1. General:

RQ 245 is an electrically fused, transparent quartz glass. This material specification describes the chemical and physical properties of RQ 245, produced by Raesch Quarz (Germany) GmbH.

2. Chemical Properties:

2.1 Chemical Composition:

RQ 245 has a purity of at least 99.88% SiO_2, with 0.12% consisting of impurities.

Elements	Al	Ca	Cr	Cu	Fe	K	Li	Mg	Mn	Na	Ni	Ti
Typical (ppm)	15	0.6	0.01	0.02	0.5	0.5	0.7	0.2	< 0.1	0.8	< 0.01	720
Max (ppm)	18	1	0.04	0.05	0.9	1.3	1.1	0.5	0.2	1.5	0.04	

2.2 OH-Content:

RQ 245, 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]	2.21
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]	$10^{14.5}$	[°C]	1174
Annealing Point	[dPas]	10^{13}	[°C]	1263
Softening Point	[dPas]	$10^{7.6}$	[°C]	1737
Working Point	[dPas]	10^{4}	[°C]	2312
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]	0.58×10^{-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}

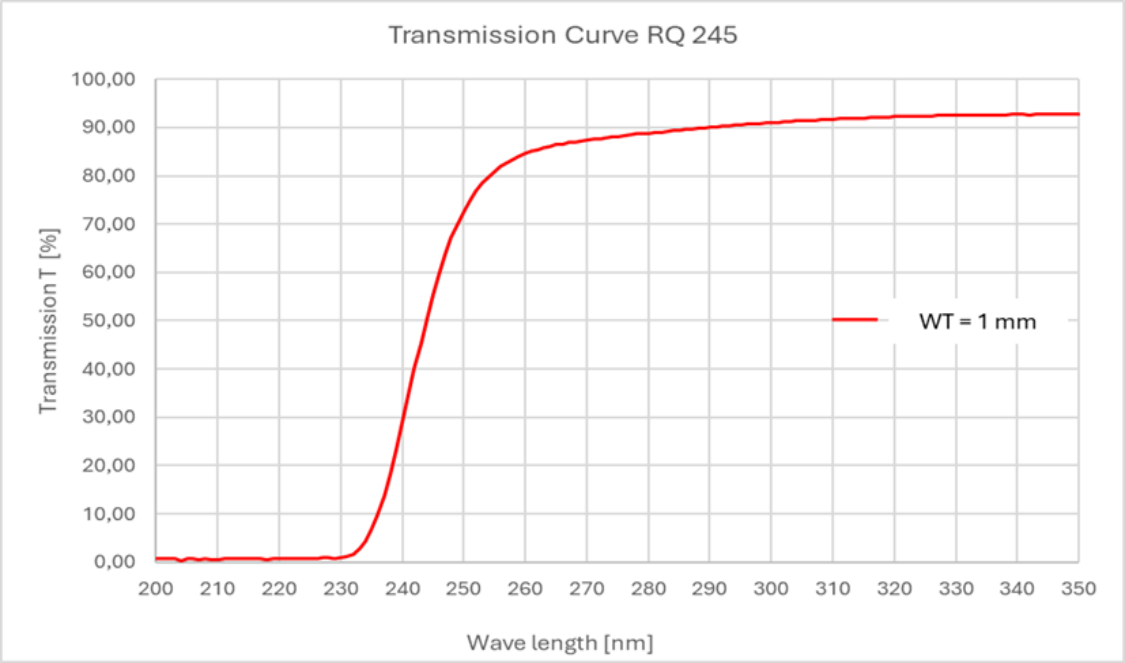
Dielectric Strength	[°C]	20	[kV/mm]	25 ... 40
	[°C]	500	[kV/mm]	4 ... 5

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

3.4 Optical Properties:

Optical Refractive Index (at λ = 589.3 nm)	[1]	1.459

Required Transmission Values at 1 [mm] Wall Thickness:				
Wave length λ [nm]	235	245	260	295
Transmission T [%]	≤ 17.1	49 ≤ T ≤ 70	≥ 76.1	≥ 84.5



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Relevant Documents:
Product Specification RQ 245

Change History		
Rev.	**Date**	**Change description**
0	04.09.2002	• New Document
1	16.09.2024	• Creating a new separate Material specification RQ245 from the product specification RQ 235/245 & updating the company information & layout.