

Advanced PCB Materials

Product Selection Guide

This Selection Guide provides a sampling of the thousands of product configurations Taconic offers. If your design requires a specialized laminate or prepreg, please contact Taconic to discuss your application.

Taconic High Performance Materials - Typical Values

Part #	Composition	Dk	Df	Volume Resistivity Mohm/cm	Surface Resistivity Mohm	Flex Strength kpsi		Moisture Absorption %	Thermal Conductivity W/M*K	CTE * ppm/°C			Peel Strength lbs/in Very Low Profile Cu
						MD	CD			x	y	z	CV 1
TLY-5A	PTFE - Glass	2.17 ^(a)	0.0009 ^(a)	10 ¹⁰	10 ⁹	14	13	<0.02	0.22	20	20	280	12
TLP-5	PTFE - Glass	2.20 ^(a)	0.0009 ^(a)	10 ⁷	10 ⁷	>12	>10	<0.02	0.22	20	20	280	10
TLY-5	PTFE - Glass	2.20 ^(a)	0.0009 ^(a)	10 ¹⁰	10 ⁸	14	13	<0.02	0.22	20	20	280	12
TLY-3	PTFE - Glass	2.33 ^(a)	0.0012 ^(a)	10 ¹⁰	10 ⁸	14	13	<0.02	0.22	20	20	280	12
TLX-0, 9, 8, 7, 6	PTFE - Glass	2.45 - 2.65 ^(a)	0.0015 - 0.0021 ^(c)	10 ¹⁰	10 ⁸	>23	>17	<0.02	0.22	9	12	140	12
TLA-6 (KTC)	PTFE - Glass	2.65	0.0017	10 ¹²	10 ¹⁴	13	12	0.02	0.19	9	12	140	>10
fastFilm™27 (FF-27) [‡] (TP)	PTFE Ceramic - Film	2.70	0.0012	10 ⁸	10 ⁸	4	4	0.03	0.34	29	28	112	16
TLC-30, 32 (TP, KTC) TLC-338, 35 (TP)	PTFE - Glass	3.00 - 3.50 ^(a)	0.0023 - 0.0037	10 ⁸	10 ⁸	24	19	<0.02	0.24	9	12	70	12
TLE-95	PTFE - Glass	2.95 ^(a)	0.0026 ^(a)	10 ⁹	10 ⁷	>24	>18	<0.02	0.28 ^(c)	9	12	70	12
RF-301	PTFE Ceramic - Glass	2.97 ^(b)	0.0012 ^(b)	10 ⁹	10 ⁸	11	9	0.02	0.23	17	20	150	10
RF-30	PTFE Ceramic - Glass	3.00 ^(b)	0.0014 ^(b)	10 ⁹	10 ⁸	20	16	0.02	0.20	11	21	208	10
TSM-DS3 (TP)	PTFE Ceramic - Glass	3.00 ^(a)	0.0011 ^(a)	10 ⁸	10 ⁶	12	8	0.07	0.65	10	16	23	8
TLF-34, 35 (KTC)	PTFE Ceramic - Glass	3.40 ^(b) , 3.50 ^(b)	0.0020 ^(c)	10 ⁹	10 ⁸	19	15	0.02	0.36	21	23	85	>10
RF-35TC (TP)	PTFE Ceramic - Glass	3.50 ^(c)	0.0011 ^(c)	10 ⁸	10 ⁷	13	12	0.05	0.60 [†] / 0.92 ^{††}	11	13	34	7
RF-35	PTFE Ceramic - Glass	3.50 ^(b)	0.0018 ^(b)	10 ⁹	10 ⁸	>22	>18	0.03	0.32 ^(c)	19	24	64	10
RF-35A2	PTFE Ceramic - Glass	3.50 ^(b)	0.0011 ^(b) 0.0015 ^(c)	10 ⁹	10 ⁸	16	8	0.03	0.29	8	10	104	12
RF-35P	PTFE Ceramic - Glass	3.50 ^(b)	0.0022 ^(b)	10 ⁷	10 ⁷	>28	>16	0.03	0.33 ^(c)	15	15	110	10
RF-41, 43, 45 (TP)	PTFE Ceramic - Glass	4.10 - 4.50 ^(d)	0.0033 - 0.0038 ^(c)	10 ⁸	10 ⁶	21	19	≤0.02, ≤0.02, ≤0.04	0.29, 0.30 0.33	9	12	96	8
TRF-43, 45 (KTC)	PTFE Ceramic - Glass	4.30, 4.50	0.0035	10 ⁷	10 ⁷	17	15	0.06	0.43	9	9	40	>8
RF-60A	PTFE Ceramic - Glass	6.15 ^(d)	0.0038 ^(a)	10 ⁸	10 ⁸	>18	>15	0.02	0.40	9	8	69	8
RF-60TC (KTC)	PTFE Ceramic - Glass	6.15 ^(c)	0.0020 ^(c)	10 ⁸	10 ⁸	10	9	0.03	0.90 [†] / 1.05 ^{††}	10	10	40	8
CER-10 (0.0620")	PTFE Ceramic - Glass	10.00 ^(d)	0.0035 ^(a)	10 ⁸	10 ⁹	>17	>16	<0.04	0.63	13	15	46	9

Prepregs/Bonding Films

FEP	Thermoplastic Film	2.00	0.0003										
HT-1.5	Thermoplastic Film	2.35	0.0025	10 ¹²	10 ¹⁰			0.01	0.22				
fastRise™ 27 (FR-27) [‡] (TP)	Prepreg/Thermoset	2.70 ^(c)	0.0014 ^(c)	10 ⁸	10 ⁸			0.08	0.25	59	70	72	
fastRise™ DS (FR-DS) [‡] (TP)	Prepreg/Thermoset	2.96	0.0018	10 ⁸	10 ⁶	>17	>8	0.10	0.36	11	17	66	
TPN-30 (KTC)	Prepreg/Thermoset	3.00	0.0038 ^(c)	10 ⁸	10 ⁹	20	15	0.13	0.25	21	23	108	
TPG-30, 35	Prepreg/Thermoset	3.00 ^(c) , 3.50 ^(c)	0.0038 ^(c) , 0.0050 ^(c)	10 ⁸	10 ⁹	20	15	0.13	0.25	21	23	108	
fastRise™ 77 (FR-77) [‡] (TP)	Prepreg/Thermoset	7.70	0.0034	10 ⁵	10 ⁵	>15	>7	0.10	0.43	10	17	62	

(KTC): Product manufactured exclusively at Korea Taconic Company, Republic of Korea
(TP): Product manufactured exclusively at Taconic Headquarters, Petersburg, NY

- (a) Measured by IPC-TM-650 method 2.5.5.5 (stripline resonator) at 10 GHz
(b) Measured by IPC-TM-650 method 2.5.5.5.1 (modified stripline) at 1.9 GHz
(c) Measured by IPC-TM-650 method 2.5.5.5.1 (modified stripline) at 10 GHz
(d) Measured by IPC-TM-650 method 2.5.5.6 (full sheet resonant)
(e) Measured by ASTM E1461

*CTE values vary by temperature range of measurement. Please inquire for specific product temperature range.

UL Rating for all products: 94 V-O except products designated with [‡]

[†] Unclad ^{††} 1 oz. copper

Copper Cladding							
Copper Designation	Surface Roughness R_{MS} Treated side		Surface Roughness R_{MS} Untreated side		Description	Thickness	
	Microinches	Microns	Microinches	Microns		Mils	Microns
RH	12	0.3	12	0.3	Rolled-Annealed ½ oz	0.7	17.5
R1	10	0.3	7	0.2	Rolled-Annealed 1 oz	1.4	35.0
CFH	19	0.5	14	0.35	Electrodeposited ½ oz	0.7	17.5
CF1	12	0.32	13	0.33	Electrodeposited 1 oz	1.4	35.0
CLH	13	0.3	20	0.5	Reverse Treated Electrodeposited ½ oz	0.7	17.5
CL1	13	0.3	25	0.6	Reverse Treated Electrodeposited 1 oz	1.4	35.0
CEH	19	0.5	13	0.3	High Ductility Very Low Profile Electrodeposited ½ oz	0.7	18.0
CE1	19	0.5	13	0.3	High Ductility Very Low Profile Electrodeposited 1 oz	1.4	35.0
CVH (CH)	27	0.7	11	0.3	Very Low Profile Electrodeposited ½ oz	0.7	17.5
CV1 (C1)	25	0.6	11	0.3	Very Low Profile Electrodeposited 1 oz	1.4	35.0
C2	77	2.0	8	0.2	Electrodeposited 2 oz	2.8	70.0

OhmegaPly®, Ticer® and other resistive foils available upon request. Please contact Taconic for availability.

OhmegaPly® is a registered trademark of Ohmega Technologies, Inc. Ticer® is a registered trademark of Ticer Technologies.

Heavy Metal Cladding - Available Upon Request				
Heavy Metal	Specific Gravity g/cm ³	Thermal Conductivity W/M*K	CTE ppm/°C	Machinability
Brass	8.5	120	20	Very Good
Copper	8.9	390	17	Good
Aluminum	2.7	180	24	Fair

Specialty Products

TacLamplus® is a cost-effective, laser ablatable, non-reinforced microwave substrate that is ideal for very low loss structures, MMIC packaging and mm-wave sensors.

TacLamplus®			
Material	Dk	Thickness	
		inches	mm
TacLamplus®	2.10	Increments of 0.0040	Increments of 0.100

fastRise™ Prepreg

Product	Pressed Thickness ¹ (mil)	Pressed Thickness ¹ (mil)	Pressed Thickness ¹ (mil)	Nominal Dk (Observed Range ²) (10 GHz)	Typical Flow (%)
FR-25-0021-45	2.1	1.0	1.0	2.49	18
FR-26-0025-60	2.7	1.3	1.0	2.60 (2.52-2.66)	20
FR-27-0030-25	3.5	2.1	1.8 (Caution)	2.78 (2.71-2.82)	4
FR-27-0035-66	3.7	2.5	2.1	2.66 (2.59-2.70)	30
FR-27-0040-25	4.9	3.7	3.2 (Caution)	2.76 (2.74-2.77)	4
FR-27-0040-43F	4.3	3.7	3.2 (Caution)	2.79	2
FR-28-0040-50	4.9	3.7	3.5	2.81 (2.78-2.84)	23
FR-27-0042-75	5.2	4.0	3.5	2.70	35
FR-27-0045-35	5.8	4.6	4.2	2.74 (2.73-2.77)	13
FR-27-0050-40	6.1	5.5	4.9	2.77 (2.71-2.83)	23

¹fastRise™ part numbers will yield a thickness variation of ≤ 4.5% for a range of 9% in a fixed condition.

²The fastRise™ part numbers with low flow show a very tight Dk tolerance. The high flow fastRise™ part numbers show a greater Dk deviation that is more related to the nature of the IPC flow test and the fact that extreme flow occurs during lamination and some resin escapes the edges.

Common Thicknesses & Tolerances

Additional thicknesses & tolerances are available upon request

Product	Available Thickness		Thickness Tolerance	
	(inches)	(mm)	(inches)	(mm)
TLY-3, 5, 5A	0.0035	0.09		
	0.0050 (TLY-3, 5)	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
TLX (TLT)-6, 7, 8, 9, 0	0.0017	0.04		
	0.0050	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
TLA-6	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0570	1.45	+/- 0.0020	+/- 0.05
TLE-95	0.0015	0.04	+/- 0.0002	+/- 0.005
	0.0035	0.09	+/- 0.00025	+/- 0.006
	0.0052	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
TLC-30, 32	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0450	1.14	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.0930	2.36	+/- 0.0030	+/- 0.08
RF-301	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
RF-30	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
TSM-DS3	0.0050	0.13	+/- 0.0005	+/- 0.013
	0.0100	0.25	+/- 0.0010	+/- 0.025
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0020	+/- 0.05
TLF-34, 35	0.0100	0.25	+/- 0.0010	+/- 0.025
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05

Product	Available Thickness		Thickness Tolerance	
	(inches)	(mm)	(inches)	(mm)
RF-35	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
RF-35A2	0.0050	0.13	+/- 0.0005	+/- 0.013
	0.0100	0.25	+/- 0.0010	+/- 0.025
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0020	+/- 0.05
RF-41	0.0600	1.52	+/- 0.0020	+/- 0.05
	0.1250	3.18	+/- 0.0035	+/- 0.09
RF-43	0.0100	0.25	+/- 0.0010	+/- 0.025
	0.0200	0.51	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0015	+/- 0.04
	0.0620	1.58	+/- 0.0020	+/- 0.05
RF-45	0.1250	3.18	+/- 0.0035	+/- 0.09
	0.0200	0.51	+/- 0.0020	+/- 0.05
RF-45	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.1250	3.18	+/- 0.0035	+/- 0.09
	0.0080	0.20	+/- 0.0010	+/- 0.025
TRF-43, 45	0.0320	0.81	+/- 0.0020	+/- 0.05
	0.0640	1.63	+/- 0.0035	+/- 0.09
	0.1200	3.05	+/- 0.0049	+/- 0.125
RF-60A	0.0100	0.25	+/- 0.0010	+/- 0.025
	0.0250	0.64	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0500	1.27	+/- 0.0030	+/- 0.08
Cer-10	0.0600	1.52	+/- 0.0030	+/- 0.08
	0.1250	3.18	+/- 0.0040	+/- 0.10
	0.0110	0.28	+/- 0.0010	+/- 0.025
	0.0250	0.64	+/- 0.0020	+/- 0.05
Cer-10	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0470	1.19	+/- 0.0030	+/- 0.08
	0.0620	1.58	+/- 0.0030	+/- 0.08
	0.1250	3.18	+/- 0.0040	+/- 0.10

Standard Sizes (Additional Sizes Available)			
Typical Size		Long Laminates	
Inches	mm	Inches	mm
36 W x 48 L	914 W x 1220 L	36 W x 60 L 36 W x 76 L 36 W x 102 L	914 W x 1524 L 914 W x 1930 L 914 W x 2590 L

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. The above information creates no express or implied warranties.

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