

DATA SHEET

D_1106

Type FR-4 : IGAV FR 95

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

| PROPERTIES (Cu 35um, thickness 1.6mm) | IPC 4101 Paragraph | IPC TM-650 Method | Laminate < 0.50mm | | Laminate ≥ 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 | 3.11.1.3 | 2.5.17.1 | | | | |
| 90% HR / 35 / 96h | | | 10 ⁸ MΩ·cm | 10 ⁸ MΩ·cm | n/a | n/a |
| <i>After moisture</i> | | | n/a | n/a | 10 ⁴ MΩ·cm | 10 ⁷ MΩ·cm |
| <i>At elevated temp (E 24h / 125°C)</i> | | | 10 ⁷ MΩ·cm | 10 ⁷ MΩ·cm | 10 ⁷ 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 |
| <i>After moisture</i> | | | n/a | n/a | 10 ⁴ MΩ | 10 ⁶ MΩ |
| <i>At elevated temp (E 24h / 125°C)</i> | | | 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 | | | | |
| <i>Length direction</i> | | | n/a | n/a | 415 N/mm ² | 550 N/mm ² |
| <i>Cross direction</i> | | | 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 | 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 (T_g) | 3.10.1.6 | 2.4.25 DSC | n/a | n/a | 130°C | 135°C |
| DIMENSIONAL STABILITY ⁽¹⁾ | 3.9.12 | 2.4.39 | - | - | ± 200ppms | ± 100ppms |
| COMPARATIVE TRACKING INDEX-CTI | IEC60112 | - | - | - | 200 V | 230 V |

| AVAILABILITY | | | |
|------------------------------|--|--------------------|---------------------------|
| STANDARD SHEETS SIZES | 927 x 1232 mm and 1082 x 1232 mm | Tolerance +13/-0mm | Logo (red) IGAV |
| | Also available in cut panels to customer requirement | | |
| 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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