

# AF 32<sup>®</sup> eco

The alkali free answer to high technical demands

The alkali-free alumino-borosilicate glass AF 32<sup>®</sup> eco is both environmentally friendly and technically impressive. The material is produced using SCHOTT's unique down-draw process, which results in a broad thickness range, with high transmission levels, a superior surface quality and excellent dielectric properties.



Various thicknesses available



High transmittance  
UV-A - NIR



Low CTE



Excellent dielectric properties



High temperature resistance



Excellent surface quality and flatness

## Applications

AF 32<sup>®</sup> eco provides solutions across a wide range of applications. With a coefficient of thermal expansion matching that of a silicon wafer, AF 32<sup>®</sup> eco is an adaptable and reliable choice for many areas ranging from consumer electronics and automotive through to industry.

AF 32<sup>®</sup> eco can be used as a substrate or cover for:

- Wafer-level packaging
- Wafer-level optics
- Carrier wafers
- Near-infrared narrow band filters
- Substrates in RF & HF devices
- Microdisplays



Automotive



Consumer electronics



Smart home



Optics



Semiconductors



Industry

**SCHOTT**  
glass made of ideas

# SCHOTT AF 32<sup>®</sup> eco

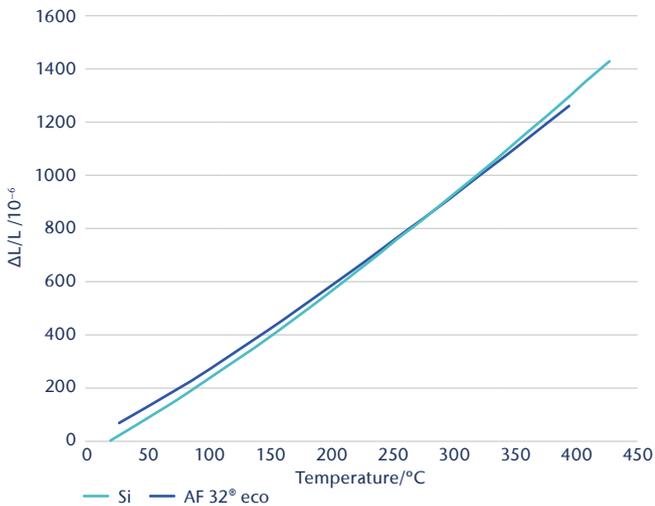
## The alkali free answer to high technical demands

### A wide range of tightly controlled thicknesses

AF 32<sup>®</sup> eco is available in a wide variety of thicknesses, from 0.03 mm up to 0.5 mm. The total thickness variation (TTV) factor remains tightly controlled, at just  $\leq 5 \mu\text{m}$  to  $15 \mu\text{m}$ .

### Alkali-free with a low CTE

Alkali-free composition and a similar CTE to silicon makes it highly suitable for semiconductor systems.



### Geometrical properties

Rectangular min. [mm]*	50 x 50
Rectangular max. [mm]*	300 x 300
Round min.*	50 (2 inch)
Round max.*	300 (12 inch)
Thickness min. [mm]	0.03
Thickness max. [mm]	0.5
Surface roughness	< 1 nm RMS

\* Customized formats are available upon request.

### Mechanical properties

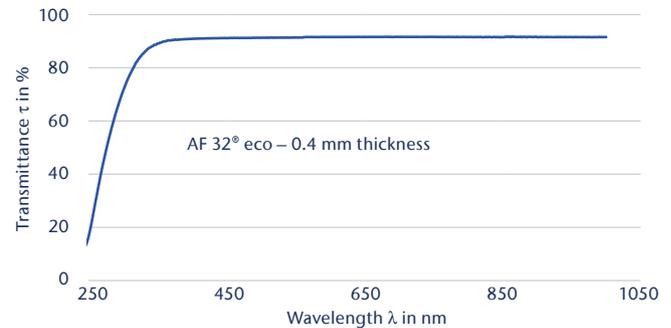
Density $\rho$	$\text{g/cm}^3$	2.43
Young's modulus E	$\text{kN/mm}^2$	74.8
Poisson's ratio $\mu$		0.24
Knoop hardness	HK 0.1/20	490
Vickers hardness	HV 0.2/25	540

### High temperature resistance

AF 32<sup>®</sup> eco has a temperature resistance of up to  $717^\circ\text{C}$  and can be used for high temperature applications.

### Outstanding transmission levels

Light transmission achieved by AF 32<sup>®</sup> eco glass is consistently strong both in the visible range and at higher wavelengths up to near-infrared.



### Optical properties

Refractive index $n_D$	1.5099
Luminous transmittance $\tau_{VD65}$ (d = 0.4 mm)	92.1 %

### Excellent dielectric properties

The low dielectric loss of AF 32<sup>®</sup> eco allows applications at very high frequencies. For example, SAW and BAW filter in the GHz range can be achieved with low insertion loss.

Frequency in GHz	1	2	5	24	77
Dielectric constant (permittivity) $\epsilon_r$	5.1	5.1	5.1	5.1	5.0
Loss tangent $\tan(\delta)$ in $10^{-4}$	35	39	49	69	110

### Thermal properties

Coefficient of thermal expansion $\alpha$ (20°C; 300°C)	$3.2 \cdot 10^{-6} \text{ K}^{-1}$
Transformation temperature $T_g$	$717^\circ\text{C}$

### Chemical properties

Hydrolytic resistance	DIN ISO 719	HGB 1
Acid resistance	DIN 12116	S 4
Alkali resistance	DIN ISO 695	A 3

