

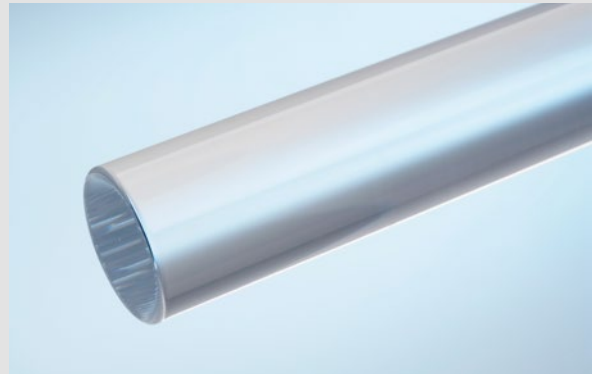
Quartz Rods

Fused quartz rods manufactured by Heraeus Conamic are available in various material grades and dimensions.

HSQ® 100 single-step quartz rods are directly drawn in a continuous electrical fusion process that covers an outer diameter range from 10 mm – 45 mm. These standard quality direct drawn quartz rods are a cost efficient solution for many industrial applications.

HSQ® 300 / 330 multi-step and improved single step fused silica rods yield an especially low bubble content and superior surface purity for high-end applications. Available sizes range from 1,5 to 90 mm outer diameter.

HSQ® 330S is a new selected grade that guarantees particularly low metal concentrations as required for super high purity semiconductor materials.



HSQ® 900 and Spectrosil® 1000 synthetic fused silica rods feature an outstanding purity and are therefore the recommended products for leading edge semiconductor applications.

All quartz glass rods are supplied with either snap-cut or machine-cut ends. Typical lengths for fused quartz rods are 1220mm (48") and 1300mm.

Chemical purity – Trace element concentration (ppm)

Typical Values (= Statistical Average Value)

	Li	Na	K	Mg	Ca	Fe	Cu	Cr	Ni	Mn	Ti	Zr	Al	OH
Electrically fused quartz														
HSQ® 100/300	0.5	0.2	0.3	< 0.03	0.5	0.1	0.01	< 0.01	< 0.01	< 0.03	1.1	1.0	15	< 30*
HSQ® 330	0.5	0.1	0.2	< 0.03	0.5	0.1	< 0.01	< 0.01	< 0.01	< 0.03	1.1	1.0	15	< 30*
* OH content can be reduced by additional annealing.														
Synthetic fused silica**														
HSQ® 900	< 0.002	< 0.01	< 0.01	< 0.01	< 0.02	< 0.03	< 0.001	< 0.001	n. s.	< 0.0005	< 0.03	< 0.04	< 0.04	0.2
Spectrosil® 1000	< 10	< 10	< 10	< 10	< 15	< 10	< 10	< 10	< 10	n. s.	< 10	n. s.	< 10	< 1350

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	synthetic
Softening temperature °C	1710	1660	1600
Annealing temperature °C	1220	1160	1100
Strain temperature °C	1125	1070	1000
Max. working temp. continuous °C	1160	1110	950
Short-term °C	1300	1250	1200

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·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 (tgδ)	
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

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