



Composites For Today's Challenges

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Lamitex® FR4 Tube

Lamitex® FR-4 epoxy tubes are reinforced with a woven glass fabric. They are primarily used for mechanical, electrical and electronic applications where extremely high mechanical strengths are required at room and moderate temperatures. Lamitex FR-4 meets or exceeds NEMA FR-4 and Mil-I-24768/27 specifications, has excellent resistance to chemicals and retains its' electrical properties in dry and high humidity environments. U.L.® 94 Flammability Rating is V-0 and the file card number for FR4 is E222199.

Mechanical Properties

	<u>Standard</u>	<u>Test Specimen</u>	<u>Avg. Test Values</u>	
Flexural Strength	ISO 178	id>100 mm	350 MPa / 50,763 psi	*1
Compressive Strength, Axial	ISO 604		230 Mpa / 33,358 psi	*1
Cohesion between layers	EN 61212-2	id<100 mm	400 Mpa / 58,015 psi	*1

Electrical Properties

Electric Strength in oil @ 90C:				
Perpendicular to Laminations	IEC 60243-1	3 mm wall thk	10.0 kV/mm - 254 Vpm	*2
Parallel to Laminations	IEC 60243-1	>3 mm wall thk id>8mm and or	50 kV/25 mm - 50.8 kV/ inch	*2
Insulation resistance after immersion in water	IEC 60167	od>10mm	10,000 M ohm	4
Comparative Tracking Index (CTI)	IEC 60112	>3 mm	200 CTI	
Permittivity:	50Hz	IEC 60250	4.5	*3
	1 MHz	IEC 60250	4.5	*3
Dissipation Factor:	50Hz	IEC 60250	0.01	*3
	1 MHz	IEC 60250	0.01	*3

Physical and Thermal Properties

Thermal endurance index @ 20,000 hrs	IEC 216		145°C	-
Density	IEC 1183-A	All	1.8 g/cm ³	
Flamability Rating	IEC 60695-11-10	>3 mm	V0	*1
Water Absorption	IEC 62-1		0.3 mg/cm ²	*4
Thermal Conductivity			1.2 x 10 ⁻⁴ Calories/Second/cm ² /(°C/cm)	

IEC 212

Conditioning: 1: 24h @ 23°C & 50%RH
2: 24h @ 23°C & 50%RH + 1hr in oil at 90°C
3: 96h @ 105°C + 1hr @ 23°C & 20%RH
4: 24h @ 50°C + 24hr in water at 23°C

Standards: NEMA LI-1
Mil-I-24768
EN 60893
Din 7735

Grade FR4
/ 27 Type GEEF
EP GC 202
Hgw 2372.2

Availability: Grade FR4 is also manufactured as laminated sheet, molded round tubes, rods, channel, angle, square and rectangular tubes and fabricated custom parts.

The standard length(s) for IDs 3 mm to 15 mm is 1220 mm and for IDs >15 mm to 1250 mm is 1220 mm and 1613 mm

All information and suggestions pertaining to the properties and uses of the materials described herein are based upon tests and data believed to be accurate; however, the final determination regarding the suitability of any material for such use is the sole responsibility of the user. No warranty is expressed or implied, including, without limitation, warrant of merchantability or fitness for a particular purpose. Under no circumstances shall Lamitex, LLC be liable for incidental or consequential loss or damage.

Composite Tubes • Bearings • Molded Shapes • Rotary Vanes • Fabricated Parts • Vulcanized Fibre • High Temp Insulation