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TECHNICAL DATA SHEET G-10

Is a fiberglass epoxy laminate usually specified when extremely high strength and consistent dimensional stability over temperature is required. G-10 is used for terminal boards, high humidity applications, electrical and electronic test equipment and electric rotor insulation. G-10 can be extremely difficult to cut and machine however, at Laminated Plastics G-10 is our specialty. G-10 is slightly stronger while G-11 is a better insulator and can withstand higher temperatures. FR-4 is a fire-retardant G-10 glass-epoxy laminate that is used primarily in the printed circuit board industry. G-10 and similar fiberglass reinforced thermosets are sometimes known as garolite.

GENERAL DESCRIPTION

Phenolic Laminates are produced by applying heat and pressure to layers of paper, canvas, linen or glass cloth impregnated with synthetic thermosetting resins. When heat and pressure are applied to the layers, a chemical reaction (polymerization) transforms the separate layers into a single laminated material with a "set" shape that cannot be softened again -- therefore, these materials are called "Thermosets". A variety of resin types and cloth materials can be used to manufacture thermoset laminates with a range of mechanical, thermal, and electrical properties.

ASTM or UL test	Property	G-3	G-5/G- 9	G-7	G-10	G-11
D792	Density (lb/in ³)	0.065	0.067	0.065	0.065	0.065
	(g/cm ³)	1.80	1.85	1.80	1.80	1.80
D570	Water Absorption, 24 hrs (%)	2.65	0.60	0.10	0.10	0.20
	MECHA	NICAL				
D638	Tensile Strength (psi)					
	-lengthwise	42,000	61,600	20,000	45,000	43,000
	-crosswise	34,000	51,100	-	38,000	37,000
D790	Flexural Strength (psi)					
	-lengthwise	40,500	61,600	30,000	75,000	80,000
	-crosswise	34,000	51,100	-	65,000	70,000
D790	Flexural Modulus (Kpsi)					
	-lengthwise	1,800	2,000	1,600	2,700	3,000
	-crosswise	1,400	1,700	-	2,400	2,700
D256	IZOD Notched Impact (ft-lb/in)					
	-lengthwise	12.0	12.5	13.0	14.0	12.0
	-crosswise	11.0	8.5	-	12.0	9.0
D695	Compressive Strength (psi)	55,000	65,000	50,000	65,000	63,000
D785	Hardness, Rockwell M	M110	M115	M105	M110	M112
	THER	MAL				
D696	Coefficient of Linear Thermal					
	Expansion					
	(x 10 ⁻⁵ in./in./°F)					
	-lengthwise	0.83	0.83	0.72	0.55	0.72
	-crosswise	1.00	1.00	0.90	0.66	0.83
-	Max Operating Temp (°F / °C)	340 /	285 /	430 /	284 /	329 /
		170	140	220	140	165
C177	Thermal Conductivity					
	(BTU-in/ft ² -hr-°F)	2.0	2.0	2.0	2.0	2.0
	(x 10 ⁻⁴ cal/cm-sec-°C)	7.0	7.0	7.0	7.0	7.0
UL94	Flammability Rating	H-B	V-0	H-B	H-B	H-B
	ELECTR	RICAL				
D149	Dielectric Strength (V/mil) short	460	300	350	800	900
	time, 1/8" thick					
D150	Dielectric Constant at 1 MHz	7.3	6.3	4.5	5.0	4.5
D150	Dissipation Factor at 1 MHz	0.023	0.019	0.018	0.019	0.020
D495	Arc Resistance (sec)	180	180	240	100	120

Benefits

Laminated Plastics specializes in fabricating G-10 Good electrical properties Extremely high strength over temperature High dimensional stability over temperature Humidity resistant

Applications

Terminal boards Electrical Electronic test equipment Electric rotor insulation High humidity applications

SHAPES AVAILABLE

NOTE: The information contained herein are typical values intended for reference and comparison purposes only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturers' complete material property datasheets. All values at 73°F (23°C) unless otherwise noted.