



Photonics for Industrial Solutions: CNC Shaping.

BERLINER GLAS manufactures glass components for technical and optical use by state-of-the-art computer-controlled machines (CNC-technology) to offer our customers new possibilities for shaping glass. All profiles consisting of smoothly integrated straight or curved lines or arbitrary shapes can be manufactured with high precision permitting new functional design perspectives. In the most common file formats (DXF, IGES, VDA) we can take the data directly from any CAD system by disc or E-mail.

CNC Shaping.

Specification*:

Material	optical glass, CaF ₂ , MgF ₂ , quartz, glassceramics, ceramic, borosilicate glass and filter glass
Outside dimensions	up to 1,000 x 1,250 mm in any thickness
Repeating accuracy	up to ± 0.003 mm
Path controlled shapes	Any radius or shapes which are digitized can be describes mathematically (acc. to value listing)
Inside shapes	Bores up to 0.25 mm, steps, elongated holes, pockets, grooves and indentations of any size
Edges	C-edges, seamed and ground edges, bevels at any angle
Roughness of ground edge	rms = 1 to 5 µm depends on tool
Edge chips	acc. to customer specification (ISO 10110, part 7 or DIN 3140, part 7)
Deep drilling	up to 500 mm, Ø 3 - 40 mm

In addition BERLINER GLAS manufactures plano optic with light-weight structures with a weight reduction of up to 90 %.

Quality Assurance:

Because the machine tool always follows the computer program, maximum accuracy is ensured (all parts are identical). The accuracy of the machine-tools are checked regularly by a high efficient Renishaw-Quick-Check-System. Furthermore we use machines which are able to compensate for temperature.

Well trained experts are programming and setting the machine tools and controlling production.

Notes:

On request 3D shapes may be manufactured as well (e.g. helical lines by using round tables). Finished glass components can be subsequently strengthened. Glass parts may also be coated or printed or receive a micrometer scale.

Metrology:

Wavefront	Interferometer (4-24"), Shack-Hartmann-wavefront sensor (UV, DUV, VIS, NIR)
Form deviation	3D coordinate measuring devices, caliper, CCD micrometers, Stitching-interferometer
Angle precision	Goniometer, interferometer, auto-collimators
Transmission/reflection	Spectral photometer
Surface defects	Traveling microscopes
Micro roughness	White light interferometer, atomic force microscope
Imaging performance/resolution	Computer-supported MTF measurement, microscopic image resolution
Centering	Objective metrology system, laser centering station
Additional functional measurement	Assembly-specific metrology station
Fine correcting procedure	Ionic beam process, robotic polishing, magnetorheological process

* The following error and tolerance data indicates possible limit values. Specified and assessed according to ISO/MIL/DIN.