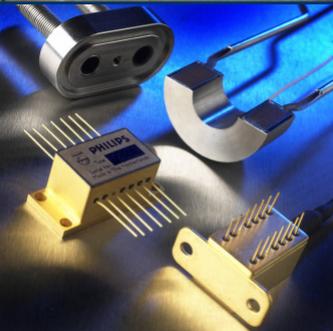




# Non-conventional Manufacturing



## EXTREME SPECIFICATIONS

Are what we like best. For the normal "bread and butter" questions, we would probably make use of cheaper workshops, but if a customer really needs specifications that can't be reached by normal operations we are challenged to adopt our machining capabilities. Examples of these are precision welding where the utmost control over heat input is needed to ensure material properties change only in a limited and controlled fashion, cleaning for large ultra high vacuum systems, gluing of bent crystalline material without inducing defects, etc, etc.

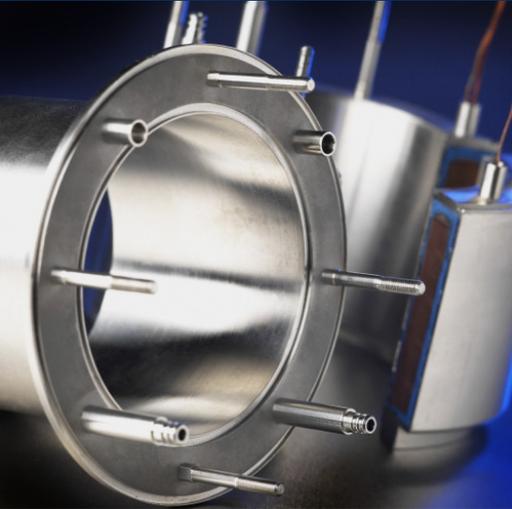
VDL ETG Research is part of VDL Enabling Technologies Group. Until the year 2000, VDL ETG Research was part of the Philips Research Laboratories for which it developed ultra precision turning equipment, prototyped the first optical recording pick-ups and stood at the cradle of many ASML and FEI products. 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



## Need a process that doesn't exist yet?

Diamond turning didn't really exist before the roadmap for optical memories dictated that it should. In much the same way, other markets such as vacuum technology pushed our capabilities to the limits. What's more, we could still build dedicated equipment and design dedicated processes for you if you need them. Of course these developments will take time, but don't let reality (now) stop you from dreaming about your future processes.

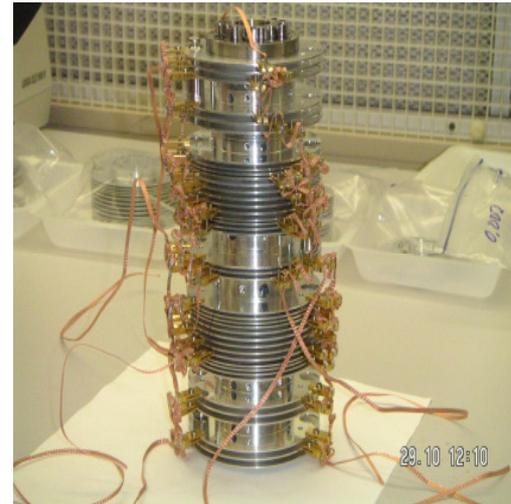


### PRECISION WELDING

Actuators for vacuum systems or electron optic lenses consist of coils sealed in steel containers. AT CTC we have a lot of experience in this. We can wind our own coils and pack them in a controlled way using either CNC laser micro welding or a TIG welding torch in combination with a lathe for orbital welding. We can test these products to be leak tight up to leak rates of  $10^{-10}$  mbar.l/s.

### ELECTRON DISCHARGE MACHINING

This technique, also known as spark erosion, comes in two versions. One is wire-EDM where the tool is a wire that's continuously renewed, so that wear of the tool is negligible. In this way accurate leaf springs can be cut from thick plates. But if a starting hole is made in a stack one can wire erode a series. It's even possible to wire erode a complete assembly, thus avoiding the tedious task of aligning a lot of elements. The second version is sink-erosion. In general this prints a hole in the shape of a previously prepared tool. Our micro sink EDM equipment is able of producing holes of the order of 20 micron and enables CNC carrying the sink tool in x, y and z direction.



### GRINDING

Bench and cylindrical grinding operations on hard metal alloys as well as on ceramics is often used to finish precision products. Single crystals such as silicon and germanium can be processed in such a way that maximum material integrity is guaranteed. One of our latest investments in this field was in ultrasonic grinding which allows minimal cutting forces during machining, thus enabling free form shapes having sometimes very thin features.