

VACUUM CHUCK.

ENABLING A HIGH YIELD IN HIGH-PERFORMANCE APPLICATIONS.



VACUUM CHUCK.

Vacuum chucks are used in many semiconductor processes to hold the wafer during processing. They are used under atmospheric conditions.

Five reasons to choose vacuum chucks made by Berliner Glas:

1. High stiffness of ceramic material
2. Lightweight structure design for weight minimization
3. No wafer sticking
4. Very low generation of added particles
5. High global flatness

APPLICATIONS

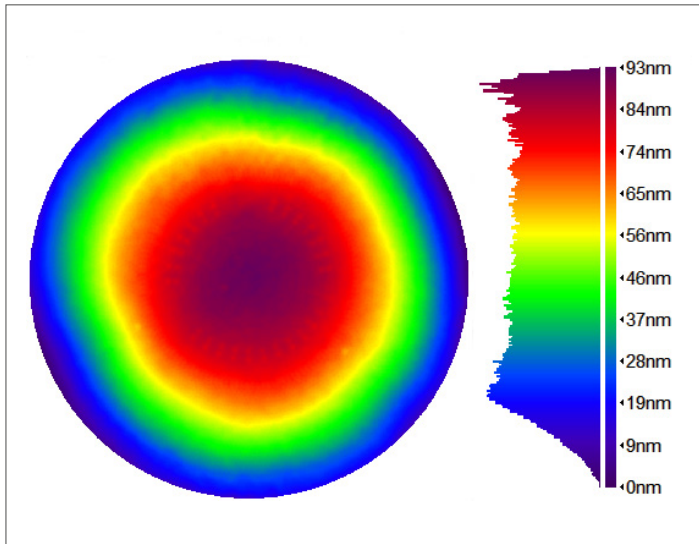
- ▶ Lithography
- ▶ Inspection
- ▶ Bonding technology
- ▶ Metrology
- ▶ Display manufacturing

CHUCK DESIGN

- ▶ Vacuum chucks up to 18 inch wafer size
- ▶ Single sided or double sided chucking
- ▶ Integrated cooling
- ▶ Integrated heating
- ▶ Lightweight structure available

FLATNESS

- ▶ Global flatness: down to 100 nm across 12 inch
- ▶ Local flatness: down to 2 μ rad local angle within a die (26 x 32 mm²)



Flatness profile - interferometric image.

CLAMPING PRESSURE

- ▶ Uniform clamping force across the clamping area
- ▶ Controllable vacuum conditions by design

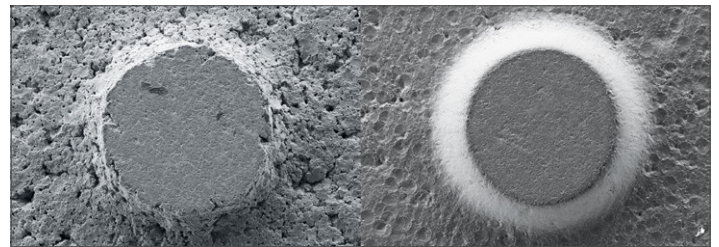
MATERIAL

- ▶ Materials matched to thermal expansion of Silicon: SiC, SiSiC, Si₃N₄, AlN & Borosilicate glass
- ▶ "Zero"-expansion materials: Zerodur®, ULE & Cordierite
- ▶ High stiffness of up to 380 GPa (41 MPsi)
- ▶ Nitride or Carbide wear resistant coating
- ▶ Highest purity of all materials according to SEMI standard
- ▶ Anodized Aluminum

MICROSTRUCTURES

- ▶ Structures (burls) reduce contact area between wafer and chuck by a factor of 100 (1 % contact area)
- ▶ Less sticking forces
- ▶ Less particle sensitivity
- ▶ Structure sizes down to 250 μ m
- ▶ CVD coating for reduction of added particle generation: Backside contamination (BSC) 0.3 > 100 nm/cm² pwp

TEST & QUALIFICATION



Conventional vs newly developed manufacturing process for burls.

- ▶ Interferometric flatness qualification for parts up to 24" in diameter
- ▶ Functional interferometric flatness qualification with chucked reference wafers by means of a 12" vertical interferometer (optionally in vacuum)
- ▶ Application of custom (local) flatness evaluation algorithms
- ▶ Chucking force, RGA & gas flow measurement
- ▶ Backside contamination measurements