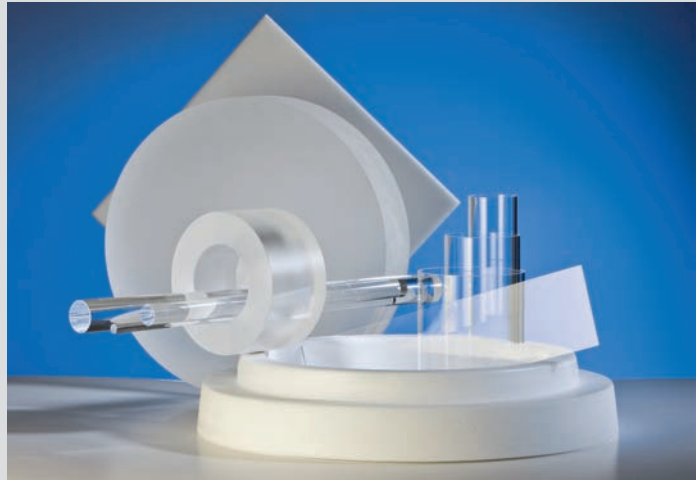


Quartz Base Materials for the photovoltaic industry

Semi-finished quartz glass products

- High temperature stability, corrosion resistant, transparent or opaque
- Raw material for: complex systems, reaction chambers, furnaces, light sources



Quartz glass is a very pure material with exceptional properties. It has very good chemical resistivity as well as superior thermal properties. The electrical insulating and mechanical properties of this special glass are also superior to other commonly used glass types. It is available not only in the well-known transparent form but also in opaque. While clear fused quartz glass has a very good optical transmission, opaque quartz glass has very high reflectivity. Opaque quartz glass is therefore used for its energy saving and thermal shielding properties.

Today, quartz glass plays a key role in the fabrication of microchips in the semiconductor industry. In the photovoltaic industry quartz glass is used in key processes to manufacture solar cells; in the production of raw material such as silicon, as well as during many manufacturing steps in e.g. light sources, lenses, furnaces or reaction chambers.

Heraeus Quarzglas has gathered a comprehensive knowledge of this special material in the past 100 years.

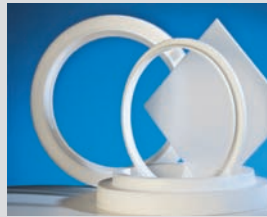
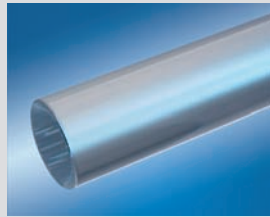
Today Heraeus is the largest integrated quartz glass producer that can select from a broad variety of processes. This variety allows Heraeus Quarzglas to provide tailored quartz glass solutions by finding the right material for today's and future applications.

Heraeus Quarzglas supplies semi finished quartz glass parts – Base Materials – that are widely used in the fabrication of process chambers and parts of furnace systems as well as key elements of complex equipment. The product portfolio consists of a wide variety of standard products such as tubes, rods and plates of HSQ 300 and OM 100 which are qualified at major players in the semiconductor and solar industry. In addition to standard products Heraeus Quarzglas provides individual quartz glass solutions.

With the close relationship to its customers Heraeus Quarzglas is able to react to new trends and developments. Heraeus Quarzglas Base Materials has a broad understanding of material properties and therefore helps to find the quartz glass grade for specific applications.

Technical Properties (typical values)

Density	2.203	Mean expansion coefficient K ⁻¹	
Tensile strength (approx.) N/mm ²	50	0...100 °C	5.1 x10 ⁻⁷
Bending strength (approx.) N/mm ²	67	0...200 °C	5.8 x10 ⁻⁷
Compressive strength (N/mm ²)	1150	0...300 °C	5.9 x10 ⁻⁷
Electrical resistivity in Ω x cm (20°C)	10 ¹⁸	0...600 °C	5.4 x10 ⁻⁷
Modulus of elasticity (N/mm ²)	7.25 x 10 ⁴	0...900 °C	4.8 x10 ⁻⁷



Standard Sizes (in mm, deviations might be possible. Please contact us.)

Tubes

Single Step

Outer Diameter	Wall Thickness
10 – 12	1 – 2
12 – 15	1 – 2.5
15 – 17	1 – 3
17 – 23	1 – 4
23 – 28	1 – 5
28 – 30	1 – 5.5
30 – 40	1 – 6
40 – 45	1.2 – 5
45 – 50	1.4 – 4.5
50 – 55	1.4 – 4
55 – 60	1.5 – 3.5
60 – 62	1.5 – 3

Multi Step

Outer Diameter	Wall Thickness
2 ≤ 8	0.5 – 2
8 ≤ 17	0.8 – 3.5
17 ≤ 25	1 – 4.5
25 ≤ 40	1.2 – 4.5
40 ≤ 54	1.8 – 6
54 ≤ 99	2 – 8
100 ≤ 129	2.2 – 8
130 ≤ 169	2.5 – 10
170 ≤ 249	3 – 12
250 ≤ 349	3 – 13
> 350	≥ 4

Rods

Single Step

Outer Diameter	Length
10 – 50	800 – 2000
70 – 90	≤ 5000

Multi Step

Outer Diameter	Length
1.5 – 70	800 – 1300

Opaque Material

Round Plate

Outer Diameter	650
Height	60

Square Plate

Length	500
Width	500
Height	60

Rectangular Plate

Length	850
Width	250
Height	60

Flange

Outer Diameter	650
Width	30 – 80
Height	60

Plates

Direct Drawn Plates

Max. Length	2500
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Thickness	Min. Width
2	130
2.3	150
2.5	150
3	200
3.5	210
4	220
5	250
6	280
7	290
8	300

Cut Plates

Surface finish:	as cut, ground or polished
Max. size	670 x 2000
Thickness	< 20

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