

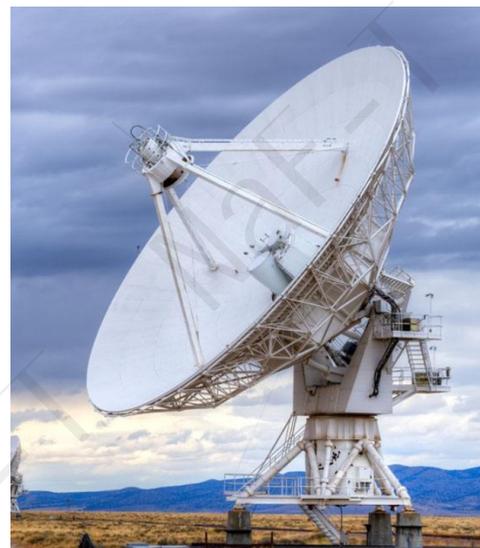
NaF5000 Series of Products

Features of NaF5000 Series

- NaF5000 series are ceramic-filled PTFE high-frequency copper clad laminates (CCLs) independently developed and produced by NaF-T.
- The dielectric constant is very stable and the dielectric loss is ultra low (D_k : 2.2~10.2; D_f : 0.0008~0.0027).
 - ▶ Consistent and stable
 - ▶ Low dielectric loss
 - ▶ High peel strength
 - ▶ Excellent cost performance

Application Fields of NaF5000 Series

- The Products are used in Antenna feed network, microwave, etc.
- NaF-T not only produces high-frequency copper clad laminates (CCLs) with ultra low loss, but also can customize the thickness and thermal conductivity of CCLs according to customer's needs.
 - ▶ Space wideband antenna
 - ▶ Microstrip and strip-line circuits
 - ▶ Medium and low orbit
 - ▶ Military system
 - ▶ Communication equipment Radar
 - ▶ Early warning and satellite communication



NaF5022: A PTFE RF Circuit Material with Ceramic filling

GENERAL PROPERTIES

Property	Typical Value	Direction	Unit	Condition	Test Method
Dielectric Constant, D_k	2.2±0.02	Z	-	10 GHz 23°C	IPC-TM-650 2.5.5.5 SPDR
Dissipation Factor, D_f	0.0009	Z	-	10 GHz 23°C	IPC-TM-650 2.5.5.5
Thermal Coefficient, ϵ_r	-120	Z	ppm/°C	10 GHz 0-100°C	IPC-TM-650 2.5.5.5
Dimensional Stability	-0.30,-0.25	X, Y	mm/m	COND A	IPC-TM-650 2.2.4
Volume Resistivity	10^7		MΩ·cm	COND A	IPC 2.5.17.1
Surface Resistivity	10^7		MΩ	COND A	IPC 2.5.17.1
Tensile Modulus	1100 1000	MD CMD	MPa	23°C	ASTM D638
Water Absorption	0.02	-	%	D48/50	IPC-TM-650 2.6.2.1
Thermal Conductivity	0.27	-	W/(m·K)	50°C	ASTM D5470
Coefficient of Thermal Expansion	30,45,230	X, Y, Z	ppm/°C	23°C/50% RH (23 ~ 150 °C)	IPC-TM-650 2.4.24
T_d	500		°C	TGA	ASTM D3850
Density	2.3		mg/cm ³		
Copper Peel Strength	32.0		pli	1 oz. EDC After floating tin	IPC-TM-2.4.8
Flammability	V-0				UL 94
Lead Free Process Compatible	YES				

PRODUCT SPECIFICATION

Standard Thickness	Standard Panel Size	Standard Copper Cladding
0.020" (0.508mm) +/- 0.0020" 0.030" (0.762mm) +/- 0.0030" 0.060" (1.016mm) +/- 0.0030" * Other thicknesses are available	12" X 18" (305 X 457mm) 24" X 18" (610 X 457mm)	Electrolytic copper foil:LP/VLP/RTF/HVLP ½ oz.(18µm) H/H 1 oz.(35µm) 1/1 * Additional cladding weights are available

Note: All typical values listed above are for reference only and not for specification.