

TECHNICAL DATA SHEET

BOROSILICATE GLASS

General features/short description

Borosilicate glass is highly resistant to water, neutral and acid solutions, concentrated acids and acid mixtures; as well as chlorine, bromine, iodine and organic substances. Hydrofluoric acid, hot phosphoric acid and alkaline solutions do attack the glass surface but this is dependent on their concentration and temperature. Therefore, with these chemicals the use should be checked for each individual case.

Temperature features

Transformation temperature	$T_g = 525 \text{ }^\circ\text{C}$
Strain point	–
Annealing point	$560 \text{ }^\circ\text{C}$ at $10^{13} \text{ dPa} \cdot \text{s}$
Softening point	$825 \text{ }^\circ\text{C}$ at $10^{7,6} \text{ dPa} \cdot \text{s}$
Working point	$1260 \text{ }^\circ\text{C}$ at $10^4 \text{ dPa} \cdot \text{s}$
Expansion limit ($^\circ\text{C}$)	–
Coefficient of expansion	$\alpha_{(20-300 \text{ }^\circ\text{C})} = 3,3 \cdot 10^{-6} \cdot \text{K}^{-1}$
Max. operating temperatures	–
Thermal conductivity	$\lambda_w = 1,2 \text{ W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$ (at $90 \text{ }^\circ\text{C}$)
Thermal capacity	–
Specific heat ($20 \text{ }^\circ\text{C}$)	–
Max. continuous working temp.	–
Max. short-term working temp.	–

Mechanical features

Density	$2,23 \text{ g/cm}^3$
Mohs hardness	–
Modulus of elasticity	$63 \cdot 10^3 \text{ N} \cdot \text{mm}^{-2}$
Bending strength	–
Knoop-hardness	–
Abrasive hardness	–
Vickers hardness	–
Torsion modulus	–
Torsion strength	–
Micro hardness	–
Compressive strength	–
Poisson's ratio	$\mu = 0,20$
Tensile strength	–
Abrasion after 9 h grinding	–
Shear modulus	–

Optical features

Refractive index	$n_d = 1,473; \lambda = 587,6 \text{ nm}$
Abbesche number	–
Bubbles, inclusions ($>0,3\text{mm}$)	–
Stress-optical coefficient	$K = 4,0 \cdot 10^{-6} \text{ mm}^2 \cdot \text{N}^{-1}$

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Electrical features

t_{K100}	250 °C
log of the electrical volume resistivity	8,0 $\Omega \cdot \text{cm}$ at 250 °C 6,5 $\Omega \cdot \text{cm}$ at 350 °C
Electrical Resistivity (350 °C)	–
Specific Electrical Resistivity	–
Contact resistance	–
Dielectric properties for 1 MHz at 25 °C	$\epsilon = 4,6$
Dielectric properties for 1 MHz at 20 °C	–
Dielectric constant at 7,5 GHz	–
Dielectric strength	–
Electrical loss factor	$\tan \delta = 37 \cdot 10^{-4}$ (for 1 MHz at 25 °C)
Loss tangent	–

Chemical features

Hydrolytic resistance, class	1 (ISO 719)
Acid resistance, class	1 (DIN 12 116)
Alkali resistance, class	2 (ISO 695)
Chemical components	SiO ₂ (81 %) Na ₂ O (3,5 %) Al ₂ O ₃ (2 %) B ₂ O ₃ (13 %) K ₂ O (0,5 %)
Content of OH	–
Typical Trace Elements	–
Heavy metal content	below 100 ppm (Elements: lead, cadmium, mercury, hexavalent chromium)
Coefficient of absorption for MoK _α - radiation	–
Coefficient of absorption for CuK _α - radiation	–
Purity	–

Transmission curve

