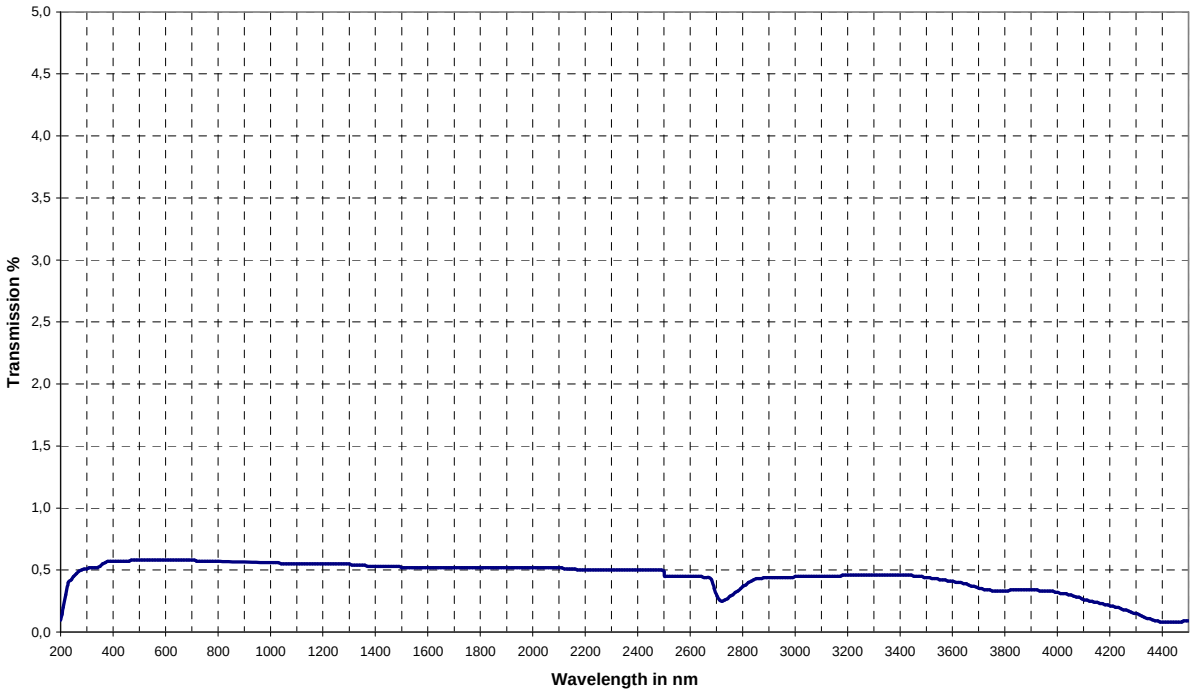
ilmasil® PO-1 is an electrically fused, opaque quartz, maufactured by fusing high purity quartz sand using QSIL's propritery plasma melting process. The opacity is achieved by controlled distribution of fine microbubbles (typical diameter 10 – 150 µm). There are no chemical additives used to achieve opacity.

Application: This specification is applicable to all products produced with ilmasil® PO-1

1 Optical Properties

1.1 Typical Transmission



Comment: transmission measured on a plane surface

Limit: < 1% for thickness 3 mm within the wavelength range of 190…8000 nm.

1 Chemical Properties

2.1 Trace Elements

Element	Typical content in ppm	Maximum content in ppm
Al	15	20
Ca	0,8	1,5
Cr	<0,05	0,05
Cu	<0,03	0,05
Fe	0,3	1
K	0,7	1,5
Li	0,5	1,5
Mn	0,05	0,1
Na	1,0	1,5
Ni	<0,02	0,05
Ti	1,5	2,0
Zr	1,5	2,7
OH-content*	<100	100

2.2 OH-content

Typical: < 100 ppm *

Tolerance: max. 100 ppm *

Stability: After thermal treatment, a decrease of maximum 3 ppm is obtainable by tempering the material at 1000°C under vacuum for a period of 30 hours.

* OH-content: values are applicable for non-flameworked material only

2.3 Chemical resistances

Hydrolytic resistance per DIN 12111 (1st. class)
Acid resistance per DIN 12116 (1st.class)
Alkaline resistance per DIN 52322 (1st.class)

3 Thermal Properties

Softening Point (lg η (in dPas) = 7.6)	ca. 1715 °C
Annealing Point (lg η (in dPas) = 13.0)	1159°C
Strain Point (lg η (in dPas) = 14.5)	1043 °C
Processing Range lg η (in dPa s) = 5 – 8	1700 – 2100°C
Max. usable temperature	
Long term	1100 °C
Short term	1300 °C
Coefficient of Thermal Expansion	
20 ... 300 °C	5.8×10^{-7} °K^{-1}
Heat conductivity at 20°C	1.21 W/(m*K)

4 Mechanical Properties

(at 20°C)

Density	2.05…2,15 g/cm³
Elasticity modulus	6.7×10^4 N/mm²
Compressive Strength	458 N/mm²
Tensile Strength	50 N/mm²
Bending Strength	36 N/mm²
Porosity	30…70 mm³/cm³
Vickers Hardness	922 (≙ 9045 N/mm²)
Mohs Hardness	5.0 ... 7.0
Knoop Hardness	614 (≙ 6023 N/mm²)

Mechanical property measurements are dependent upon geometry, thermal gradient and the surface quality. For calculation purpose, please use lower values.

5 Electrical Properties

Dielectric strength	
20 °C	23,2 kV/mm
500 °C	5,4 kV/mm
Dielectric loss factor	
at 1 kHz and 20°C	tg δ ≈ 2.0×10^{-4}
Dielectric constant	
at 1 kHz and 20°C	ε ≈ 3.3

(measurement per DIN EN 60672-2)
(measurement per DIN EN 60243-1)