



Lamitex® Halogen Free FR-5 Laminated Sheet

FR-5 is constructed of a self-extinguishing halogen free epoxy resin and a woven glass fabric reinforcement with excellent resistance to chemicals, exceptional CTI 600) track resistance and retention of electrical properties in high humidity environments. FR-5 is a low smoke and toxicity emissions composite whose 1.0" sheets meets Railway applications EN 45545-2;R22,

<u>Mechanical Properties</u>	<u>Standard</u>	<u>Test Specimen Thickness</u>	<u>Values</u>	
Flexural Strength	ISO 178	≥1.6 mm	375 MPa / 54,390 psi	*1
Flexural Strength measured at 150°C	ISO 178	≥1.6 mm	280 MPa / 40,610 psi	*1
Modulus of Elasticity	ISO 178	≥1.6 mm	20 GPa / 2,900.7 kpsi	*1
Compressive Strength	ISO 604	≥5.0 mm	500 MPa / 72,518 psi	*1
Izod Impact Strength Parallel with laminations	ISO 180/2A	≥5.0 mm	60 kJ/m ² / 44,253 ft-lb/m ²	*1
Shearing Strength	EN 60893-2	≥5.0 mm	45 MPa / 6,525 psi	*1
Coefficient of Thermal Expansion			10.0 cm/cm/°C / x 10 ⁻⁶	
Tensile	ISO 527	≥1.6 mm	300 MPa / 43,510 psi	*1
<u>Electrical Properties</u>				
Electric Strength in oil @ 90C:				
3 mm, Perpendicular to Laminations	IEC 243-1	3.0 mm	15 kV/mm - 381 V/mil	*2
25 mm, Parallel to Laminations	IEC 243-1	≥3.0 mm	70 kV/ 25 mm - 71 kV/in	*2
Permittivity: 50 MHz and 1 MHz	IEC 250	≥1.6 mm	4.5	*3
Dissipation Factor: 50 MHz	IEC 250	≥1.6 mm	0.005	*3
Dissipation Factor: 1 MHz	IEC 250	≥1.6 mm	0.008	*3
Insulation resistance after immersion in water	IEC 167	All	500,000 M Ω	*4
Arc Resistance	ASTM D229		180 sec	*1
Comparative Tracking Index	IEC 112	≥3.0mm	600 CTI	*1
<u>Physical and Thermal Properties</u>				
Temperature index @ 20,000 hrs	IEC 216	≥3.0 mm	180°C Temp Index	
Fire class	IEC 60695-11-10	≥5.0 mm	V-0	
Density	IEC 1183-A	All	1.85 g/cm3	*1
Water Absorption	IEC 62-1	50x50x3 mm	20 mg	*4
Smoke Emission & Toxicity	EN 45545-2, R22, R23 & R24		HL3	*F
Oxygen Index (OI)	EN ISO 4589-2		≥32 %	*F
Smoke Density (Ds max.)	EN ISO 5659-2	25 mm	1	*F
Smoke Density (Ds max.)	EN ISO 5659-2	1 mm	106	*F
Toxicity (CIT _{nlp})	NF X70-100-1/-2		0.06	*F

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
 B: 1 hr/150°C / measured at 150°C

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.

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