Heraeus

OM® 100

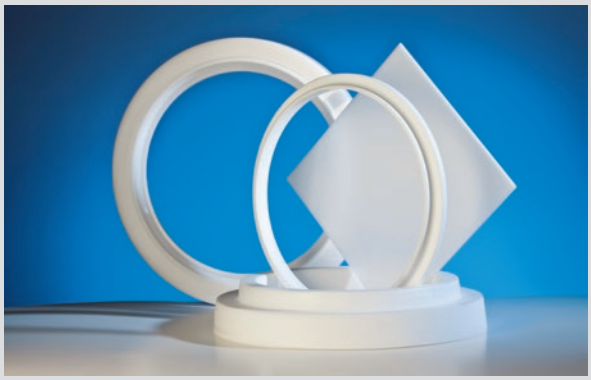
Applications

- Process chambers in high-end 8", 12", and 18" semiconductor manufacturing equipment
- Thermal insulators in the shape of flanges, spacers and plates

Characteristics

OM® 100 is an opaque high purity quartz glass. Evenly distributed, micron-sized pores yield excellent diffuse reflection and low transmission from UV to IR radiation. Heat radiation is efficiently blocked by only a few mm of OM® 100 bulk material.

The material density of OM® 100 is very close to the density of clear fused quartz. The unique microstructure results in a very smooth surface finish after flame polishing. Material shrinkage or the "orange-peel effect" known from other opaque fused silica is effectively avoided. Therefore, flame polished OM® 100 offers good sealing properties. Also the durability of OM® 100 is improved compared to other opaque material when exposed to HF acid.



This allows more cleaning cycles in semiconductor process equipment.

OM® 100 features the typical viscosity and thermal properties of high purity quartz glass. Due to its high density OM® 100 can be easily welded to clear fused quartz with excellent welding seam quality. The mechanical strength is almost equivalent to clear fused quartz and superior to most competing materials.

Dimensions

Maximum dimensions [mm]

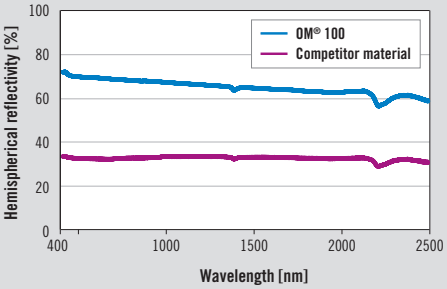
Product	Length / OD	Width	Height
Round block	720	–	60
Square block	500	500	60
Rectangular bar	Up to 900	< 300	60
Flange blank in near net shape design	Up to 800	–	Up to 250

Chemical purity – typical trace elements in OM® 100 (ppm by weight)

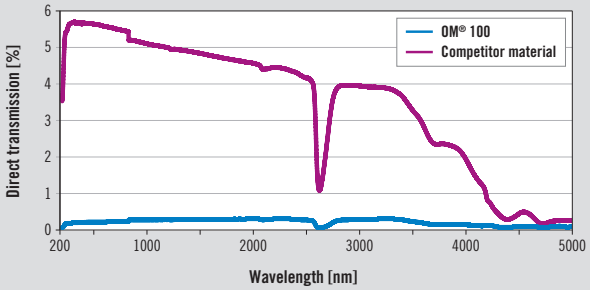
	Li	Na	K	Mg	Ca	Fe	Cu	Cr	Ni	Mn	Ti	Zr	Al	OH
OM® 100	0.1	0.1	0.2	< 0.03	0.4	0.1	< 0.01	< 0.01	< 0.01	< 0.03	1.1	1.0	15	n. s.

Optical properties

Reflectivity from 3 mm thick plate

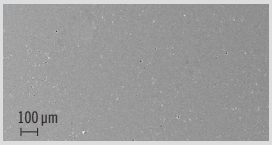


Transmission through 3 mm thick plate

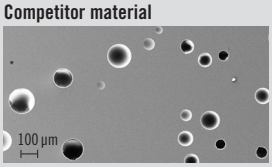


Microstructure

OM® 100



Competitor material



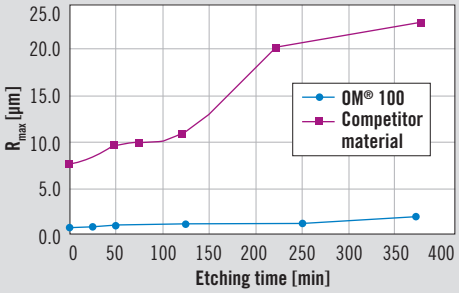
Images taken by scanning electron microscopy.

Etch performance

OM® 100

Competitor material

Surface Roughness vs. Etching Time in 5 % HF



Thermal properties

Temperature [°C]	Thermal conductivity [W/(m·K)]	Thermal expansion [‰] $(L_T - L_{20\,°C}) / L_{20\,°C}$	Specific Heat [J/(g·K)]
20	1.24	0.00	0.70
100	1.35	0.05	0.83
200	1.47	0.12	0.92
400	1.70	0.23	1.02
600	1.83	0.32	1.07
800	1.96	0.40	1.08
1000	2.10	0.47	1.11
1100	2.17	0.50	1.12

Physical properties

Density [g/cm³]	2.15 – 2.18
Porosity	< 2,3 %
Bubble size	< 20 µm
Young's modulus	54 kN/mm²
Bending strength (3 point)	84 N/mm²

Viscosity

Softening point (lg η = 7.6 dPa*s)	1730 °C
Annealing point (lg η = 13.0 dPa*s)	1200 °C
Strain point (lg η = 14.5 dPa*s)	1080 °C
Max. working temperature – continuous	1100 °C
Max. working temperature – short term	1300 °C

Europe
Heraeus Quarzglas GmbH & Co. KG
Heraeus Conamic
Base Materials
Kleinostheim, Germany
Phone +49 (6181) 35-7444
conamic.basematerials.eu
@heraeus.com

UK
Heraeus Conamic UK Ltd.
Wallsend Tyne & Wear
NE28 6DD, UK
Phone +44 (191) 2598 411
conamic.basematerials.eu
@heraeus.com

China
Heraeus ShinEtsu Quartz (China) Inc.
200122 Shanghai, China
Phone +86 (21) 68672266-809
conamic.basematerials.cn
@heraeus.com

USA
Heraeus Quartz North America LLC
Heraeus Conamic
Base Materials Division
Chandler, AZ 85226, USA
Phone (+1) 512 989 05 03
conamic.basematerials.us
@heraeus.com

Japan
Shin-Etsu Quartz Products Co., Ltd.
Tokyo 160-0023, Japan
Phone +81 (3) 3348 1913
division2@sqp.co.jp
division3@sqp.co.jp

Korea
HS Advanced Materials Co., Ltd.
Chungbuk Provence
Korea
Phone +82 (43) 532 5371
hsam@hs-am.com

www.heraeus-conamic.com

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