

# TLC

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**Low Cost**  
**Low Dissipation Factor**  
**Tightly Controlled Dielectric Constant**  
**Exceptional Dimensional Stability**  
**High Flexural Strength**  
**UL 94 V-0 Rating**

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## TACONIC

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# APPLICATIONS

LNBS

PCS/PCN Large Format  
Antennas

Power Amplifiers

Passive Components

# TLC

Taconic has over 35 years of experience coating fiberglass fabric with PTFE (polytetrafluoroethylene). This enables Taconic to manufacture copper clad PTFE/woven glass laminates with exceptionally controlled electrical and mechanical properties.

Taconic TLC laminates are engineered to provide a cost effective substrate. TLC laminates are suitable for a wide range of microwave applications. TLC laminates offer far superior electrical performance compared to thermoset laminates (e.g. FR-4, PPO, BT, polyimide, and cyanate ester). The construction of the laminate provides exceptional mechanical stability. The dielectric constant (Dk) is typically offered at 3.2 +/- 0.05.

TLC laminates can be sheared, drilled, milled and plated using standard methods for PTFE/woven fiberglass materials. The laminates are dimensionally stable, and exhibit virtually no moisture absorption during fabrication processes.

TLC laminates are generally ordered clad on both sides with 1/2, 1 or 2 oz. electrodeposited copper.

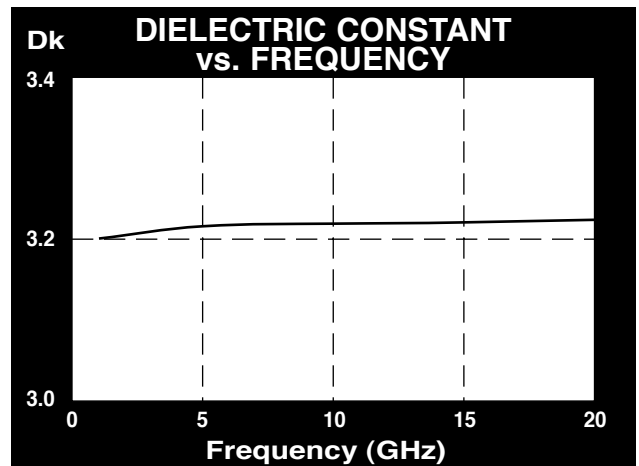
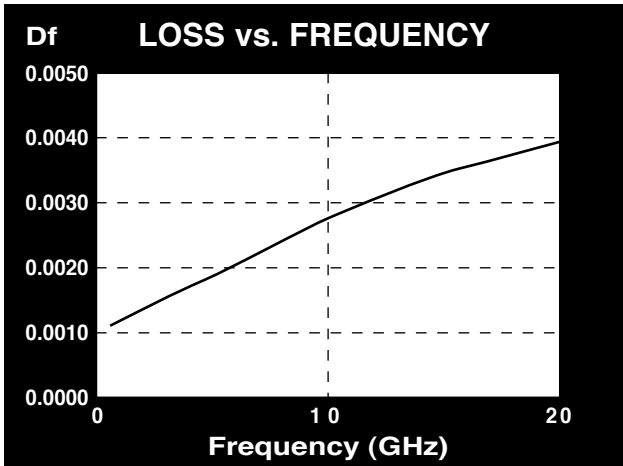
TLC laminates exhibit flammability of V-0 and are tested in accordance with IPC-TM 650. A certificate of conformance containing lot-specific data accompanies each shipment.

See "How to Order" on back page for a complete product listing.

## TLC Typical Values

Property	Test Method	Unit	Value	Unit	Value
Dielectric Constant @ 10 GHz	IPC-TM-650 2.5.5.5		3.20		3.20
Dissipation Factor @ 10 GHz	IPC-TM-650 2.5.5.5		0.0030		0.0030
Moisture Absorption	IPC-TM-650 2.6.2.1	%	<0.02	%	<0.02
Dielectric Breakdown	IPC-TM-650 2.5.6	kV	>60	kV	>60
Volume Resistivity	IPC-TM-650 2.5.17.1	Mohm/cm	10 <sup>7</sup>	Mohm/cm	10 <sup>7</sup>
Surface Resistivity	IPC-TM-650 2.5.17.1	Mohm	10 <sup>7</sup>	Mohm	10 <sup>7</sup>
Arc Resistance	IPC-TM-650 2.5.1	Seconds	>180	Seconds	>180
Flexural Strength (MD)	IPC-TM-650 2.4.4	psi	>40,000	N/mm <sup>2</sup>	>276
Flexural Strength (CD)	IPC-TM-650 2.4.4	psi	>35,000	N/mm <sup>2</sup>	>241
Peel Strength (1 oz ED)	IPC-TM-650 2.4.8	lbs/linear inch	12.0	N/mm	2.1
Thermal Conductivity	ASTM F 433	W/m/K	0.24	W/m/K	0.24
CTE (x-y)	ASTM D 3386 (TMA)	ppm/°C	9-12	ppm/°C	9-12
CTE (z)	ASTM D 3386 (TMA)	ppm/°C	70	ppm/°C	70
Outgassing (% TML)	ASTM E 595*	%	0.01	%	0.01
Outgassing (% CVCM)	ASTM E 595*	%	0.00	%	0.00
Outgassing (% WVR)	ASTM E 595*	%	0.01	%	0.01
Flammability Rating	UL 94		V-0		V-0

\*As reported by NASA. See [http://outgassing.nasa.gov/og\\_disclaimer.html](http://outgassing.nasa.gov/og_disclaimer.html).



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

Dielectric Constant	Dielectric Constant	Typical Thicknesses <sup>1</sup>			
TLC-27	2.75 +/- 0.05	0.0145"		0.37 mm	
TLC-30	3.00 +/- 0.05	0.0200"	0.0620"	0.51 mm	1.58 mm
		0.0300"	0.0930"	0.76 mm	2.36 mm
		0.0310"	0.1250"	0.79 mm	3.18 mm
TLC-32	3.20 +/- 0.05	0.0450"	0.1870"	1.14 mm	4.75 mm
		0.0600"	0.2500"	1.52 mm	6.35 mm

Available Sheet Sizes <sup>2</sup>	
12" x 18"	304 mm x 457 mm
16" x 18"	406 mm x 457 mm
18" x 24"	457 mm x 610 mm
16" x 36"	406 mm x 914 mm
24" x 36"	610 mm x 914 mm
Long Laminates	
36" x 60"	914 mm x 1526 mm
36" x 76"	914 mm x 1930 mm
36" x 102"	914 mm x 2590 mm

<sup>1</sup>Other thicknesses may be available. Please call for availability.

<sup>2</sup>Our standard sheet size is 36" x 48" (914 mm x 1220 mm). Please contact our customer service department for availability of other sizes.

Available Copper Cladding						
Designation	Weight	Copper Thickness		R <sub>MS</sub> Treated Side		Description
RH	1/2 oz / ft <sup>2</sup>	~0.0007"	~18 µm	16 µin	0.4 µm	Rolled annealed
R1	1 oz / ft <sup>2</sup>	~0.0014"	~35 µm	11 µin	0.3 µm	Rolled annealed
CLH	1/2 oz / ft <sup>2</sup>	~0.0007"	~18 µm	13 µin	0.3 µm	Reverse treated / Electrodeposited
CL1	1 oz / ft <sup>2</sup>	~0.0014"	~35 µm	13 µin	0.3 µm	Reverse treated / Electrodeposited
CVH (CH)	1/2 oz / ft <sup>2</sup>	~0.0007"	~18 µm	27 µin	0.7 µm	Very low profile / Electrodeposited
CV1 (C1)	1 oz / ft <sup>2</sup>	~0.0014"	~35 µm	25 µin	0.6 µm	Very low profile / Electrodeposited
C2	2 oz / ft <sup>2</sup>	~0.0028"	~70 µm	77 µin	2.0 µm	Electrodeposited

Heavy metal claddings (aluminum, brass & copper) may also be available upon request. Please call for information.

An example of our part number is: **TLC-32-0310-CV1/CV1 - 18" x 24" (457 mm x 610 mm)**

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