

Type FR-4 : IGAV FR95

IEC Specification	IEC 61249-2-7		UL/ANSI Grade	FR-4 (type L21)
IPC Specification	IPC-4101/21			
DESCRIPTION				
Glass epoxy. Rigid Laminates – PTH applications, supports standard double side lead free assembly processes.				
Reinforcement : Woven E-glass	Flame Retardant : Bromine-RoHS compl.		Resin system (primary) : Difunctional epoxy	
Glass Transition T_g : 135°C	Filler : Non			
ROHS compliance directive 2002/95/EC				
CERTIFICATIONS AND HOMOLOGATIONS		UL	E 47820	
		VDE	HA002596 & 4169	
		BSI	6506	

PROPERTIES (Cu 35 µm, thickness 1.6 mm)	IPC 4101 Paragraph	IPC TM-650 Method	Laminate < 0.50 mm		Laminate ≥ 0.50 mm	
			Specification	Typical values	Specification	Typical values
SURFACE QUALITY ⁽¹⁾	3.8.3	2.1.5	Grade A	Grade A	Grade A	Grade A
THICKNESS ⁽¹⁾	3.8.4.2	2.2.18	Class L	Class L	Class L	Class L
PEEL STRENGTH (std Cu foil)						
<i>After thermal stress, 10" 288°C</i>	3.9.1.1.1	2.4.8	1.5 N/mm	1,8 N/mm	1.4 N/mm	1,8 N/mm
<i>At 125 °C</i>	3.9.1.1.2	2.4.8 /2, /3	1.3 N/mm	1,6 N/mm	1.3 N/mm	1,6 N/mm
<i>After process solutions</i>	3.9.1.1.3	2.4.8	1.3 N/mm	1,8 N/mm	1.3 N/mm	1,8 N/mm
VOLUME RESISTIVITY						
<i>C 90%HR / 35°C / 96h</i>	3.11.1.3	2.5.17.1	10 ⁸ MΩ·cm	10 ⁸ MΩ·cm	n/a	n/a
<i>After moisture resistance</i>	3.11.1.3	2.5.17.1	n/a	n/a	10 ⁴ MΩ·cm	10 ⁷ MΩ·cm
<i>At elevated temp (E 24h / 125°C)</i>	3.11.1.3	2.5.17.1	10 ⁷ MΩ·cm	10 ⁷ MΩ·cm	10 ⁷ MΩ·cm	10 ⁷ MΩ·cm
SURFACE RESISTIVITY						
<i>C 90%HR / 35°C / 96h</i>	3.11.1.4	2.5.17.1	10 ⁶ MΩ	10 ⁷ MΩ	n/a	n/a
<i>After moisture resistance</i>	3.11.1.4	2.5.17.1	n/a	n/a	10 ⁴ MΩ	10 ⁶ MΩ
<i>At elevated temp (E 24h / 125°C)</i>	3.11.1.4	2.5.17.1	10 ⁵ MΩ	10 ⁵ MΩ	10 ⁵ MΩ	10 ⁵ MΩ
MOISTURE ABSORPTION	3.12.1.1	2.6.2.1	n/a	n/a	0,35 %	0,19 %
DIELECTRIC BREAKDOWN	3.11.1.6	2.5.6	n/a	n/a	42 kV	45 kV
PERMITTIVITY at 1MHz ⁽²⁾	3.11.1.1	2.5.5	4,8	4,8	4,8	4,8
LOSS TANGENT at 1 MHz	3.11.1.2	2.5.5	0,027	0,027	0,027	0,027
FLEXURAL STRENGTH, <i>Length direction</i>	3.9.1.3	2.4.4	n/a	n/a	415 N/mm ²	550 N/mm ²
<i>Cross direction</i>	3.9.1.3	2.4.4	n/a	n/a	345 N/mm ²	450 N/mm ²
ARC RESISTANCE	3.11.1.5	2.5.1	60 sec.	120 sec	60 sec.	120 sec
THERMAL STRESS (10" at 288°C)	3.10.1.2	2.4.13.1	Pass Visual	60 sec	Pass Visual	60 sec
ELECTRIC STRENGTH ⁽²⁾	3.11.1.7	2.5.6.2	32 kV/mm	36 kV/mm	n/a	n/a
FLAMMABILITY	3.10.1.1	UL 94	V - 0	V - 0	V - 0	V - 0
GLASS TRANSITION TEMP (T _g)	3.10.1.6	2.4.25 DSC	n/a	n/a	130 °C	135 °C
DIMENSIONAL STABILITY ⁽¹⁾	3.9.1.2	2.4.39	-	-	± 200 ppms	± 100 ppms
COMPARATIVE TRACKING INDEX - CTI	IEC60112	-	-	-	200 V	230 V

AVAILABILITY					
STANDARD SHEET SIZES (mm)	927 x 1232 and 1082 x 1232	Tolerance	+13/-0 mm	Logo (red)	IGAV
	Also available in cut panels to customer requirement				
SQUARENESS	3 mm max., as differential between diagonal measurements.				
Copper thickness	18, 35 and 70 µm (other copper thickness upon request)				

Specification column corresponds to guaranteed values. Typical values are average values of our current production and are based on reliable analytical methods, they can only serve as guideline and not give rise to any rights under warranty terms. Aismalibar reserves the right to future changes.

- Notes:
- (1) Other level upon agreement
 - (2) Influenced by build-up (% of resin)
 - (3) As agreed upon between user and supplier

IEC Specifications (IEC 61249-2-7) and Test Methods (IEC 61189-2): IEC specifications and test methods are in most of cases equivalent to IPC standards. They can be used as reference upon specific agreement between customer and supplier.



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