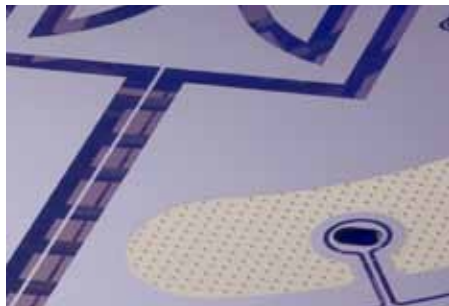


Photonics for Semiconductor:
Advanced Chucking Solutions.

You define the requirements.

We develop customer-specific solutions.



Electrostatic Chucks.

BERLINER GLAS supports the semiconductor industry with innovative chucks for critical manufacturing processes.

Our electrostatic chucks provide solutions to optimize your processes: extremely flat micro-structured and wear resistant chucking surfaces, single or double sided chucking, integrated cooling and heating capability, nearly zero or matched thermal expansion.

In addition to customized, ultra-fast, flexible and reliable chucking solutions for high productivity and yield, BERLINER GLAS provides control units for electrostatic chucks.

With solid experience in electrostatic chucking solutions, BERLINER GLAS supports cutting edge lithography with its components and is highly committed to next generation lithography.

Within our R&D department, there are engineers specialized in dielectric materials and electrostatic chuck behavior as well as in electric control circuitry and vacuum compatibility.

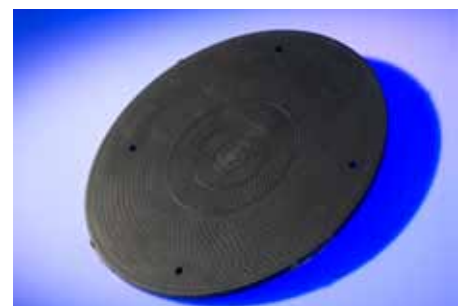
Vaccum Chucks.

Vacuum wafer chucks are widely used in semiconductor manufacturing. The lithographic exposure process has the highest requirements with respect to these components.

For over more than a decade, BERLINER GLAS has been developing chuck designs and manufacturing techniques to yield the highest level flatness, parallelism and chucking pressure combined with suitable surface structures to serve state-of-the-art lithography systems – especially immersion lithography.

Both, wafer chucks and reticle chucks are developed and produced in our facilities and are made of selected ceramic and glass-ceramic materials supplied by our qualified partners.

Our designers are trained in chuck principles and mathematical modeling of chuck behavior, in material properties, mechanical and thermal design and coating design as well as cleanliness requirements.



Our skills and expertise.

Your benefit.

	Vacuum and Electrostatic Chucks	Electrostatic Chucks	Vacuum Chucks
Chuck structure	<ul style="list-style-type: none"> ◆ Wafer chucks up to 12 inch wafer size ◆ Reticle chucks ◆ Single sided or double sided chucking ◆ Integrated water cooling (optional) ◆ Integrated electrical heating (optional) 	<ul style="list-style-type: none"> ◆ Up to eight electrodes per side ◆ Unipolar or multipolar electrodes 	<ul style="list-style-type: none"> ◆ Up to four separated vacuum segments
Flatness	<ul style="list-style-type: none"> ◆ Global flatness down to 100 nm across 300 mm ◆ Local flatness of down to 2 μrad local angle ◆ Local flatness across a die is within a few nanometers 		
Chuck force	<ul style="list-style-type: none"> ◆ Uniform clamping force between part and chuck across chuck area 	<ul style="list-style-type: none"> ◆ Up to 0.5 bar ◆ Down to 0.1 seconds chucking and de-chucking time ◆ Down to 1 mW electric power dissipation per 12 inch area 	<ul style="list-style-type: none"> ◆ Up to 1 bar ◆ Very low vacuum flow due to vacuum seals
Material	<ul style="list-style-type: none"> ◆ "Zero"-expansion materials like Zerodur, ULE & Cordierite ◆ Silicon-matched expansion materials like Silicon-Carbide, Silicon-Nitride, SiSiC & Borosilicate glass ◆ Tailored thermal conductivity by use of different chuck materials ◆ High stiffness of up to 260 GPa (41 MPsi) ◆ Nitride or Carbide wear resistant coating ◆ All materials are low outgassing and of highest available purity grade 	<ul style="list-style-type: none"> ◆ High resistance materials allow short chucking time ◆ High voltage breakthrough threshold materials allow high clamping force 	
Microstructures	<ul style="list-style-type: none"> ◆ Burls or ring structures can reduce contact area by a factor of 100 leading to less sticking forces and less particle sensitivity ◆ structure sizes down to 50 μm and heights down to 1 μm ◆ Nitride or Carbide wear resistant coating 		
Test & Qualification	<ul style="list-style-type: none"> ◆ Interferometric flatness qualification for parts up to 24" in diameter ◆ Functional interferometric flatness qualification with chucked reference wafers or reticles by means of a 12" vertical interferometer (optionally in vacuum) ◆ Application of custom (local) flatness evaluation algorithms ◆ Chucking force measurement ◆ Residual gas analysis (RGA) 	<ul style="list-style-type: none"> ◆ High voltage functional electrical test 	<ul style="list-style-type: none"> ◆ Vacuum flow test

Solutions in Optics. Hightech in Glass.

The BERLINER GLAS GROUP is one of the leading European providers of optical key components, assemblies and systems as well as high-quality refined technical glass. With our understanding of optical systems and optical production techniques, we develop and integrate optics, mechanics and electronics into innovative system solutions. These solutions are applied worldwide across the whole spectrum of the light-using industry – from medicine to semiconductors, metrology and analysis to defense or as displays, for example in offices, televisions, monitors or navigation systems.

The BERLINER GLAS GROUP consists of companies which have been developing and producing optical solutions for over 100 years. As an owner-managed medium-sized company with around 950 employees, we can offer our customers tailor-made, market-driven solutions of the highest quality anywhere and at any time.



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