

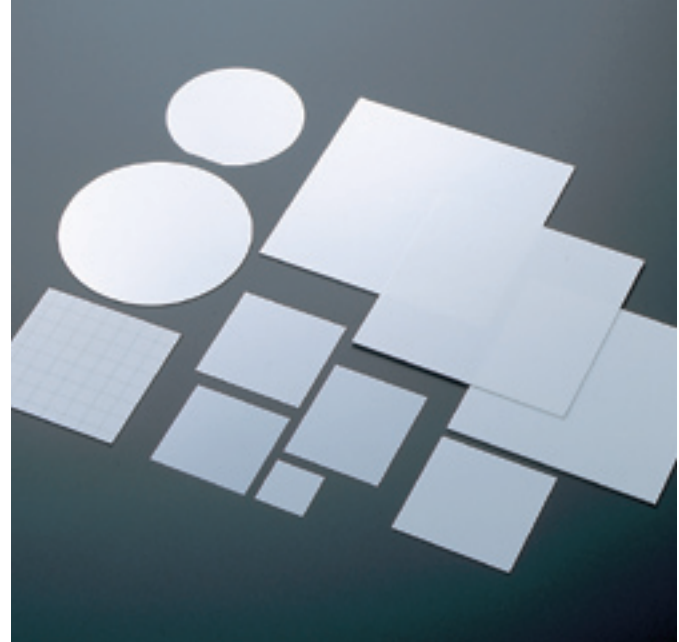
Thin Film Substrates

For thin film deposition, we have 99.6% alumina substrates (A-493, A-494) which offer excellent surface smoothness.

Characteristics of Material

Unit: Inch (mm)

Item	Unit	A-493	A-494
Surface Roughness	Side A: CLA μ inch	3.0 (.08)	2.0 (.05)
	Side B: (Ra μ m)	5.0 (.125)	4.0 (.10)
Bulk Density	kg/m ³	3.6×10^3	3.86×10^3
Grain Size Average	μ m	<1.5	<1.0
Alumina Content	Wt%	99.6	
Color	—	White	
Water Absorption	—	Nil	
Dielectric Constant	1MHz	9.9 \pm .2	
Dielectric Loss Angle	1MHz	2×10^{-4}	
Volume Resistivity	$\Omega \cdot$ cm	$>10^{14}$ (25°C)	
Thermal Conductivity	25°C	33	
	300°C	30	
	500°C	25	
Coefficient Of Linear Thermal Expansion	per °C		
	25 to 300°C	7.2×10^{-6}	
	25 to 600°C	7.4×10^{-6}	
	25 to 800°C	8.2×10^{-6}	
Flexural Strength	MPa	550	



Design Guideline Thickness

Unit: Inch (mm)

Thickness	Standard: .010 (0.25), .015 (0.38), .025 (0.635) Minimum: .005 (0.127) Maximum: .040 (A493), .027 (A494)
Tolerance	Standard: $\pm 10\%$ NLT $\pm .002$ (0.05) Premium: $\pm 5\%$ NLT $\pm .0008$ (0.02)

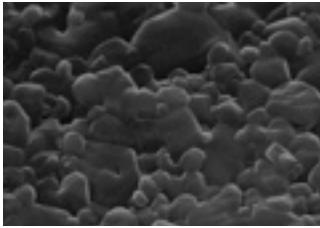
Length, Width

Item	Green Score	Laser Score
Max Size	4.7" \times 4.7" (120 \times 120)	
Tolerance	Standard: (0.10) $\pm 0.8\%$ NIL $\pm .004$ " Premium: $\pm 0.5\%$ NIL $\pm .003$ " (0.08)	Standard: +.008"/-.002" (+0.2/-0.05) Premium: (厚み0.5mm以下) (Thickness: 0.020" or LESS) $\pm .004$ " / -.002" (+0.1/-0.05)
Perpendicularity		
Straightness	Standard: a=L \times 0.5% b=L \times 0.5% Premium: a=L \times 0.3% b=L \times 0.3%	.002"

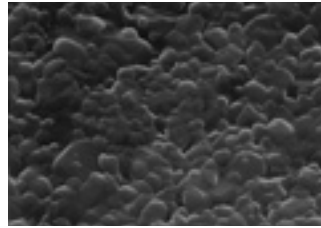
※The values are typical material properties and may vary according to products configuration and manufacturing process. For more details, please feel to contact us.

SEM

A493



A494



Surface Roughness

