



Properties	NEMA grade reinforcement~ resin binder	G-10/FR4 glass~ epoxies	X paper~ phenolic	C, CE canvas~ phenolic	L, LE linen~ phenolic
Tensile Strength					
	lengthwise, PSI	40,000	20,000	9,500	12,500
	crosswise, PSI	35,000	16,000	7,500	8,750
Compressive Strength					
	flatwise, PSI	60,000	36,000	37,000	37,000
	edgewise, PSI	35,000	19,000	23,500	25,000
Flexural Strength					
	lengthwise, PSI	55,000	25,000	17,000	15,000
	crosswise, PSI	45,000	22,000	15,000	13,750
Properties	NEMA grade reinforcement~ resin binder	FR4 glass~ epoxies	X paper~ phenolic	C, CE canvas phenolic	L, LE linen~ phenolic
Modulus of Elasticity in flex					
	lengthwise, PSI x 10 ⁶	2.7	1.8	.95	1.05
	crosswise, PSI x 10 ⁶	2.2	1.3	.85	.85
Shear Strength, PSI		19,000	12,000	11,500	11,750
IZOD Impact					
	flatwise, ft lb per inch of notch	7	4	3.2,2.3	2.5,1.8
	edgewise, ft lb per inch of notch	5.5	0.5	1.9,1.4	1.1, 1
Rockwell Hardness M scale		110	110	104	105
Specific Gravity		1.82	1.36	1.35	1.34

Coefficient of Thermal Expansion					
cm/cm/ deg C x 10 ⁻⁵		.9	6	2	2
Properties	NEMA grade reinforcement~ resin binder	FR4 glass~ epoxies	X paper~ phenolic	C, CE canvas phenolic	L, LE linen~ phenolic
Water Absorption					
.062" thick, % per 24 hrs		0.25	6	4.4,2.2	2.5,1.95
.125" thick, % per 24 hrs		0.15	3.3	2.5,1.6	1.6,1.3
.500" thick, % per 24 hrs		0.10	1.1	1.2,0.75	0.9,0.7
Dielectric Strength, volt/mil					
perpendicular to laminations; short					
.062" thick		500	700	200\500	200\500
.125" thick		400	500	150\360	150\360
Dissipation Factor					
condition A, 1 megacycle		0.025	0.06	0.1,.055	0.1,.055
Dielectric Constant					
condition A, 1 megacycle		5.2	6	- , 5.8	- , 5.8
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Insulation Resistance					
Condition: 96 hours at 90% relative humidity (in mega ohms)		200,000	-	-	-
Flame Resistance					
Underwriter Labs, Classification		94V-0	94HB	94HB	94HB
Bond Strength, in lbs		2,000	700	1,800	1,600

Max Continuous Operating Temperature				
Approximate degrees F	285	285	265	265
Sheet Mil Spec: Mil-I-24768 / _ _	27	12	14	13
Types	GEE-F	PBM	FBG	FBE
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