



Substrate Material Specifications

Parameter	Substrate Material			
	Green Soda Lime	B270	Borofloat	Quartz
Composition (%)				
SiO ₂	73	70	60	100
B ₂ O ₃	-	-	5	-
Al ₂ O ₃	1	-	15	-
Na ₂ O	15	8	1	-
K ₂ O	1	9	1	-
R ₀	10	14	18	-
Thermal Properties				
Coefficient of Expansion Over 50-200°C	94 x 10 ⁻⁷ /C°	93 x 10 ⁻⁷ /C°	37 x 10 ⁻⁷ /C°	4 – 5 x 10 ⁻⁷ /C°
Softening Point (C°)	740	710	900	1600
Transformation Temp (C°)	562	520	673	-
Strain Point (C°)	511	505	636	1000
Optical Properties				
Light Transmittance (%) d=2.33, λ=400nm	90	91	91	90 (λ=400nm)
Reflective Index (n _d)	1.52	1.52	1.53	1.46
Chemical Properties (Weight Loss mg/cm²)				
Water (25°C/4h)	1.2x10 ⁻³	1.2x10 ⁻³	8.0 x 10 ⁻⁴	8.0 x 10 ⁻⁵
NaOH 5% (100°C/6h)	1.1	1.1	1.4	0.9
HCl 5% (80°C/1h)	1.0 x 10 ⁻²	1.0 x 10 ⁻²	5.0 x 10 ⁻³	4.0 x 10 ⁻⁴
Mechanical Properties				
Specific Gravity	2.49	2.55	2.58	2.20
Young Modules (kg/mm ²)	7000	7340	7540	7413
Sheer Modules (kg/mm ²)	2870	2980	3260	33170
Knoop Hardness (kg/mm ²)	540	530	657	615
Electrical Properties				
Bulk Resistivity @ 200°C	7.7	9.6	10.6	12.5
Dielectric Constant @ IMH, R.T	7.5	7.1	6.1	4.0