MATERIAL DATA SHEET

Material: Grade FR-4 Glass/Epoxy Sheet, IPC 4101/21

Standards:

NEMA LI-1 Grade	G-10/FR-4
IPC 4101	/21
ASTM D709	FR-4
MIL-I-24768	/ 27 Type GEE-F

Physical Properties	Test Condition		ASTM	Typical Values
For Thickness				<.0197"
Specific Gravity			D792	1.85g/cm^3
Rockwell Hardness (M Scale)			D785	115
Water Absorption (maximum)			D229	.8%
Flexural Strength (maximum)	Condition A:	Lengthwise Crosswise	D229	415 lb./in^6 345 lb./in^6
Tensile Strength	Condition A:	Lengthwise Crosswise		- -
Compressive Strength (.500" thick)	Condition A:	Flatwise Edgewise	D695	70,000 psi 25,000 psi
Shear Strength@73 F			D732	21,500 psi
Izod Impact Strength (.500" thick)	E48/40:	Lengthwise Crosswise	D229	7.0 ft-lb/in.(notch) 5.5 ft-lb/in.(notch)
Peel Strength	Condition A		D229	.70 lb/in

Thermal & Electrical Properties	Test Condition	ASTM	Typical Values
Glass Transition Temp, min.			110° C
Volume resistivity	96/35/90		1x10^6 megohms-cm
Surface resistivity	96/35/90		1x10^4 megohms
Dielectric Breakdown Voltage (step x step)	Condition A / D 48/50	D229	-
Maximum Permittivity @ 1 MHz	Condition A / D 24/23	D229	5.4
Maximum Dissipation @ 1 MHz	Condition A / D 24/23 / D48 / 50	D229	0.045
Loss Tangent at 1MHz, maximum			.035
Electric Strength (short time)	Condition A	D229	30 kV/mm
Arc Resistance (minimum)	Condition A	D 495	60 Seconds
Flammability Rating	UL 94		V0