IGAV®
Cu-Clad Laminates

AISMALIBAR®

DATA SHEET

D_1106

Type FR-4 : IGAV FR 95ML

IEC Specification		
IEC Specification	IPC-4101/21	**UL/ANSI Grade** FR-4 (type L121)
DESCRIPTION		
Glass epoxy. Thin core Laminates - Multilayer and PTH applications, high thermal resistance and low z-CTE (for lead free technology)		
Reinforcement: Woven E-glass	**Flame Retardant:** Bromine Rohs compl.	**Filler:** Non
Glass Transition T, Tg: 135ºC	**Resin system (primary):** Difunctional epoxy	
ROHS Compliance directive 2002/95/EC		
CERTIFICATIONS AND HOMOLOGATIONS	**UL**	E 47820

PROPERTIES	IPC 4101 Paragraph	IPC TM-650 Method	Laminate < 0.50mm Specification	Laminate < 0.50mm Typical values	Laminate ≥ 50.mm Specification	Laminate ≥ 50.mm 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)						
After thermal stress, 10" 288ºC	3.9.1.1.1	2.4.8	1.5 N/mm	1.8 N/mm	1.4 N/mm	1.8 N/mm
At 125ºC	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
After process solutions	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	3.11.1.3	2.5.17.1				
90% HR / 35 / 96h			10^8 MΩ·cm	10^8 MΩ·cm	n/a	n/a
After moisture			n/a	n/a	10^4 MΩ·cm	10^7 MΩ·cm
At elevated temp (E 24h / 125ºC)			10^7 MΩ·cm	$2 \cdot 10^7$ MΩ·cm	10^5 MΩ·cm	10^7 MΩ·cm
SURFACE RESISTIVITY	3.11.1.4	2.5.17.1				
90% HR / 35 / 96h			10^6 MΩ	10^7 MΩ	n/a	n/a
After moisture			n/a	n/a	10^4 MΩ	10^6 MΩ
At elevated temp (E 24h / 125ºC)			10^5 MΩ	10^5 MΩ	10^5 MΩ	10^5 MΩ
MOISTURE ABSORTION	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
PERMITIVITY at 1MHz (2)	3.11.1.1	2.5.5	4.8	4.8	4.8	4.8
LOSS TANGENT at 1MHz	3.11.1.2	2.5.5	0.027	0.027	0.027	0.027
FLEXURAL STRENGTH	3.9.1.3	2.4.4				
Length direction			n/a	n/a	415 N/mm^2	550 N/mm^2
Cross direction			n/a	n/a	345 N/mm^2	410 N/mm^2
ARC RESISTANCE	3.11.1.5	2.5.1	60 sec	120 sec	60 sec	120 sec
THERMAL STRESS (10" at 288ºC)	3.10.1.2	2.4.13.1	Pass visual	60 sec	Pass visual	60 sec
ELECTRIC STRENGH (2)	3.11.1.7	2.5.6.2	32kV/mm	36kV/mm	n/a	n/a
FLAMMABILITY	3.10.1.1	UL 94	V - 0	V - 0	V - 0	V - 0
GLASS TRANSITION TEMP (Tg)	3.10.1.6	2.4.25 DSC	n/a	n/a	135ºC	135ºC
DIMENSIONAL STABILITY	3.9.12	2.4.39	-	-	±200	±100

AVAILABILITY			
STANDARD SHEETS SIZES	927 x 1232 mm and 1082 x 1232 mm Also available in cut panels to requirement.	Tolerance +13/-0mm	No Logo
SQUARENESS	3 mm max., as differential between diagonal measurement		
Copper thickness	**18, 35 and 70 mic (other copper thickness upon request)**		

Specification column corresponds to guaranteed values. Typical values are average values of current production and are based on reliable analytical methods, they have to be used only 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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