FR4

FR4 is a class of glass fiber epoxy laminate that is flame retardant.

Mechanical properties

Ultimate tensile strength	240 - 310 MPa
Young's modulus (modulus of elasticity)	12 - 27 GPa
Elongation at break	0.008 - 0.01 %
Hardness	100 - 110 HRM

Physical properties

UV resistance	Good

Thermal properties

Maximum service temperature	122 - 145 °C
Thermal expansion coefficent	9.9 - 11.9 10^-6/ºC
Thermal conductivity	0.29 - 0.34 W/(m·°C)

Electrical properties

ESD Safety	No

Common applications

Structural applications	
Electrical applications	
PC boards	

FR4 CNC Machining Applications & Parts

At Slinar, we precision-machine FR4 (G10) into high-performance components for industries that demand excellent electrical insulation, mechanical strength,

and flame retardancy. Here are common parts we manufacture:

1. Electrical Insulation Components

- PCB Test Fixtures: Insulating bases, probe plates, and mounting boards for In-Circuit Test (ICT) and flying probe testers.
- Terminal Boards & Blocks: Machined blocks and strips with drilled and tapped holes for secure electrical connections.
- Bus Supports & Insulators: Standoffs, spacers, and barriers for transformers, switchgear, and power supplies.
- Circuit Breaker Parts: Arc chutes, barriers, and isolation plates that meet UL94 V-0 standards.

2. Precision Mechanical & Wear Parts

- Wear Rails & Guides: Low-friction guide rails, ways, and liners for CNC machinery and automation equipment, offering a non-metallic alternative.
- Bushings & Bearings: Self-lubricating bushings, washers, and thrust bearings for applications requiring corrosion resistance and electrical isolation.
- Gaskets & Shims: Complex gaskets and precision shims for high-temperature and corrosive environments.

3. Jigs, Fixtures, & Factory Automation

- Assembly Jigs: Lightweight, rigid, and non-conductive jigs and fixtures for electronic assembly and welding.
- Sensor Mounts: Custom brackets and enclosures for proximity sensors and other sensitive electronics.
- Tooling Plates: Flat, stable plates for mounting components in measurement and optical systems.

Why Machine Your FR4 Parts with Slinar?

- Expertise in Composites: We use specialized CNC processes to prevent delamination and ensure clean, burr-free edges.
- From Prototype to Production: We support projects of any volume, from a single prototype to full production runs.
- Instant Quoting & DFM: Upload your design for an instant quote and free Design for Manufacturability feedback.

Get an Instant Quote for your custom FR4 parts today