used for the pilot hole to replace the drill bush.



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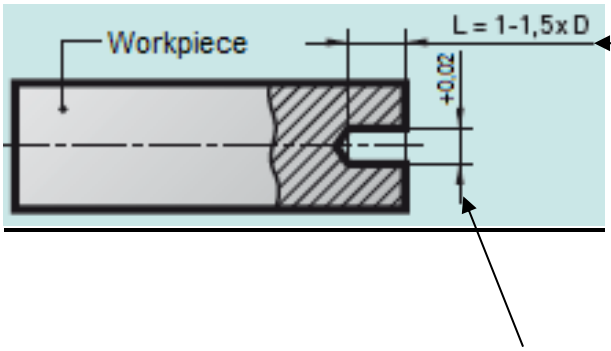
1. Produce of the pilot hole:



Minimum depth of pilot hole 1,5x Diameter

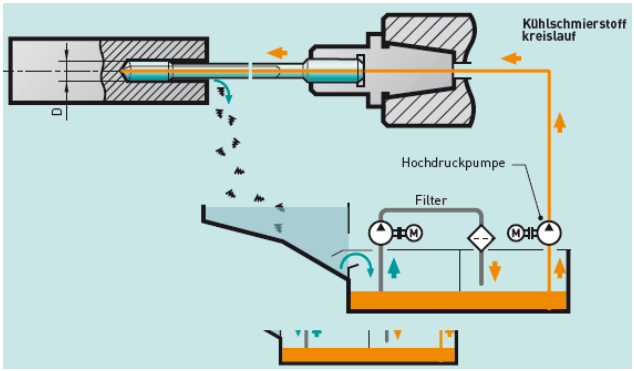
Diameter of the pilot hole +0.02 mm larger than the diameter of the deep hole drill.
Usually the pilot drills are used with the m7 tolerance. (TBT-pilot-drill)

2. Operation deep hole drilling:

Drive with anti-clockwise to the safety distance in the pilot hole to enter the deep hole drill. Here note that the maximum rotation of the tool is not exceeded by 200rpm, as the tool swings otherwise might destroy it and thus could also injure the machine operator.
After reaching the depth of the pilot hole turn on the internal cooling system, set on the rpm to full speed (in the working direction) and after that the feed.

Deep hole drilling steps:

1) Drive until shortly before retracting the deep hole drill bore base
2) Turn the internal cooling on
3) Turn on the rotation
4) Start the feedrate (for the first few mm a lower feedrate)



(Schaubild Einlippenbohrer auf BAZ)

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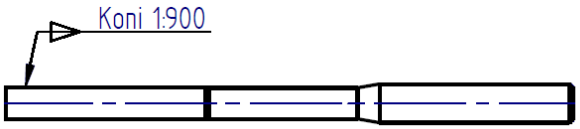
3. Drilling deeper than 40 x Ø

If you want to produce holes on a machining center with a length of for example 80 x Ø you have to work with two tools.
The second tool diameter should be 0.02 mm smaller than the first used tool.
The reason of the diameter difference is that the solid carbide head is not cylindrical, and after regrinding, the head will be smaller.



(The solid carbide head is produced conical. Standard 1:900)

4. Calculation of the tools:

Example: 10,000 mm Drilling diameter with a depth of 800mm.
Tools: Solid Carbide Twist Drills, Deep hole drill with clamping element 20x50 DIN1835 form A

Pilotdrill:

Solid carbide twist drills Ø 10, 00 m7 (Tolerances would be (+0.006 +0.021)

Deep hole drill:

Deep hole drill Ø10,000 x 505 mm

Length calculation:

Diameter multiplied by 40 times	= 400 mm
Plus length of driver (clamping element)	= 50 mm
Cylindrical end of the Deep hole drill = approx. 2 times diameter	= 20 mm
Flute length for evacuation of the chips = approx. 2 x diameter	= 20 mm
Regrinding length = approx. 1,5 x diameter	= 15 mm
Over all length (OAL)	= 505 mm

Tool to be produced: Ø10,000 x 505 mm

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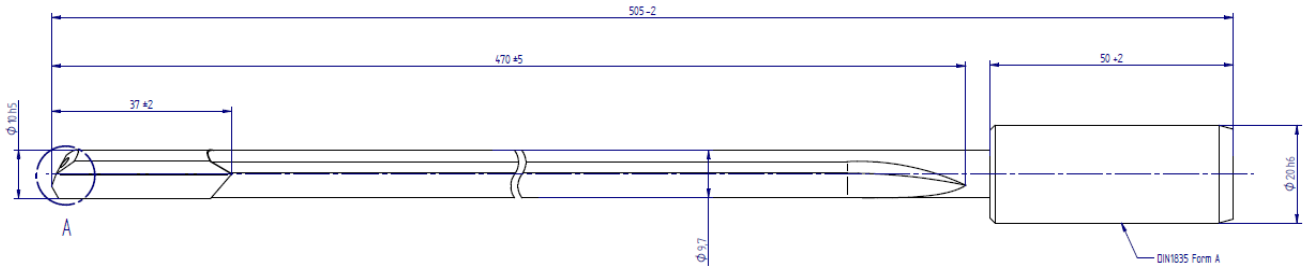
The Second tool will be produced 0,02 mm smaller than the first one

Deep hole drill Ø9,980 x 905 mm

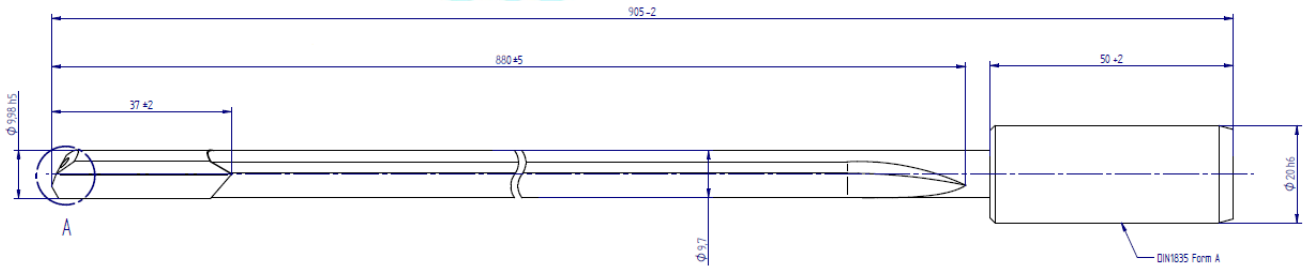
In this case we add. 40 x Ø to the first tool.

Example: Ø10,000 x 40 = 400 mm (free length) + overall length (OAL) from the first deep hole drill. In this case we produce the tool: Ø9,980 x 905 mm

Ø10,000 x 505 mm



Ø9,980 x 905 mm



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