



T-shaped microprobe stylus with a probing sphere of 110 µm in diameter, measuring an internal microthread with a size of M 0.7 × 0.175

Advantages

- Calibration of internal microthreads up to M 0.7 mm
- Exchangeable probing spheres
- Utilizable in tactile coordinate measuring machines

Contact

Andreas Barthel
Technology Transfer
Phone: +49 (0)531 592-8307
Fax: +49 (0)531 592-69-8307
E-mail: andreas.barthel@ptb.de

Achim Wedmann
Department "Coordinate Metrology"
Phone: +49 (0)531 592-5226
Fax: +49 (0)531 592-69-5226
E-mail: achim.wedmann@ptb.de



Physikalisch-Technische
Bundesanstalt
Bundesallee 100
D-38116 Braunschweig
Germany

www.technologietransfer.ptb.de

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T-shaped microprobe stylus

PTB has developed a novel microprobe which, based on its special T-shape geometry, is optimized for measurement tasks such as internal microthreads. In the new design, the probing spheres are kept in place by clamping forces, which makes them exchangeable. Thanks to its universal coupling, the T-shaped microprobe can be adapted to nearly any tactile coordinate measuring machine.

Technical Description

Measuring microstructured components is often a particular challenge in precision engineering. Stylus tips adapted to internal microthreads and having the required dimensions were previously not available.

For these new T-shaped microprobes, which can be manufactured in various sizes, the probing elements used are commercially available microspheres made of ruby with typical diameters of down to 110 µm that are fixed onto a T-shaped probe stylus of hard metal. Hereby, the probing spheres are kept in place in the base unit by clamping forces and can be exchanged, for example if they are worn out. The probe stylus is manufactured by means of microwire discharge machining.

Application

The progressive miniaturization of components requires increasingly smaller and complex internal microstructures (e.g. internal microthreads). A large amount of those is used, among other things, in clock-making, but also in medical engineering. At the same time, these structures may exhibit only very low tolerances. Hence, it has become indispensable to measure the manufactured components during the production process. The T-shaped microprobe can be used in practically all commercial tactile coordinate measuring machines. First verification measurements on internal microthreads having a nominal diameter of 0.7 mm and a pitch of 0.175 mm have already been performed.

Economic Significance

The T-shaped microprobe allows traceable tactile measurements of internal microstructures with gap widths of down to approx. 150 µm and a reliable detection and assessment of high-precision and functionally relevant internal structures. This allows, e.g., DAkkS-accredited calibration laboratories to extend their service offer. Together with a novel approach for the areal assessment of threads, this opens up the possibility of an integrated consideration of quality.

Development Status

The system has been thoroughly tested in the laboratory. A German patent application is pending.