

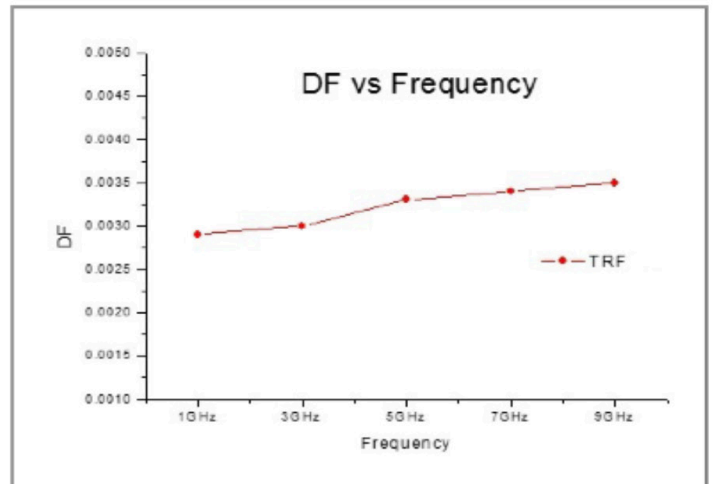
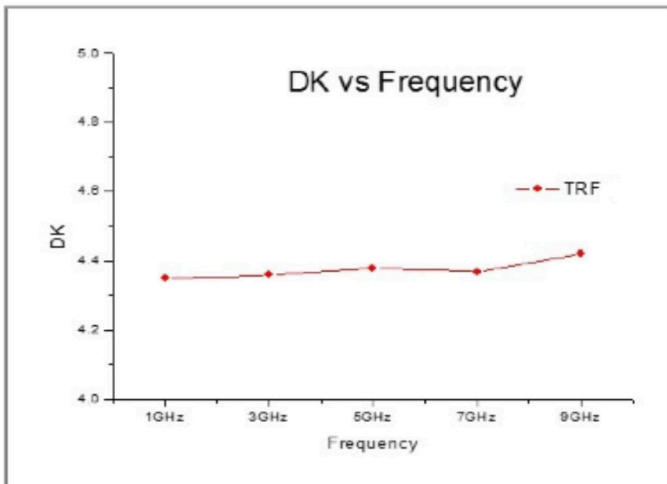
TRF Low Loss, Thermally Stable Laminates

The TRF range of laminated materials represents a new generation of low loss, thermally stable laminates.

TRF is woven glass reinforced for enhanced dimensional stability coupled with AGC's expertise in ceramic technology. TRF exhibits low and consistent Z-axis expansion across a wide temperature range, including and up to soldering conditions. The dielectric constant range may allow designers to make a seamless transition from FR-4 in applications where a lower loss material may be required.

Benefits & Applications:

- Low Loss Ceramic Filled PTFE
 - High Thermal Conductivity
 - Stable DK over Temperature
 - Stable DK over Frequency
 - Very Low Z-Axis CTE
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- Satellite Radio Antennas
 - RFID Antennas



TRF-41 & 43 Typical Values							
Property	Test Method	Unit	Value		Unit	Value	
			TRF-41	TRF-43		TRF-41	TRF-43
DK @ 10 GHz	IPC-TM-650 2.5.5.5.1		4.10	4.30		4.10	4.30
DF @ 10 GHz	IPC-TM-650 2.5.5.5.1		0.0035			0.0035	
Moisture Absorption	IPC-TM-650 2.6.2.1	%	0.06		%	0.06	
Flexural Strength (MD)	IPC-650 2.4.4	lbs/in	17,000		N/mm ²	177	
Flexural Strength (CD)	IPC-650 2.4.4	lbs/in	15,000		N/mm ²	103	
Peel Strength (CH)	IPC-650 2.4.8	lbs/in	8		N/mm	1.4	
Thermal Conductivity	IPC-650 2.4.50	W/M*K	0.43		W/M*K	0.43	
Volume Resistivity	IPC-TM-650 2.5.17.1	Mohm/cm	8.0 x 10 ⁷		Mohm/cm	8.0 x 10 ⁷	
Surface Resistivity	IPC-TM-650 2.5.17.1	Mohm	3.0 x 10 ⁷		Mohm	3.0 x 10 ⁷	
CTE (X)	ASTM D 3386 (TMA)	ppm/°C	9		ppm/°C	9	
CTE (Y)	ASTM D 3386 (TMA)	ppm/°C	9		ppm/°C	9	
CTE (Z)	ASTM D 3386 (TMA)	ppm/°C	40		ppm/°C	40	
Flammability Rating	UL 94		V-0			V-0	

All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.

Designation	Dk
TRF-41	4.10 ± 0.15
TRF-43	4.30 ± 0.15

Typical Thicknesses	
Inches	mm
0.0080	0.20
0.0160	0.41
0.0240	0.61
0.0320	0.81
0.0400	1.02
0.0640	1.63*
0.1200	3.05*

*Parts of thickness specification not less than 64 mil products would be IPC-4103/class B. Our standard sheet size is 36" x 48" (914 mm x 1220 mm). Please contact us for availability of other sizes.

Please see our Product Selector Guide for information on available copper cladding.

An example of our part number is: **TRF-43-0640-CL1/CL1 - 18" x 24" (457 mm x 610 mm)**