



# Material Information

## AF37

January 14, 2004

**AF 37** with its specific properties is exceptionally well suited for a number of display technologies, especially for liquid crystal displays such as Active Matrix LCD.

The float glass technology permits large and homogenous substrates.

**AF 37** is an alkaline-earth aluminosilicate glass with a high content of  $Al_2O_3$ . It is alkali- and arsenic free in synthesis.

Features are

- high heat resistance and low shrinkage
- high chemical resistance
- low density and low sagging
- alkali and arsenic free in synthesis

### **Mechanical Properties**

Density	2.48 g/cm <sup>3</sup>
Young's Modulus	78 kN/mm <sup>2</sup>
Poisson Ratio	0.24
Vickers Hardness (2N, 25sec)	640



### **Chemical Durability**

The following resistance classes refer to international standard test methods (DIN and ISO).

Hydrolytic resistance  
(DIN ISO 719, DI H<sub>2</sub>O, 1h, 98°C) Class H1

Acid resistance  
(DIN 12116, HCl, 6mol/l, 6h, 108°C) Class S4

Alkali resistance  
(ISO 695, NaOH 1mol/l  
+ Na<sub>2</sub>CO<sub>3</sub> 0,5mol/l, 3h, 102°C) Class A2

Chemical durability is measured by weight loss per surface area after immersion under certain conditions. The concentrations of the following reagents refer to weight percent.

NaOH  
(5%, 1.3mol/l, 6h, 95°C) 1.3 mg/cm<sup>2</sup>

NH<sub>4</sub>F:HF  
(10%, 1.8mol/l, 20min, 23°C) 0.68 mg/cm<sup>2</sup>

HCl  
(5%, 1.4mol/l, 24h, 95°C) 0.44 mg/cm<sup>2</sup>

DI H<sub>2</sub>O  
(24h, 95°C) < 0.01 mg/cm<sup>2</sup>



### ***Thermal Properties***

Coefficient of thermal expansion (20 – 300°C)	3.77 *10 <sup>-6</sup> /K
Shrinkage (Hold 1h at 400°C, ramping 2.5°C/min)	≤ 5 ppm
Transformation temperature T <sub>g</sub>	711 °C
Temperatures for the viscosities of:	
Strain point (10 <sup>14.5</sup> dPa)	684 °C
Annealing point (10 <sup>13</sup> dPa)	722 °C
Softening point (10 <sup>7.6</sup> dPa)	942 °C
Working point (10 <sup>4</sup> dPa)	1263 °C
Heat conductivity (90°C)	1.12 W/mK
Mean specific heat capacity (20-100°C)	0.78 kJ/kgK

### ***Electrical Properties***

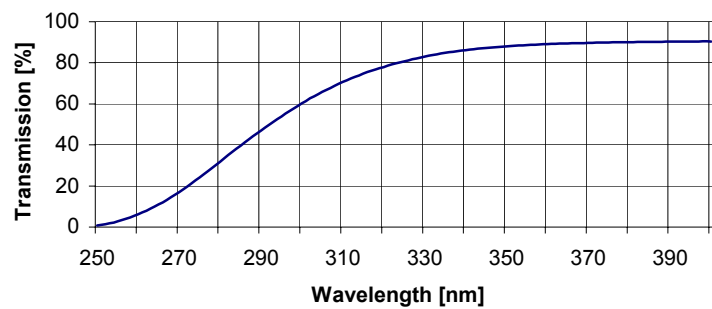
Dielectric constant (1 MHz, 25°C)	5.5
Loss tangent (1 MHz, 25°C)	0.19 %
Volume resistivity (250°C)	10 <sup>12.4</sup> Ωcm
Volume resistivity (350°C)	10 <sup>10.7</sup> Ωcm
Temperature T <sub>k</sub> 100 (for volume resistivity of 10 <sup>8</sup> Ωcm)	627 °C



### Optical Properties

Refractive index $n_d$ (wavelength 587nm)	1.52
Birefringence constant (wavelength 588nm, 21°C)	$3.18 \cdot 10^{-6} \text{ mm}^2/\text{N}$
Transmittance:	
Average (400 to 700nm)	91.1%
Edge at 50% transmission	292 nm

Transmission 250 - 400nm



Transmission 400 - 700nm

