

## Epoxy Glass Laminates in Flat Plates.

This material is made up of fiberglass supports in the form of cloth or mats, strengthened at higher temperatures and pressures to form solid and tough plates with high rigidity. This resistance depends both on the relative amount of glass present in the laminate and on the orientation of fibers, while chemical and electrical content depends on the type of resin chosen.

All of these characteristics are dealt with in standard ASTM D-709 standard. Our materials comply with its grades and descriptive characteristics.

GRADE	MATERIAL	CHARACTERISTICS
G - 10	Epoxy Glass Cloth	Good insulating rigidity, dielectric losses under dry or humid conditions.
G - 11	Epoxy Glass Cloth	Similar G – 10 properties but better rigidity to high temperature.
FR - 4	Flame Resistant Epoxy Glass Cloth	Similar G – 10 properties but flame resistance.
FR - 5	Flame Resistant Epoxy Glass Cloth	Similar G – 11 properties with flame resistance.

They have high rigidity with a very high weight-resistance ratio, good resistivity and surface strength.

The most common applications are medium and high voltage rotation machines such as slot closure wedges, terminal plates, insulating supports and in industry in general, where high dynamic values are required.

It is manufactured in 0.3 to 50-mm-thick plates, measuring approximately 1000 x 1600.

Tubes: circular, winding tubes. Consult about diameters and length.

Bars: From 6-mm diameter on; pultrusion method.

### Chemical Resistance Chart

Composite	%	°C
Transformer oil	100	110
Acetic acid	10	70
Acetic acid	50	50
Fatty acids	100	110
Citric acid	100	100
Nitric acid	5	50
Phosphoric acid	80	90

**ALTA AISLACION ELECTRICA – LAS HERAS 3890 – VILLA MARTELLI (B1603AXH)**

TEL.FAX: (54-11) 4760-8205 / 4760-5390 / 4760-3232

email: [ventas@imavolt.com.ar](mailto:ventas@imavolt.com.ar) website: [www.imavolt.com.ar](http://www.imavolt.com.ar)

Sulfuric acid	25	90
Sulfuric acid	50	70
Tanic acid	100	90
Methanol	100	20
Ethanol	100	20
Aqua ammonia	5	60
Calcium hydroxide	25	80
Sodium hydroxide	10	50
Sodium hydroxide	25	60
Hydrogen peroxide	30	70
Sodium hypochlorite	15	110
Carbon monoxide	- -	100
Sodium bicarbonate	100	100
Acetic acid*	100	100
Sodium cyanide	100	100
Sodium phosphate	100	100
Potassium nitrate	100	100
Potassium permanganate	100	100
Zinc chloride	100	100

## Properties of Epoxy Glass Laminates

Properties	Unit	G - 10	FR - 4	G -11	FR -5	Felt or Mat
Density	G/cm <sup>3</sup>	1.80	1.80	1.80	1.80	1.78
Tensile strength	Kg/cm <sup>2</sup>	3300	3300	3600	3500	1600
Flexural strength	Kg/cm <sup>2</sup>	3500	3500	3500	3500	1800
Compression strength	Kg/cm <sup>2</sup>	3900	3900	3900	3900	2200
Impact strength	Kg cm/cm	50 - 600	50 - 60	70 - 80	70 - 80	70
Module of elasticity	Kg/cm x 10 <sup>3</sup>	190	190	200	200	180
Dielectric constant	-----	5.5	5.5	5.5	5.5	4.8

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Power factor	-----	0.025	0.035	0.025	0.35	0.025
Humidity absorption	%	0.3	0.3	0.3	0.4	0.4
Dielectric strength	kv/mm	11 - 14	12	12 - 14	12 - 14	11 - 12
Resistance to flame	seg*	---	20	---	20	---
Temperature range	°C	160	160	160	160	160

### Thickness and Tolerance Chart

Nominal Thickness (mm)	Tolerance (mm)	Nominal Thickness (mm)	Tolerance (mm)
0.5	+ - 0.03	7	+ - 0.30
0.6	+ - 0.03	7.5	+ - 0.30
0.7	+ - 0.05	8	+ - 0.30
0.8	+ - 0.05	9	+ - 0.30
0.9	+ - 0.07	10	+ - 0.40
1.0	+ - 0.10	11	+ - 0.40
1.5	+ - 0.10	12	+ - 0.40
2.0	+ - 0.12	13	+ - 0.40
2.5	+ - 0.12	14	+ - 0.40
3.0	+ - 0.15	15	+ - 0.50
3.5	+ - 0.15	16	+ - 0.50
4.0	+ - 0.15	17	+ - 0.50
4.5	+ - 0.15	18	+ - 0.50
5.0	+ - 0.20	19	+ - 0.50
5.5	+ - 0.20	20	+ - 0.50
6.0	+ - 0.20	21	+ - 0.50
6.5	+ - 0.20	22	+ - 0.50

For thickness greater than the ones mentioned in the chart above, tolerance increases at a rate of 0.1 mm per 8 mm of increment of laminate thickness.

It is manufactured in maximum measurements of 1600 x 950mm.

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