



DEMCON | Focal

Optics applications

- Lens design
- Opto-mechanical design
- Lens qualification
- Optical fabrication
- Lens assembly and alignment



Lens design

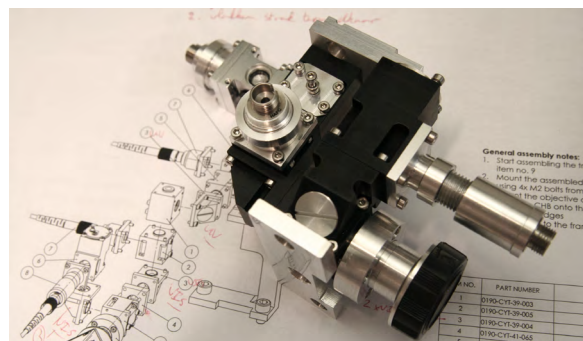
Demcon Focal has the capabilities to design, deliver and qualify one of the most demanding precision optical assemblies: a lithography lens. Demcon is using state-of-the-art alignment tooling and cleanroom facilities to achieve diffraction limited imaging for a large field of view. We have designed a lithography lens with high NA and large field of view that is capable of imaging semiconductor structures on wafers to produce e.g. processors, LEDs, MEMS, USB memory, etc.

Project specifics

- Magnification 5x (0.2x)
- Telecentric on image side
- Field-of-View 22 x 22 mm
- Diff limited
 - Critical dimensions < 0.4 μm (NA > 0.5)
 - High critical dimensions uniformity (< 2%)
- Useable Depth-of-Field ~ 1 μm
- Distortion < 100 nm (maximum over field)
- Magnification needs to be adjustable using back-focus
 - Order of magnitude 10 ppm
- Magnification and focus changes due to short term temperature change as small as possible
 - Temperature stability within +/- 0.1 degree Celsius
- Magnification and focus deviations due to pressure change are compensated using focus and back-focus only

Lens assembly and alignment

Creating state-of-the-art custom optics involves close collaboration between optical, opto-mechanical and mechanical engineering disciplines to design a lens system that meets its requirements. Besides theoretical expertise and powerful simulation software to test tolerances of a design, intimate knowledge of assembly equipment and its possibilities are needed to realize a prototype. Demcon Focal not only has all the theoretical expertise under one roof, it also has the facilities and practical assembly experience to deliver your lens system.



For various customers Demcon Focal has assembled and aligned optics, such as:

- F-theta lens with a long working distance
- Focusing lens with a Strehl ratio > 0,95
- Lens systems for various microscopic applications
- Lenses for lighting applications

Project specifics

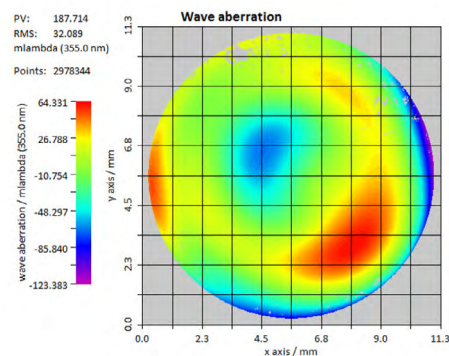
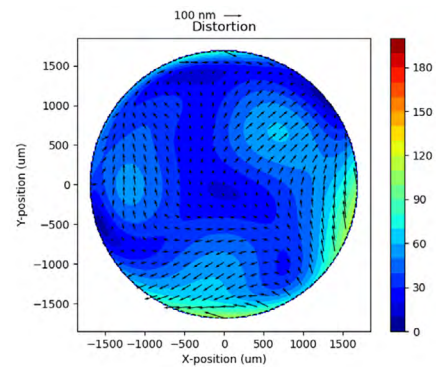
- Alignment of optics to diameter of 100 mm
- Stacks up to 20 lenses or more
- Use of various assembly techniques such as individual lens-cells.
- Decentering accuracy < 1 μm
- Tip/tilts < 5 arcseconds

Lens qualification

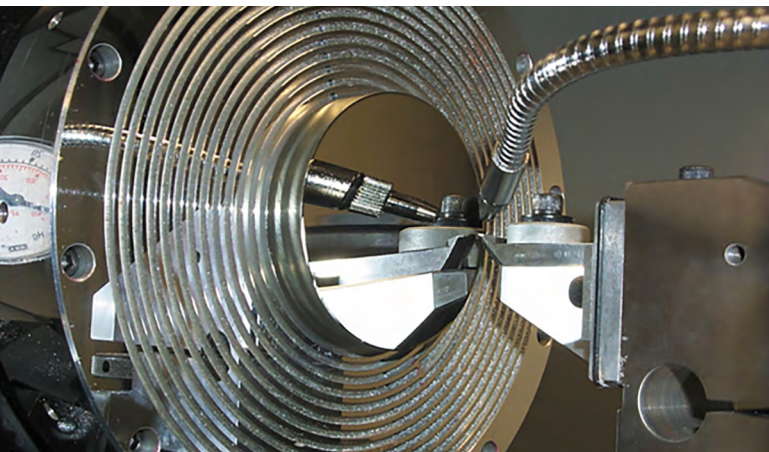
Projects for designing and creating lenses do not stop after assembly: lenses need to be qualified and tested against customer requirements. Demcon Focal is well suited to integrate this into any lens development project by using market standards for metrology or in various cases by creating in-house qualification systems for wave front aberrations, distortion, field curvature, MTF or other means to determine the performance of an assembled lens.

Project specifics

- Customized interferometric double pass wave front analysis.
- Distortion measurement < 100 nm
- Field curvature
- MTF values using various targets/grids
- Through focus scans
- Telecentricity



Optical fabrication



Demcon Focal has an extended supply chain to serve you for nearly every lens challenge. From standard glass optics to customized prisms, filters or diamond turned mirrors, we can source all kinds of optical components to find a solution for your problem. Besides standard optical grade lenses, we also have access to aspherical polymer lenses, off-axis parabolic mirrors and customized coatings.

The engineers at Demcon Focal have a proven track record of designing innovative solutions to meet customers' requirements. Furthermore, Demcon Focal's prototyping process is streamlined for speed, selecting only reliable suppliers who are capable of contributing their own expertise to a given solution.

Project specifics

- Lenses and plano windows from up to 2 to 150 mm in materials from Schott, Ohara, Corning, Hoya
- Doublets and triplets, round, square, rectangular, etc.
- Prisms, cylinders
- Diamond turned mirrors, diameters up to 300 mm, Ra < 6 nm in Alu, Cu, RSA, brass and other non ferro material
- Thermal lenses in silicon and germanium
- Polymer lenses in Zeonex, OKP, APL, PMMA, PC
- Diffractives, Fresnels, off-axis parabolic, aspherical
- Various AR and Reflective coatings



DEMCON | Focal

Demcon Focal is part of the international Demcon group and is specialized in design, engineering and assembly of bespoke opto-mechatronic (sub-)systems, for high technological markets like semiconductor, bio-medical, life science, aerospace, industrial manufacturing and others. Often these systems are used in applications where accuracy, stability and rapid movement or exploitation in extreme environments is required.

Demcon Focal achieves customized design and engineering in a multidisciplinary approach, entailing optical, vision, data, electronic, software, mechanical and system engineering. Activities include high-level requirement engineering, concept optical design, prototyping, detailed engineering, system integration, manufacturing and testing activities.

Demcon Focal also performs specialized volume production that requires trained engineers, dedicated equipment and a clean environment. We can offer system service and support and we have production facilities available for complex optical modules.

Demcon

Institutenweg 25
7521 PH Enschede
The Netherlands
T +31(0)88 115 2000

Kanaaldijk 29
5683 CR Best
The Netherlands
T +31(0)88 115 2400

Delftechpark 23
2628 XJ Delft
The Netherlands
T +31(0)88 115 2000

Zernikelaan 6
9747 AA Groningen
The Netherlands
T +31(0)88 115 2000

Nottulner Landweg 90
D-48161 Münster-Roxel
Germany
T +49 (0)251 980 16 40

25 International Business
Park #03-60A
Singapore 609916
T +65 (0)9059 3463