TNO’s optical workshop operates at the cutting edge of technology by manufacturing specially designed optical components in small quantities. Experienced, highly skilled staff interact directly with optical designers to enable excellent shape accuracy and very low WFE. Specially designed optics can reduce the quantity and size of optical components in scientific instruments for Earth observation, astronomy and lithography.

With conventional polishing glass, ceramics and metals are grinded with the same accuracy and at an extreme high quality level. When you have specific needs and requirements, we are able to offer you custom-built optical solutions.

**COMPONENTS**
- Specially designed optics (low quantity, prototyping), design on request
- High accuracy (shape, flatness, angle), low surface roughness

**APPLICATIONS**
- High-end optical systems in space, astronomy and lithography applications
- Spectrometers, imaging optics, beam expanders, etc.
- Refraction and reflection optics (typical sizes: 10 - 300 mm)
  - Spherical
  - Prisms
  - Cylinders
- Windows (typical sizes: 10 - 300 mm)
WE OFFER ACCURACY AND EXTREME HIGH QUALITY TO YOUR OPTICAL REQUIREMENTS

MATERIALS FOR UV, VISIBLE AND IR
> Various glass types (NBK7, fused silica, Zerodur, ULE, etc.)
> Crystals, e.g. quartz, CaF, MgF2, sapphire
> Nickel
> Silicon
> Germanium
> Molybdenum
> Silicon carbide
> Ceramics

... challenge us with your material

ADVANTAGES OF CONVENTIONAL POLISHING AT TNO
> Merging of expertise: optical/mechanical design and manufacturing
> Highly skilled staff for manufacturing specially designed optical components and coatings
> Metrology and optical qualification
> Enhancement or new development of manufacturing processes
> Design, assembly and testing of complete instruments
> Assembly expertise:
  • Sub-assemblies, e.g. beam splitters
  • Wringing (optical contacting)
  • Assembly plan
  • Mechanical integration of optics

SPECIFICATIONS
> Surface shape: common $\lambda/5$, special $\lambda/10$ up to $\lambda/20$ (depending on design and material)
> Surface roughness: $\leq 1$ nm Sq (depending on material)
> Angle accuracy: 3 arcsec

Silicon carbide objects