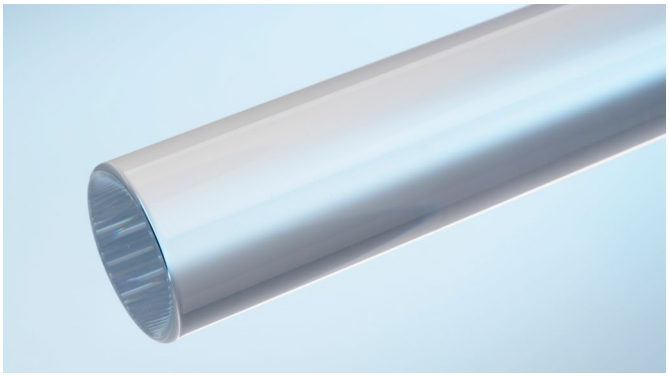
Quartz Rods

Characteristics

- Tight geometrical tolerances
- High chemical purity
- Low bubble and inclusion content

Applications

- Fabrication of batch furnace components
- Boats, wafer carriers and pedestals



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 Properties (Typical Values)

Trace Element Concentration (ppm)

Electrically fused quartz	Li	Na	K	Mg	Ca	Fe	Cu	Cr	Ni	Mn	Ti	Zr	Al	OH
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 (S)	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*

Synthetic fused silica	Li	Na	K	Mg	Ca	Fe	Cu	Cr	Ni	Mn	Ti	Zr	Al	OH
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	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	n. s.	n. s.	< 0.01	n. s.	< 0.01	< 1350

*OH content can be reduced by additional annealing.

Mechanical Data

Density	2.203 g/cm³
Mohs Hardness	5.5...6.5
Micro Hardness	8600...9800 N/mm²
Knoop Hardness	5800...6100 N/mm²
Modulus of Elasticity (at 20°C)	7.25×10^4 N/mm²
Modulus of Torsion	3.0×10^4 N/mm²
Poisson's Ratio	0.17
Compressive Strength	~ 1150 N/mm²
Tensile Strength	~ 50 N/mm²
Bending Strength	~ 67 N/mm²
Torsional Strength	~ 30 N/mm²
Sound Velocity	5720 m/s

Electrical Data

Resistivity [Ω×cm]	
20°C	10^{18}
400°C	10^{10}
800°C	6.3×10^6
1200°C	1.3×10^5
Dielectric strength [kV/mm] (sample thickness ≥ 5 mm)	
20°C	25...40
500°C	4...5
Dielectric loss angle (tg δ)	
1 kHz	5.0×10^{-4}
1 MHz	1.0×10^{-4}
3×10^{10} Hz	4.0×10^{-4}
Dielectric constant (ε)	
20°C 0...10^6 Hz	3.70
23°C 9...10^8 Hz	3.77
23°C 3×10^{10} Hz	3.81

Thermal Data

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

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 thermal expansion coefficient K^{-1}	
-50...0°C	2.7×10^{-7}
0...100°C	5.1×10^{-7}
0...200°C	5.8×10^{-7}
0...300°C	5.9×10^{-7}
0...600°C	5.4×10^{-7}
0...900°C	4.8×10^{-7}

HCA-SemiQG_5.2/E/12.2022

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

USA
Heraeus Quartz North America, LLC.
Heraeus Conamic
Chandler, Arizona, USA
Phone: +1 678 714-4306
conamic.basematerials.us@heraeus.com

UK
Heraeus Conamic UK Ltd.
Wallsend, UK
Phone: +44 191 2598-411
conamic.basematerials.eu@heraeus.com

Korea
Heraeus Korea Corporation
Heraeus Conamic Anseong Factory
Miyang-myeon, Gyeonggi-do, Korea
Phone: +82 31 671-7601
conamic.basematerials.kr@heraeus.com

China
Heraeus ShinEtsu Quartz (China) Inc.
Pudong, Shanghai, China
Phone: +86 21 6867 2266-809
conamic.basematerials.cn@heraeus.com

Japan
Shin-Etsu Quartz Products Co., Ltd.
Shinagawa, Tokyo, Japan
Phone: +81 3 6737-0221
division3@sqp.co.jp

Taiwan
Heraeus Materials Technology Taiwan Ltd.
Taipei, Taiwan
Phone: +886 2 2627-1111
conamic.basematerials.tw@heraeus.com

www.heraeus-conamic.com