

# Corning® Astra™ Glass

Corning® Astra™ Glass is balanced to accommodate stringent customer needs for high resolution across a broad range of processing temperatures. Astra Glass features an optimized blend of low total pitch variation, low total thickness variation, and low sag for advantaged dimensional stability performance.

## Product & Material Information

Corning® Astra™ Glass is produced to the following type specifications:

### Material Information

Glass Type	Alkaline Earth Boro-Aluminosilicate	
Forms Available	Fusion Drawn Sheet	
Mechanical Properties	Density (20°C)	2.52 g/cm <sup>3</sup>
	Young's Modulus	81 GPa
	Shear Modulus	33 GPa
	Poisson's Ratio	0.23
Thermal Expansion	Coefficient of Thermal Expansion (0 - 300°C)	34 x 10 <sup>-7</sup> /°C
Viscosity	Softening Point (10 <sup>7.6</sup> poises)	1013°C
	Annealing Point (10 <sup>13</sup> poises)	778°C
	Strain Point (10 <sup>14.5</sup> poises)	725°C
Electrical Properties	Log <sub>10</sub> Volume Resistivity	at 25°C 25.3 ohm-cm
		at 250°C 14.2 ohm-cm
		at 500°C 9.5 ohm-cm
	Dielectric Constant (23°C, 20% RH, 1kHz)	5.8
	Loss Tangent (23°C, 20% RH, 1kHz)	0.1%
Optical Properties	Refractive Index (at 589.3nm)	1.522
	Stress Optical Coefficient	29.2 (nm/cm/MPa)
	Transmittance (from 400 to 800nm)	>90%

### Thermal Conductivity

Thermal conductivity is a calculated value and is equal to the product of the thermal diffusivity multiplied by specific heat multiplied by density of the glass.

Temp (°C)	Diffusivity (cm <sup>2</sup> /s)	Specific Heat (J/kg-°K)	Conductivity (W/m-°K)
25	0.0060	688	1.043
100	0.0058	763	1.107
200	0.0055	904	1.255
300	0.0054	1017	1.372
400	0.0053	1021	1.391
500	0.0052	1071	1.409

### Chemical Durability

Chemical durability is measured via weight loss per surface area after immersion. Values are highly dependent upon actual testing conditions. Unless otherwise noted, concentrations refer to weight percent.

Reagents	Time	Temp	Weight Loss (mg/cm <sup>2</sup> )
HCl - 5%	24 hrs	95°C	0.09
HNO <sub>3</sub> - 1M	24 hrs	95°C	0.06
HF - 10%	20 min	20°C	5.18
110BHF	5 min	30°C	0.38
1HF:10HNO <sub>3</sub>	3 min	20°C	1.56
1HF:100HNO <sub>3</sub>	3 min	20°C	0.17
DI H <sub>2</sub> O	24 hrs	95°C	0.00
Na <sub>2</sub> CO <sub>3</sub> - 0.02N	6 hrs	95°C	0.11
NaOH - 5%	6 hrs	95°C	1.58