

1. General:

RQ 200 is an electrically fused, transparent quartz glass. This material specification describes the chemical and physical properties of RQ 200, produced by Raesch Quarz (Germany) GmbH.

2. Chemical Properties:

2.1 Chemical Composition:

RQ 200 has a purity of at least 99.99% SiO₂, it contains the following impurities in ppm:

Elements	Al	Ca	Cr	Cu	Fe	K	Li	Mg	Mn	Na	Ni	Ti
Typical	15	0.6	0.01	0.02	0.2	0.5	0.7	< 0.1	< 0.1	0.8	< 0.01	1.3
Maximal	18	1	0.04	0.05	0.6	1.3	1.1	0.2	0.2	1.5	0.04	1.9

2.2 OH-Content:

RQ 200, in its untreated state directly after tube drawing, has an OH content of approximately 120 ppm. Through vacuum annealing, the OH content can be reduced to less than 1 ppm, depending on the wall thickness and annealing duration.

2.3 Chemical Resistance:

Quartz glass exhibits exceptionally high inertness to chemical reagents. It is classified as Class 1 for water, alkali, and acid resistance. This chemical durability remains effective even at high concentrations and temperatures. Exceptions include hydrofluoric acid and concentrated phosphoric acid.

2.4 Gas Permeability:

At room temperature, quartz glass is virtually impermeable to gases. Depending on their respective diffusion coefficients, helium becomes noticeably permeable at around 180°C, hydrogen at around 300°C, light gases at 600°C, and neon, nitrogen, oxygen, and air at around 1000°C.

3. Physical Properties:

3.1 Mechanical Properties:

Density	[g/cm ³]	2.203
Poisson's ratio	[1]	0.17
Hardness	[Mohs]	5.5 - 6.5
Compressive Strength	[N/mm ²]	1150
Tensile Strength	[N/mm ²]	50
Bending Strength	[N/mm ²]	68
Modulus of Elasticity at 20 °C	[N/mm ²]	75000

* The mechanical properties are significantly influenced by the shape, surface texture, and internal stresses. The table lists typical values

3.2 Thermal Properties:

Strain Point	[dPas]	10 ^{14.7}	[°C]	1167
Annealing Point	[dPas]	10 ^{13.2}	[°C]	1255
Softening Point	[dPas]	10 ^{7.6}	[°C]	1760
Working Point	[dPas]	10 ⁴	[°C]	1700 - 2100
Transformation Temperature			[°C]	approx. 1200
Boiling Point			[°C]	approx. 2230

Max. working temperature: continuous	[°C]	Up to 1160
Max. working temperature: short-term	[°C]	Up to 1300
Devitrification Range	[°C]	1000 - 1700

Linear Thermal Expansion Coefficient (at 25 - 300°C)	[1/K]	0.54×10^{-6}
Thermal Conductivity (at 20°C)	[1/Wm*K]	1.4
Specific Heat (at 50°C)	[J/kg*K]	775

3.3 Electrical Properties:

Electrical resistivity	[°C]	20	[Ω*m]	1×10^{18}
	[°C]	400	[Ω*m]	1×10^{10}
	[°C]	800	[Ω*m]	6.3×10^6
	[°C]	1200	[Ω*m]	1.3×10^5

Dielectric Strength	[°C]	20	[kV/mm]	25 ... 40
	[°C]	500	[kV/mm]	4 ... 5

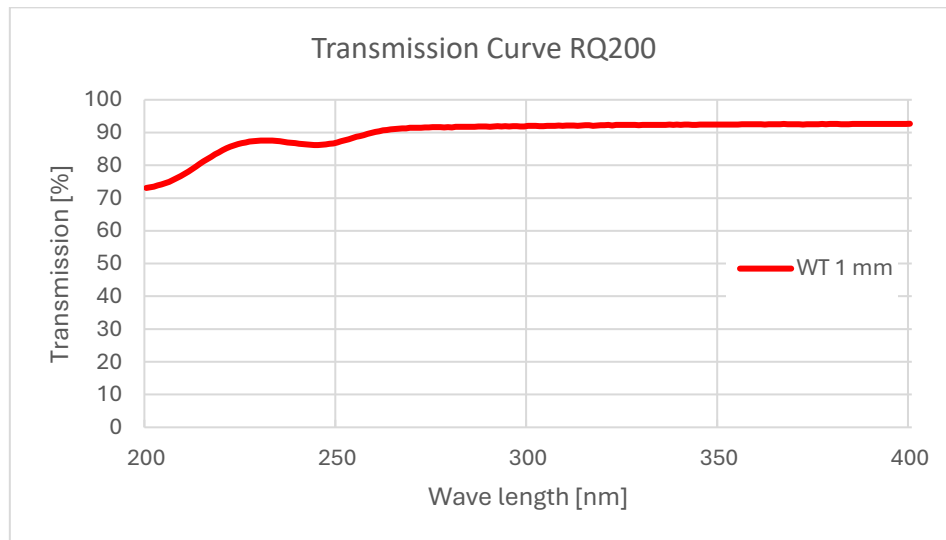
Dielectric Constant ϵ (at 20°C, 1 MHz)	[1]	3.7
Dielectric Loss Factor $\tan \delta$ (at 20°C, 1 MHz)	[1]	1×10^{-4}

3.4 Optical Properties:

Optical Refractive Index (at $\lambda = 589.3 \text{ nm}$)	[1]	1.459
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Required Transmission Values at 1 [mm] Wall Thickness:

Wave length λ [nm]	200	250	254	360	400
Transmission T [%]	> 65	> 85	> 87	> 90	> 91



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Relevant Documents:

Product Specification RQ 200

Change History		
Rev.	Date	Change description
0	01.04.2019	<ul style="list-style-type: none">New Document
1	17.04.2024	<ul style="list-style-type: none">New Logo & Layout