

# TRF-41,-43,-45

## Low-loss ceramic-filled PTFE

The TRF range of laminated materials represent a new generation of low-loss, thermally-stable laminated material from Taconic Advanced Dielectric Division

TRF is woven-glass reinforced for enhanced dimensional-stability and coupled with Taconic's expertise in ceramic technology, TRF exhibits low and consistent Z-axis expansion across a wide range of temperature including and up to soldering conditions.

### Benefits

- Low-loss ceramic-filled PTFE
- High thermal conductivity
- Stable DK over temperature
- Stable DK over frequency
- Very low z-axis CTE

### Applications

- Satellite radio antennas
- RFID antennas
- GPS antennas



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**TRF-41, -43, -45 Typical Values**

Property	Test Method	Unit	TRF-41 Value	TRF-43 Value	TRF-45 Value
Dielectric Constant	IPC-TM-650 2. 5. 5. 6	-	4.1±0.15	4.3±0.15	4.5±0.15
Dissipation Factor	IPC-TM-650 2. 5. 5,5. 1(m)	10GHz	0.0035	0.0035	0.0035
Moisture Absorption	IPC-TM-650 2.6.2.1	%	0.06	0.06	0.06
Surface Resistivity	IPC-TM-650 2.5. 17. 1	Mohm	3 .0 x 10 <sup>7</sup>	3 .0 x 10 <sup>7</sup>	3 .0 x 10 <sup>7</sup>
Volume Resistivity	IPC-TM-650 2.5. 17,1	Mohm · cm	8. 0 x 10 <sup>7</sup>	8. 0 x 10 <sup>7</sup>	8. 0 x 10 <sup>7</sup>
Flexural Strength (Lengthwise)	IPC-TM-650 2.4.4	lbs / in N/mm <sup>2</sup>	17,000 177	17,000 177	17,000 177
Flexural Strength (Crosswise)	IPC-TM-650 2.4. 4	lbs / in N/mm <sup>2</sup>	15,000 103	15,000 103	15,000 103
Peel Strength	IPC-TM-650 2,4,8	lbs / in N/mm	8 1.4	8 1.4	8 1.4
Thermal Conductivity	ASTM F433	W/m-k	0.43	0.43	0.43
C.T.E (X axis)	ASTM D 3386 (TMA)	ppm/ °C (50-150 °C)	9	9	9
C.T.E (Y axis)	ASTM D 3386 (TMA)	ppm/ °C (50-150 °C)	9	9	9
C. T.E (Z axis)	ASTM O 3386 (TMA)	ppm/ °C (50-150 °C)	40	40	40
Flammability	UL-94		V-0	V-0	V-0

Remarks : 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.

**How to Order**

Designation	Dk
TRF-41	4.1
TRF-43	4.3
TRF-45	4.5

**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*

Remarks : Dielectric thickness specification of IPC-4103/Class B apply on TRF-series not less than 64mil products.

**Available Copper Cladding**

Designation	Weight	Copper Thickness		RMS Treated Side		Description
		~0.0007"	~18µm	13µm	0.3µm	
CLH	1/2 oz / tt <sup>2</sup>	~0.0007"	~18µm	13µm	0.3µm	Reverse treated / Electrodeposited
CL1	1 oz / ft <sup>2</sup>	~0.0014"	~35µm	13µm	0.3µm	Reverse treated / Electrodeposited
CVH (CH)	1/2 oz / ft <sup>2</sup>	~0.0007"	~18µm	27µm	0.7µm	Very low profile / Electrodeposited
CV1 (C1)	1 oz / ft <sup>2</sup>	~0.0014"	~35µm	25µm	0.6µm	Very low profile / Electrodeposited
C2	2 oz / ft <sup>2</sup>	~0.0028"	~70µm	77µm	2.0µm	Electrodeposited

**An example of our part number is: TRF-45-0640-CL1 /CL1 - 18" x 24" (457 mm x 610 mm)**

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