



Ultra Precision Machining & Metrology



Ultra Precision Machining

Parts manufactured have accuracies in the (sub)-micron area, usually with a high demand on surface finish (roughness). Examples are optical components and air bearing systems. Manufacturing can be done for prototypes (one off's), small series or larger batches (often in cooperation with the UPW workshop of our plant at Acht). Advice on manufacturability and use of suitable and/or alternative materials can be given.

Metrology

The metrology department is a high class measuring facility dedicated to perform geometrical measurements with extreme high accuracies. With a focus on 3D-metrology and forms measurements are carried out on high-end standard equipment or own built apparatus.

VDL ETG Research is part of VDL Enabling Technologies Group. Until the year 2000, VDL ETG Research was part of the Philips Research Laboratories for which it developed ultra precision turning equipment, prototyped the first optical recording pick-ups and stood at the cradle of many ASML and FEI products. In 2000 we became part of Philips' machine factories: the Enabling Technologies Group. In 2006 we became part of the VDL group. We continue to combine creativity and professionalism to support R&D and New Business Development in any place that can be reached from Eindhoven by bike or e-mail.

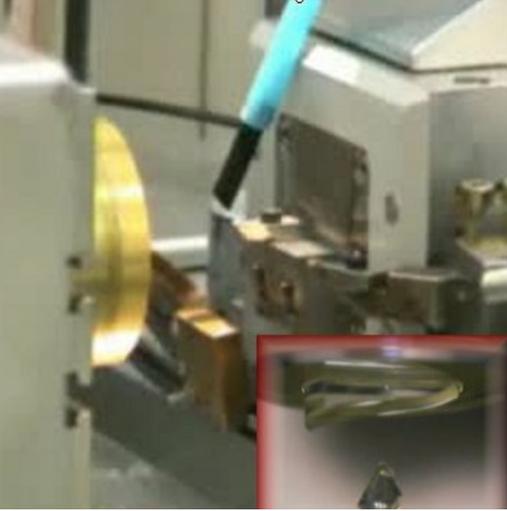
Strength through co-operation





Diamond cutting

The hardest material in the world is used to produce the sharpest cuts. In order to make workpieces with the highest surface quality, we use diamond tools that we can shape on home built machines and use in home built lathes. Optical quality can be cut without the need for polishing, to produce optics directly in transparent materials or to make moulds for injection-moulding, reflective mirrors....

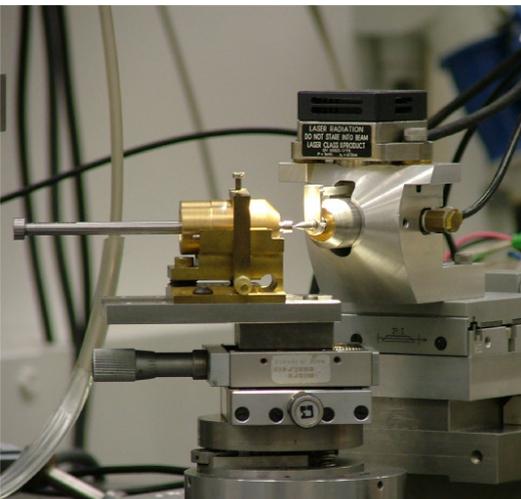
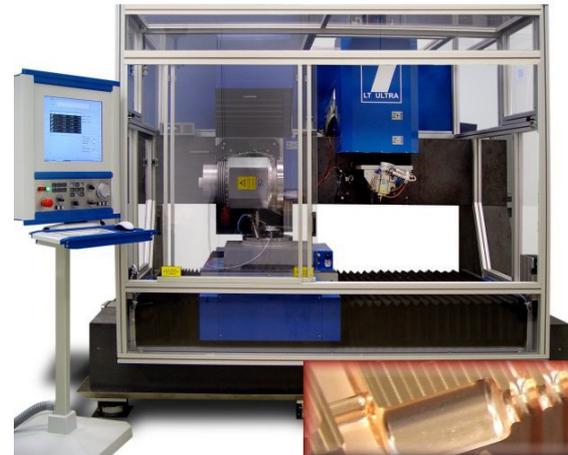


TURNING, ULTRASONIC TURNING, LONG RANGE TOOL SERVO

The most basic operation is turning and lots of materials such as nickel, brass and PMMA can be processed directly in this way. However if diamond is used for cutting ferrometals, the diamond is converted to carbon. To process this material class we have developed ultrasonic diamond cutting where the contact time between work piece and tool is short enough to prevent diamond conversion. Furthermore, to be able to produce free form surfaces by turning, we developed our long range tool servo in which the angular position of the rotation axis is fed back to the linear position of the diamond tool with a maximum stroke of 2.5 mm and resolution of 1 nm.

MILLING

Our latest investment was in a large ultra precise diamond milling machine. Having travel ranges of 1000 x 350 x 250 mm, the scales still read 1 nm. Five axes (three translations and two rotations) can be used simultaneously. It can be operated in fly-cutting mode but there is also a high speed spindle (120.000 rpm) available for micromilling. Air bearings and guide ways for ultra high precision mechatronics, large electron optical parts but also micro fluidic chips and moulds can be produced ideally on this machine.



METROLOGY

3D measurements can be done on our Coordinate Measurement Machine ranging 850 x 700 x 600 mm with an accuracy of 0.5 micron. However, apart from this multi purpose touch probe approach there are often more specialized tools (some home build) available which have a better fit for instance for cylindrical products such as lenses and mirrors. For contactless measurements, optical probes and interferometry is available.