

GSFR4A



Globally Sourced FR-4 Sheet Data Sheet

Definition: GSFR4A 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: GSFR4A 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 GSFR4A 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-F and ASTM D 709 Type IV Grade FR-4 (Exception taken to Class 0 (i.e., V-0) vertical flammability requirement for thicknesses 1/32"-1/4". No vertical flammability exception needed <1/32" or >1/4").

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 |

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|---------------------------------------|--------|---|------|
| Water Absorption – ASTM D229 D1-24/23 | 0.031" | % | 0.30 |
| | 0.062" | % | 0.20 |
| | 0.125" | % | 0.10 |

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 wave 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.

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