

Quartz Glass Plates

■ Applications

Etch tanks, windows, support plates, pedestals for reaction chambers, cover plates

■ Characteristics

High temperature stability, corrosion resistant, transparent or opaque



Heraeus Quarzglas provides transparent quartz glass plates with very good transmission and opaque plates with high reflectivity. Transparent quartz glass plates are offered in a wide variety of grades, from cost efficient direct drawn plates, to plates cut from various solid materials. They are used for instance to produce etch tanks or as windows and cover plates for various applications.

Heraeus Quarzglas' grades are primarily differentiated by the production route and the chemical impurity characteristics. Therefore, transparent quartz glass plates are divided into two larger groups: flame fused and electrically fused. In each group a variety of grades is available, each with individual advantages for specific applications.

In addition to transparent quartz glass Heraeus has a unique opaque material with exceptionally low transmission, which is also available in the form of plates (OM 100). It is made in a ceramic process and frequently used for its heat or electromagnetic blocking characteristics.

Heraeus Quarzglas cuts quartz glass solids into plates using band and wire saws. While band saws allow larger sizes to be cut, wire sawn plates have a smoother surface finish and excellent parallelism.

Depending on the size, specific surface finishes can be selected: cut or drawn, ground or polished. In addition to an improved surface finish, Heraeus Quarzglas offers to cut plates to customized shapes through water jet or laser cutting.

Dimensions (mm)

Direct drawn plates (max. length: 2500)

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

	Clear fused quartz cut plates	Opaque plates
Surface finish	as cut, ground or polished	as cut, ground or polished
Max. size	670 x 2000	400 x 500
Thickness	< 20	2 – 10

Chemical Purity – Typical trace elements and OH content (ppm by weight oxide)

Grade	Prod. Route	Al	Ca	Cr	Cu	Fe	K	Li	Mg	Mn	Na	Ti	Zr	OH
CFQ 099	E	15	0.8	<0.05	<0.1	0.4	0.8	1.2	0.1	0.1	0.9	1.5	0.8	n.s.
HSQ 100	E	15	0.5	<0.05	<0.05	0.1	0.4	0.6	0.05	<0.05	0.3	1.1	0.7	n.s.
HSQ 300*	E	15	0.5	<0.05	<0.05	0.1	0.4	0.6	0.05	<0.05	0.3	1.1	0.7	<30
HSQ 700	E	15	0.5	<0.05	<0.05	0.1	0.1	0.05	0.05	<0.05	0.3	1.1	0.7	<30
TSC 3	F	15	0.5	<0.01	<0.01	0.1	0.2	0.2	n.s.	0.01	0.1	1.3	1.3	170
TSC 4	F	8	0.4	<0.01	<0.01	0.2	0.05	0.2	n.s.	<0.01	<0.08	1.5	0.5	170
OM 100	C	15	0.8	<0.01	<0.01	0.1	0.4	0.2	0.05	<0.01	0.2	1.2	0.7	n.s.

E = electrically melted, F = Flame fused, S = Soot process

*guaranteed values available as HSQ 330

Technical Properties (typical values)

Mechanical Data

Density	2.203 g/cm ³
Mohs Hardness	5.5 ... 6.5
Micro Hardness	8600 ... 9800 N/mm ²
Knoop Hardness	5800 ... 6100 N/mm ²
Modulus of elasticity (at 20°C) ²	7.25 x 10 ⁴ N/mm ²
Modulus of torsion	3.0 x 10 ⁴ N/mm ²
Poisson's ratio	0.17
Compressive strength (approx.)	1150 N/mm ²
Tensile strength (approx.)	50 N/mm ²
Bending strength (approx.)	67 N/mm ²
Torsional strength (approx.)	30 N/mm ²
Sound velocity	5720 m/s

Thermal Data

	electrically fused	flame fused
Softening temperature °C	1710	1730
Annealing temperature °C	1220	1200
Strain temperature °C	1125	1080
Max. working temperature continuous °C	1160	1050
short-term °C	1300	1350

Mean specific heat J/kg·K

0 ... 100°C	772
0 ... 500°C	964
0 ... 900°C	1052

Heat conductivity W/m·K

20°C	1.38
100°C	1.47
200°C	1.55
300°C	1.67
400°C	1.84
950°C	2.68

Mean expansion coefficient K⁻¹

0 ... 100°C	5.1 x 10 ⁻⁷
0 ... 200°C	5.8 x 10 ⁻⁷
0 ... 300°C	5.9 x 10 ⁻⁷
0 ... 600°C	5.4 x 10 ⁻⁷
0 ... 900°C	4.8 x 10 ⁻⁷
-50 ... 0°C	2.7 x 10 ⁻⁷

Electrical resistivity in Ω x cm

20°C	10 ¹⁸
400°C	10 ¹⁰
800°C	6.3 x 10 ⁶
1200°C	1.3 x 10 ⁵

Dielectric strength in kV/mm (sample thickness ≥ 5 mm)

20°C	25 ... 40
500°C	4 ... 5

Dielectric loss angle (tg δ)

1 kHz	5.0 x 10 ⁻⁴
1 MHz	1.0 x 10 ⁻⁴
3 x 10 ¹⁰ Hz	4.0 x 10 ⁻⁴

Dielectric constant (ε)

20°C, 0 ... 10 ⁶ Hz	3.70
23°C, 9 ... 10 ⁸ Hz	3.77
23°C, 3 x 10 ¹⁰ Hz	3.81

Europe

Heraeus Quarzglas GmbH & Co. KG
Base Materials
Kleinostheim, Germany
Phone +49 (6181) 35-7444
sales.hqs.basematerials.de
@heraeus.com

UK

Heraeus Quarzglas GB
Send, Woking
Surrey GU23 7EF, UK
Phone +44 (1483) 213324
sales.hqs.basematerials.uk
@heraeus.com

China

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

USA

Heraeus Quartz America LLC
Base Materials Division
Austin, TX 78728, USA
Phone (+1) 512 989 05 03
sales.hqs.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.
Quartz Materials Division
Jincheon-Gun, ChungBuk, Prov., Korea
Phone +82 (0) 43-532-5373
HSAM@hs-am.com

www.base-materials.heraeus-quarzglas.com