

# GSFR4



## Globally Sourced FR-4 Sheet Data Sheet

**Definition:** GSFR4 is constructed from a woven glass fabric with an epoxy resin binder. The epoxy resin system is flame retardant and typically contains bromine on the epoxy resin backbone.

**Characteristics:** GSFR4 exhibits extremely high mechanical strength (flexural, impact, and bonding) at room temperature and has good dielectric loss and electric strength properties under both dry and humid conditions.

**Colors:** Natural and Black

**Certifications\*:** The manufactures of GSFR4 has informed Norplex-Micarta that the product meets NEMA LI 1-1998 Grade FR-4, ANSI/NEMA IM 60000-2021 Grade FR-4 MIL-I-24768/27 Type GEE-5 and ASTM D 709 Type IV Grade FR-4.

### TYPICAL PROPERTIES

GENERAL PHYSICAL PROPERTIES	Thickness	UNITS	VALUE
Izod Impact Strength Lengthwise – ASTM D229 E-48/50	0.125" and above	ft-lb/in	7.5
Izod Impact Strength Crosswise – ASTM D229 E-48/50	0.125" and above	ft-lb/in	6.5
Flexural Strength Lengthwise – ASTM D229 Condition A	0.031"	psi	60,000
	0.062"	psi	60,000
	0.125"	psi	55,000
Flexural Strength Crosswise – ASTM D229 Condition A	0.031"	psi	50,000
	0.062"	psi	50,000
	0.125"	psi	45,000
Bond Strength – ASTM D229 Condition A	0.500" and above	lb	2,100
Bond Strength – ASTM D229 D-48/50	0.500" and above	lb	1,700
Water Absorption – ASTM D229 D1-24/23	0.031"	%	0.30
	0.062"	%	0.20
	0.125"	%	0.10

# GSFR4

## Globally Sourced FR-4 Sheet Data Sheet



### TYPICAL PROPERTIES

THERMAL & ELECTRICAL PROPERTIES	Thickness	UNITS	VALUE
Flammability Rating – U.L. 94 Condition A	0.031" and above	Class	V-1
Breakdown Voltage – ASTM D229 Condition A	0.031" - 1.000"	kV	55
Breakdown Voltage – ASTM D-48/50	0.031" - 1.000"	kV	50
Permittivity @ 1 MHz – ASTM D229 Condition A	0.031" - 1.000"	-	5.0
Permittivity @ 1 MHz – ASTM D229 Condition D-24/23	0.031" and above	-	5.2
Permittivity @ 1 MHz – ASTM D229 Condition D-48/50	0.125"	-	5.4
Dissipation Factor @ 1 MHz – ASTM D229 Condition A	0.031" and above	-	0.025
Dissipation Factor @ 1 MHz – ASTM D229 D-24/23	0.031" and above	-	0.035
Dissipation Factor @ 1 MHz – ASTM D229 D-48/50	0.125"	-	0.045

\* Product Certification. PRODUCT is import material, certified via manufacturers documentation to any standard under which it is sold. Norplex-Micarta, at its sole discretion, may substitute domestic or alternate source material in order to fill order requirements. Norplex-Micarta will have no obligation to notify customers of a change in material source. Substitution of PRODUCT does not waive any of these [NORPLEX-MICARTA SUPPLEMENTAL TERMS](#). PRODUCT will not be tested lot by lot; therefore, neither section 4.5 of MIL-I-24768 nor section 13 of ASTM D709 will apply.

This data, while believed to be accurate and based on reliable analytical methods, is for informational purposes only. The terms and conditions of the agreement under which it is sold will govern any sales of this product. Data supplied above are "typical values" and are not to be considered "specification values". Tests of a specific lot may have different results.

Norplex-Micarta makes no warranty, expressed or implied, including any implied warranty or fitness for a particular application. The user should conduct testing and verification of this material for suitability in its specific application.

It is the responsibility of the users of this information to make sure that they have the latest version of this TDB and to review our web site, [www.norplex-micarta.com](http://www.norplex-micarta.com), or contact our Customer Service department to determine if this information is the most current available.