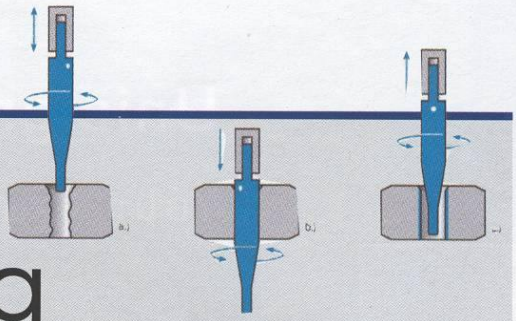

Bore processing for small components can present a challenge; specialised technology provides the solution.

Precise processing

MINIATURISATION of manufactured products is not simply about making everything smaller; conventional manufacturing processes cannot always be simply scaled down. For example certain workpiece characteristics become more critical, and this has a knock-on effect on the manufacturing process. The need to avoid burr formation on ductile materials, generally unacceptable in 'micro-technology' applications, means tungsten carbide, ceramic, silicon or polycrystalline diamond (PCD) are becoming more important; brittle/rigid materials on the other hand are machined mainly by a grinding and polishing procedure, using diamond as cutting material.

Processing bores with diameters 0.015 to 4mm represents a special challenge, particularly with regard to access, and what are often large aspect ratios (bore length:diameter). There is not an abundance of manufacturing processes for machining small bores, which deliver to the tolerances (on form, position, measure, etc) and surface quality required within the sub-micrometer range; while EDM, laser, and ultrasonic methods have been developed, finishing remains a problem. Diameters below 1.2mm are beyond the practical economical and technical limits for conventional procedures such as internal cylindrical grinding or honing; and reliable measuring of the bores in itself represents a challenge within this diameter range.

With its Micro Bore Sizing (MBS) machine range Microcut addresses this, offering specialised and economical solutions for processing of bores down to 0.015mm diameter, and in particular for hard materials. The method is devised to deliver diameter, roundness and cylindricity to close tolerances plus high surface quality.

Specialised and accurate abrasive tooling plus stable processing conditions are at the heart of the process: with the conical part of the tool the raw bore is enlarged and with the cylindrical part consistent geometry is achieved over a large number of pieces. It is claimed that surface and accuracy are comparable to those achieved by lapping technology; and the cold process does not affect the microstructure of the workpiece material.

Choice of the tool governs surface roughness and metal removal rate; processes with two alternative types of tool can be performed on Microcut's UniBore 800:

- Lapping process (loose grit) - suitable for brittle-rigid materials.
- Honing process (bonded grit) - favoured for softer materials such as steel

Applications range across the toolmaking, fibre optics, medical, semiconductor and automotive industries. Typical work pieces which can benefit from the process are nozzles, tubes and bushes; specific examples include ferrules for fibre optic connectors, where roundness of «0.5µm has been achieved. **www.microcut.ch**