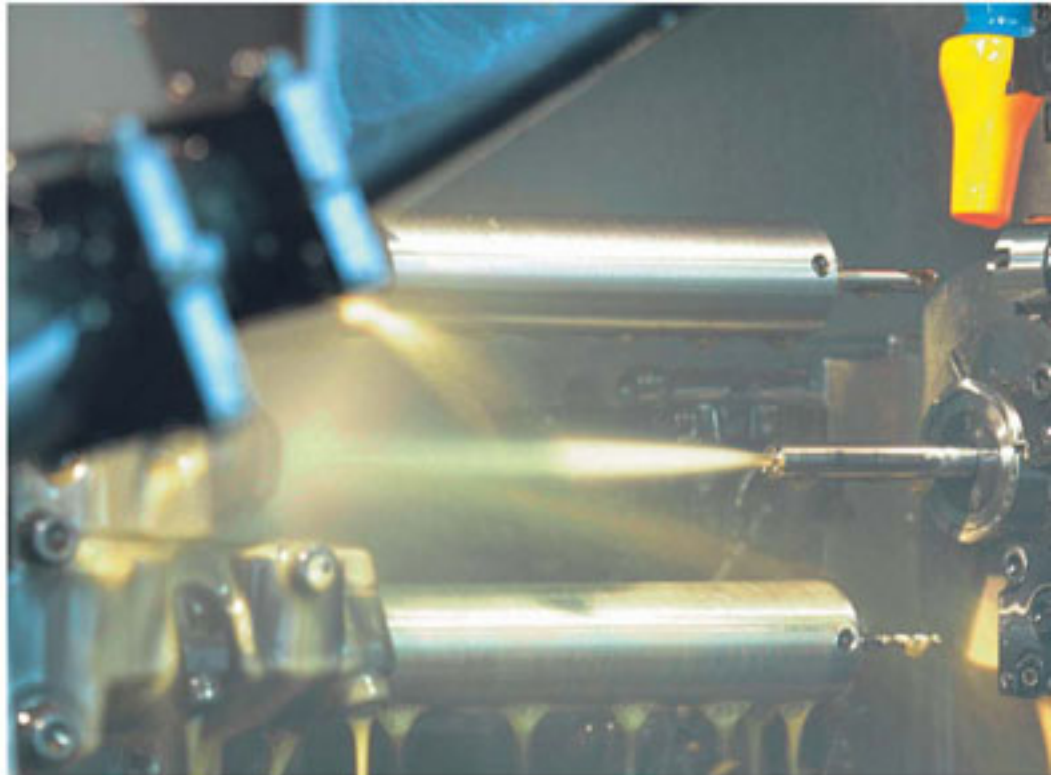


With today's technology, deep-hole drillings with high depth-to-diameter ratios using single-lip drills can be made to high precision on machining centers, using sophisticated equipment and drills. The drilling fluid applied plays a central role.



Deep-hole drilling in difficult-to-



Modern carbide drills, such as the BOTEK single-lip drill, face increasing advance speeds and stresses. High-tech is the only answer.

Deep-hole drilling on a modern machining center requires a deep-hole drill and a powerful high-pressure cooling system. In deep-hole drilling of high alloy stainless steels like those used in medical devices, the drilling fluid continuously flushes chips out of the hole under very high pressure, ensuring process reliability at every stage.

INOX 1.4441 implant

The processing for the implant in the illustration includes turning, tapping, deep-hole drilling, hexagon milling, cutting and smoothing. If all the steps are to be done on the same machining center, the cutting oil used must also be high-performance. Conventional deep-hole drilling oil cannot meet this requirement. For proper machining of the piece, the cutting oil must have the following properties:

- outstanding extreme pressure characteristics, as the system pumps oil at up to 350 bar
- good degassing properties in all temperature ranges
- extreme cooling capacity, specifically for deep-hole drilling
- optimal protection for tool edges in tapping and drilling

- above-average wetting and lubricant properties
- no odor or aerosol emissions

The specialists chose MOTOREX ORTHO NF-X for a comparative test with a conventional deep-hole drilling oil, focusing specifically on the deep-hole drilling stage.

Informative comparison series

Complete processing of the ductile implant steel workpiece at Stuckenbrock Medizintechnik GmbH in Tuttlingen, Germany, plainly pushed all the production elements to their limits.

The comparison series was produced on identical TORNOS machining centers with the same tools. Particular attention was paid to the results of deep-hole drilling using a conventional deep-hole drilling oil and MOTOREX ORTHO NF-X. The extreme requirements in terms of high pressure stability and cooling properties of the cutting oil during deep-hole drilling (bit diameter 1.15 mm, hole depth 60 mm) revealed significant differences after only a short time.



...table to the complex package of additives in all MOTOREX ORTHO cutting oils using v_{max} technology. MOTOREX v_{max} technology delivers the desired chemical synergies at the decisive moment for processing in specific temperature ranges, resulting in maximum production speeds.

...process and processing fluid shows through clearly in extended tool life.

Do you have any questions about deep-hole drilling? Our specialists at MOTOREX AG will be glad to assist you.

o-cut materials

The greatest advantage of ORTHO NF-X, with its low viscosity of ISO 15, was its ability to bridge the gap between a thick oil, e.g. 32 cSt, for tapping and a thin oil for deep-hole drilling without any loss of performance. While surface quality was virtually identical in the previous processing stages, deep-hole drilling with ORTHO NF-X showed sharply improved tool life (see diagram of drill bit life) with optimized R_A values.

Overall performance also increased greatly, by over 47.6%. The improvement is attrib-

Deep-hole drilling with a favorable side effect

Deep-hole drilling on a machining center begins with a pilot hole. During drilling with the solid carbide single-lip bit the tool is supported by the guide pads on the hole wall. This has a smoothing effect, giving the high surface quality (R_A value) which is a characteristic of deep-hole drilling, and maximizes tolerance and shape accuracy in drilling. This otherwise requires an additional process, such as lapping. The ability to omit lapping as a processing stage not only boosts production capacity but also has cost benefits.

Modern deep-hole drilling tools are high-precision, high-tech products which constitute an important factor in production costing. An ideal combination of tool,



This high-precision implant is made from 1.4441 implant steel in several processing steps using a deep-hole drill at Stuckenbrock Medizintechnik GmbH in Germany.

Bit life in deep-hole drilling

