

## AF 45 THIN BOROSILICATE GLASS

AF 45 is an alkali-free modified borosilicate glass with a high content of BaO and Al<sub>2</sub>O<sub>3</sub>. AF 45 with, its specific properties and large range of different thicknesses with tight tolerances, is exceptionally well suited for a number of applications including: liquid crystal displays, electroluminescent displays, CCD covers, hybrid circuits and solar cells. Due to a special down draw production process, AF 45 glass sheets are marked by fire-polished surfaces; this glass type can be used without ground and polished surfaces. AF 45 offers excellent thermal resistance for high temperature applications up to approximately 600°C.

The subsequent properties are based primarily upon the measuring results of the very latest standards and measuring methods. Schott retains the right to change the data in keeping with the latest technical standards. Numerical values stated without tolerance are reference values of an average production quality.

### PRODUCT FEATURES

- Low coefficient of thermal expansion
- Low shrinkage after heat treatment
- High luminous transmittance

### CHEMICAL DATA

Hydrolytic Resistance (DIN ISO 719)	1
Equivalent of Alkali (Na <sub>2</sub> O) per gram of glass grains in µg/g	6.8
Acid Resistance (DIN 12116)	4
Half Surface Weight Loss after 6 hours in mg/dm <sup>2</sup>	>250
Alkali Resistance (DIN ISO 695-A)	3
Surface Weight Loss after 3 hours in mg/dm <sup>2</sup>	460

### MECHANICAL PROPERTIES

Density (@ 20°C/68°F)	2.72 g/cm <sup>3</sup>
Modulus of Elasticity	66.0 kN/mm <sup>2</sup>
Knoop Hardness HK <sub>100</sub>	555
Poisson's Ratio	0.235
Stress Optical Coefficient	3.2

$$(1.02 \cdot 10^{-12} \text{ m}^2/\text{N})$$

- Torsion Modulus 26.7 kN/mm<sup>2</sup>

### ELECTRICAL PROPERTIES

- Dielectric Constant (@ 1 MHz) 6.2
- Dielectric Loss Factor (@ 1 MHz)  $9 \times 10^{-4}$
- Electric Volume Resistivity for A.C. 50Hz (ρ)
  - @ 250°C  $6.0 \cdot 10^{13} \Omega \text{ cm}$
  - @ 350°C  $3.2 \cdot 10^{11} \Omega \text{ cm}$
  - @ 500°C  $1.6 \cdot 10^9 \Omega \text{ cm}$

### OPTICAL PROPERTIES

- Refractive Indices at 20°C (68°F)
  - $n_e (\lambda = 546 \text{ nm})$  1.5275
  - $n_d (\lambda = 588 \text{ nm})$  1.5255
- Dispersion ( $n_F - n_C$ )  $84.0 \times 10^{-4}$
- Abbe Value ( $v_e$ ) 62.2
- Luminous Transmittance ( $\tau_{vD65}$ ) 91.2%  
(Glass thickness 1.1mm)

### THERMAL PROPERTIES

- Linear Thermal Coefficient of Expansion α (20-300°C/ 68-572°F)  $4.5 \times 10^{-6}/^\circ\text{K}$
- Transformation Temperature T<sub>g</sub> 662°C/1224°F
- Strain Point ( $10^{14.5} \text{ dPa}\cdot\text{s}$ ) 627°C/1161°F
- Annealing Point ( $10^{13} \text{ dPa}\cdot\text{s}$ ) 663°C/1225°F
- Softening Point ( $10^{7.6} \text{ dPa}\cdot\text{s}$ ) 883°C/1621°F
- Thermal Conductivity κ
  - @ 25°C 0.93 W/(m•°K)
  - @ 87°C 1.04 W/(m•°K)
  - @ 127°C 1.10 W/(m•°K)
  - @ 166°C 1.13 W/(m•°K)

All data are intended to be used as guidelines, unless otherwise stated. Please contact Schott should you have additional technical questions.

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### SHEET SIZES AND TOLERANCES

Nominal thickness [mm]	Gross length [mm]	Gross width [mm]	Net width (quality width) [mm]	Parallelism * [%]	Squareness * [%]
0.05	440 ± 10	approx. 420	360 +10 / -0	-	-
0.10 – 0.50	440 ± 10		360 +10 / -0	≤ 0.5	≤ 1.0

\* In % of measured edge length

### STANDARD THICKNESS, DEVIATION AND WARP

Nominal thickness ** [mm]	Thickness tolerance [mm]	Thickness variation $\Delta D$ (deltaD) [ $\mu\text{m}$ ]	Flatness deviation Warp [mm]
	Variation in lot	Within sheet, across draw direction	Referenced to standard size
0.050	± 0.010	≤ 10	Due to the low stiffness, sheet flatness deviation (warp) is not specified.
0.100	± 0.015	≤ 20	
0.200	± 0.020	≤ 20	
0.300	± 0.020	≤ 20	≤ 0.6
0.400	± 0.020	≤ 20	≤ 0.6
0.500	± 0.050	≤ 30	≤ 0.6

\*\* Custom thicknesses may be manufactured upon request.

### TRANSMISSION CURVE (0.5mm)

