NEMA Grade G11

G-11 High Temperature Glass Cloth Epoxy is a thermosetting industrial fibre glass composite laminate consisting of a continuous filament glass cloth material impregnated with an epoxy resin binder; it is usually identifiable by its natural colour, ranging from a yellow green shade to an amber shade. G-11 possesses extremely high mechanical strength, high dimensional stability, and good dielectric loss properties, along with good electric strength properties, both wet and dry.

These properties are maintained not only at room temperature but also under humid or moist conditions. NEMA G-11 was the designation given to Glass Cloth Epoxy sheet composite by the National Electrical Manufacture Association (NEMA) to specify a consistent product between manufactures.

This grade is like G-10/FR-4 but has a higher operating temperature and superior mechanical properties at elevated temperatures, making for better insulating properties.

Colour	Green
Standard Thickness	0.2MM – 25MM
Sheet Size	2040 X 1020 MM

Features & Benefits	**Applications**
• **High dielectric strength**	• Electrical equipment
• **Radiation resistant**	• Aerospace & Underwater conditions
• **High tensile strength**	• Rocket cases
• **Low cold flow or creep**	• Antenna insulators
• **Chemically resistant**	• Test boards
• **High flexural strength**	• End plates
• **Dimensional stability**	• Cryogenic insulation
• **Low moisture absorption**	• Solder Frames
• **Low dissipation factor**	• Test fixtures
• **High impact strength**	• Medical diagnostic
• **Cryogenic serviceability**	• Circuit board holders
	• Terminal board

Mica and Insulating Supplies Co. Pty Ltd
89-91 Licola Crescent,
Dandenong South, Victoria, 3175
Australia
+61 3 9706 5185
info@misco.net.au

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Property Profile NEMA Grade	Dimension	G11
Military Specifications		P-18177
Military Type		GEB
Base Material		Glass Cloth
Resin		Epoxy
Physical Properties		
Density	#/cu.in.	
Water Absorption (1/8"thk)	%	
Hardness	R''M''	115
Tensile Strength – with grain	PSI	45,000
Compressive Strength - Flatwise	PSI	80,500
Flexural – Flatwise with grain	PSI	75,000 PLUS
Bonding Strength (1/2" thick)	#	2,000
Electrical Properties		
Impact – IZOD edgewise with grain	Ft.lb./in.	10
Shear – Flatwise (1/8" thick)	PSI	25,000
Dielectric Strength – perpendicular (Tested in transformer oil, 23° C)	VPM Short time	-
Dissipation Factor	10^6 cycles/sec	0.017
Dielectric Constant	10^6 cycles/sec	5.2
Volume Resistivity	Megaohms-cm	$5x10^6$
Surface Resistivity	Megaohms	$1x10^7$
Arc Resistance	Seconds	-
Operating Temperature	Degrees C.	180
Operating Temperature	Degrees F.	356
: Test Samples	1/8" thick laminate	
: Test Methods		Impact Strength D732 – condition E – 48/50 Arc Resistance D495 – condition A All others D229

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