



FRANKLIN

**PLASTICS & NON-METALLICS
FOR INDUSTRY SINCE 1921**

FRANKLIN FIBRE – LAMITEX CORPORATION
P.O.Box 1768, Wilmington, DE 19899

Phone: (302) 652-3621
Fax: (302) 571-9754
e-mail: info@franklinfibre.com

Lamitex® FR-4 Tube Technical Data

Lamitex® FR-4 epoxy convolute wrapped tubes are reinforced with woven glass fabric. They are used for mechanical, electrical and electronic applications where extremely high mechanical strength at moderate temperatures is required. FR-4 meets NEMA FR4 self extinguishing requirements and has very good electrical properties in high humidity environments.

<u>Mechanical Properties</u>	<u>Test Method:</u>			<u>Conditioning</u>	
	<u>EN 61212-2</u>	<u>Standard</u>	<u>Test Specimen</u>	<u>IEC 212</u>	<u>Values</u>
Flexural Strength	4.1	ISO 178	id>3.937 inches	1	50,763 psi
Compressive Strength, Axial	4.2	ISO 604		1	33,358 psi
Cohesion between layers	4.3	EN 61212-2	id<3.937 inches	1	58,015 psi
 <u>Electrical Properties</u>					
Electric Strength in oil @ 90C:					
Perpendicular to Laminations	5.1	IEC 243-1	.118 inch wall thk	2	254 Vpm
Parallel to Laminations	5.1	IEC 243-1	>.118 inch wall thk	2	50.8 kV/ inch
Insulation resistance after immersion		IEC 167	id>.315 inch and		10,000 M ohm
in water	5.2		or od>.394 inches	4	
Permittivity:	5 ^l	IEC 250		3	4.5
1 MHz	5.3	IEC 250		3	4.5
Dissipation Factor:	5 ^l	IEC 250		3	0.01
1 MHz	5.3	IEC 250		3	0.01
 <u>Physical and Thermal Properties</u>					
Thermal endurance index @ 20,000 hrs	6.0	IEC 216		-	302°F T.I.
Density	7.2	IEC 1183-A	All	1	1.041 oz/in ³
Water Absorption	7.1	IEC 62-1		4	6.82 ⁻⁶ oz/in ²

Conditioning: 1: 24h @ 73°F & 50%RH
2: 24h @ 73°F & 50%RH + 1hr in oil at 194°F
3: 96h @ 221°F + 1hr @ 73°F & 20%RH
4: 24h @ 122°F + 24hr in water at 73°F
5: 96h @ 221°F + 1hr in oil at 194°F

The standard length(s) for IDs .118" to .591" is 48 inches and for IDs >.591" to 49.2" is 48 inches and 63 inches

All values are average test results from extensive testing of typical production material. No warranty is implied or guaranteed and testing is recommended for each application.

Epoxies • Phenolics • Melamine • Silicone • Sheets • Molded Shapes • Tubes • Cut to Size • Fabricated Parts

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