

FR-4 Laminates



FR-4 Fiberglass Epoxy Laminate

Description:

FR-4 fiberglass epoxy laminate is made from fiberglass cloth and epoxy resin by hot pressing and drying into the plate-type insulating material.

- FR-4 is fire flammability FR-4.0 products with UL grade 94V-0, meet NEMA FR-4, MIL-I-24768/27 GEE-F and IEC 60893 EP GC 202 specification, nature and yellow color, or specified by customer
- ESD FR-4 products is filled with conductive filler which could discharge electro static during machining and usual application, black color
- Halogen free FR-4 is none bromide FR-4.1 products with fire flammability meet UL grade 94 V-0, yellow color

Features:

- High mechanical properties under high temperature.
- Excellent Stability of dielectric properties under high moisture.
- Outstanding electrical properties under ordinary dry and humidity conditions.
- Complies with UL94 V-0 certified.
- Excellent heat resistance, with an insulation class of B.
- MOT (max operation temperature) 130C.

Application:

- Bearings,
- Computer Electronics
- Carriers
- Electronic Boards
- Gaskets, Gears
- Industrial Electronics
- Machine Components
- Mechanical Lines
- PCB's fixture,
- Wave Soldering Pallet
- Surfboard fin
- Switches
- Terminal Boards
- Transformers
- Washers
- Wear Strip

Size Specification

Available thickness range: 0.1mm to 100mm

Available size: 915x1220mm 1020x1220mm 1220x2440mm

Size dimensions and thickness can be customized, max to 1220*3050mm

FR-4 Laminates



FR-4 Fiberglass Epoxy Laminate

Typical technical data

| Test Item | | Condition | Unit | Typical value |
|--------------------------------------|-----------------|--------------------|-------------------|----------------------------------|
| Dielectric Withstanding Voltage | Z-axis | C-90/20/65 15 | KV/mm | 54 |
| | X,Y-axis | 0-0.5/90 | KV | 28 |
| Isolated resistance | As received | C-90/20/65 | MΩ | 10 ⁶ -10 ⁸ |
| | Boiled | C-90/20/65+D-2/100 | MΩ | 10 ⁴ -10 ⁶ |
| Surface resistance | | C-96/35/90 | MΩ-cm | 10 ⁷ -10 ⁹ |
| Volume resistance | | C-96/35/90 | MΩ | 10 ⁶ -10 ⁸ |
| Relative Permittivity (1MHz) | | Fluid cell | | 4.2-4.7 |
| Dissipation Factor (1MHz) | | Fluid cell | | 0.030-0.035 |
| Arc Resistance | | ASTM D495 | Sec | 120-140 |
| Comparative Tracking Index | | ASTM D3638 | V | 175-250 |
| Flexural Strength | Y-axis | ASTM D790 | MPa | 400-500 |
| | X-axis | | Mpa | 450-550 |
| Compressive Strength | Y-axis | ASTM D695 | MPa | 340-440 |
| | X-axis | | MPa | 290-390 |
| Tensile Strength | | ASM D882 | MPa | 250-350 |
| Flexural Modulus | | ASTM D790 | MPa | 21560-24500 |
| Bonding strength | | D-48/50 | KN | 8.0-10.0 |
| Rockwell Hardness | | ASTM D785 | HR-R A | 120-125 |
| Izod Impact Strength | X-axis | ASTM D256 | J/cm | 5.4-6.4 |
| Tg | DSC | IPC-TM-650 2.4.25 | C | 135 |
| Moisture Absorption | 1.0mm thickness | E-24/50+D-24/23 | % | 0.1-0.8 |
| Specific Gravity | | As received | g/cm ³ | 1.95 |
| Coefficient of Thermal Expansion | X,Y-axis | RT~ 200C | PPM/C | 11-14 |
| | | RT~ 125C | PPM/C | 45-50 |
| | Z-axis | 125-200C | PPM/C | 250-260 |
| Flammability | UL94 | Rating | | V-0 |
| Thermal reliability | | 130C/2Hr | | pass |
| | | 280C/30s | | Pass |
| Relative Temperature Index (RTI,MOT) | | UL 746E | C | 130 |
| Insolation level | | IEC 60216-1 | Class | B |

Note: All test data provided are typical values and are not intended to be specification values.