



# Epoxy Fiber — FR4

Glass Fiber Reinforced Epoxy Laminate | G10/FR4

VO Flame Retardant | High Electrical Insulator | IPC-4411

Material Type

**Epoxy Thermoset Laminate**

Form: Plate / Flat / Tube

Combustion: **VO — Flame Retardant**

## MATERIAL DESCRIPTION

Epoxy Fiber FR4 is a flame retardant thermoset laminate produced by impregnating glass fiber tissue with epoxy resin and hot pressing. With its high flexural modulus (20000-24000 MPa), outstanding electrical insulation and excellent dimensional stability, it is the standard of electronic circuit boards (PCBs), transformer insulation and high voltage structural components. Its flame retardant properties compared to standard G10 make this material essential in industrial safety applications.

## MECHANICAL AND PHYSICAL PROPERTIES (ISO/ASTM / IPC)

Feature	Unit	Value	Feature	Unit	Value
Intensity	g/cm <sup>3</sup>	1.80 - 1.90	Shore D Hardness	—	<b>95 - 100</b>
Breaking Stress	MPa	250 - 350	Friction Coefficient	—	<b>~ 0.40</b>
Elasticity Modulus	MPa	20000 - 24000	Glass Transition (T <sub>g</sub> )	°C	<b>~ 140</b>
Impact Resistance	kJ/m <sup>2</sup>	100 - 200	Work. Gene. Coefficient	10 <sup>-4</sup> K <sup>-1</sup>	<b>0.15</b>
Notched Impact	kJ/m <sup>2</sup>	50 - 80	Dielek. Strength	kV/mm	<b>30 - 50</b>
Water Absorption (24h)	%	0.1	Surface Resistance	Ohm	<b>10<sup>12</sup></b>
Service Temperature	°C	-40 / +140	Combustion Class	UL 94	<b>VO</b>

## AREAS OF APPLICATION

PCB — Circuit Board Substrate

Transformer and Power Electronics Insulation

High Voltage Constructions

Aviation Structural Components

Electrical Panel Insulations

Precision Mechanical Bearings

## CHEMICAL RESISTANCE AND GENERAL PROPERTIES

It shows excellent resistance to moisture and water; Water absorption is only 0.1%. Offers good resistance to organic solvents and most chemicals; Structural integrity may be partially affected by prolonged acid or base contact. Flame retardant (VO) class prevents flame spread in case of fire and is a mandatory choice in electronic security applications. Due to its thermoset structure, it cannot be welded; Precision machining is possible with CNC milling, drilling and laser cutting. It is the standard insulation and structural laminate material of the electronics, electrical, aviation and high voltage power systems industries.

The technical information specified in this document reflects the reference values of international ISO/ASTM/IPC standards. Chemical resistance may vary depending on concentration, temperature and exposure time.