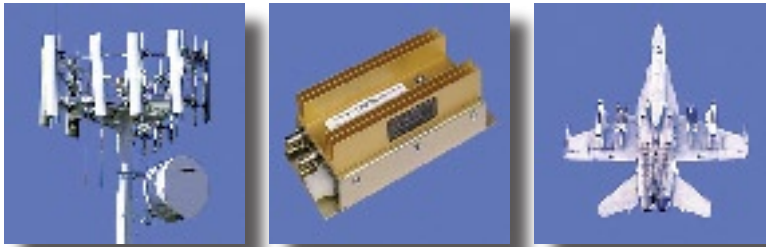




High Performance Laminates Guide



North & South America

Taconic - Headquarters
Petersburgh, NY 12138
Tel: 518-658-3202 / 1-800-833-1805
Web: www.taconic-add.com
Email: addinfo@4taconic.com

Europe

Tel: +353-44-9395600
Web: www.taconic-add.com
Email: add@4taconic.com

Asia

Tel: +82-31-704-1858
Web: www.taconic-add.com
Email: ktc@4taconic.com

Taconic High Performance Laminate Properties

Part #	Composition	DK	DF	Volume Resistivity Mohm/cm	Surface Resistivity Mohm	Flexural Strength K psi		Moisture Absorption %	Thermal Conductivity W/m/K	Coefficient of Thermal Expansion ppm/°C			Peel Strength lbs/in 1 oz Cu
						MD	CD			x	y	z	
TLY-5A	PTFE Woven Glass	2.17 ^(a)	0.0009 ^(a)	10 ⁷	10 ⁷	>12	>10	<0.02	0.22	20	20	280	12
TLY-5	PTFE Woven Glass	2.20 ^(a)	0.0009 ^(a)	10 ⁷	10 ⁷	>12	>10	<0.02	0.22	20	20	280	12
TLY-3	PTFE Woven Glass	2.33 ^(a)	0.0012 ^(a)	10 ⁷	10 ⁷	>12	>10	<0.02	0.22	20	20	280	12
HT 1.5	Bonding Film	2.35	0.0025					0.005					
TLX-0	PTFE Woven Glass	2.45 ^(a)	0.0019 ^(a)	10 ⁷	10 ⁷	>23	>19	<0.02	0.14	9	12	140	12
TLX-9	PTFE Woven Glass	2.50 ^(a)	0.0019 ^(a)	10 ⁷	10 ⁷	>23	>19	<0.02	0.14	9	12	140	12
TLX-8	PTFE Woven Glass	2.55 ^(a)	0.0019 ^(a)	10 ⁷	10 ⁷	>23	>19	<0.02	0.14	9	12	140	12
TLX-7	PTFE Woven Glass	2.60 ^(a)	0.0019 ^(a)	10 ⁷	10 ⁷	>23	>19	<0.02	0.14	9	12	140	12
TLX-6	PTFE Woven Glass	2.65 ^(a)	0.0019 ^(a)	10 ⁷	10 ⁷	>23	>19	<0.02	0.14	9	12	140	12
TLC-27	PTFE Woven Glass	2.75 ^(a)	0.0030 ^(a)	10 ⁷	10 ⁷	>40	>35	<0.02	0.24	9	12	70	12
TLE-95	PTFE Woven Glass	2.95 ^(a)	0.0030 ^(a)	10 ⁷	10 ⁷	>35	>30	<0.02	0.24	9	12	70	12
TLC-30	PTFE Woven Glass	3.00 ^(a)	0.0030 ^(a)	10 ⁷	10 ⁷	>40	>35	<0.02	0.24	9	12	70	12
TacPreg TPG-30	Prepreg	3.00	0.0038					0.13					
TacLam TLG-30	PTFE Ceramic BT Woven Glass	3.00	0.0026	8.2 x 10 ⁷	1.5 x 10 ⁶	20	22.1	0.16	0.27	8	12	61	13
RF-30	PTFE Ceramic Woven Glass	3.00 ^(b)	0.0014 ^(b)	1.3 x 10 ⁹	1.5 x 10 ⁸	>13	>9	<0.02	0.20	11	21	125	>10
TSM-30	PTFE Ceramic Woven Glass	3.00 ^(c)	0.0015 ^(c)	2.5 x 10 ⁸	5.6 x 10 ⁷	>6.9	>6	0.03	0.27	23	28	78	8
TLC-32	PTFE Woven Glass	3.20 ^(a)	0.0030 ^(a)	10 ⁷	10 ⁷	>40	>35	<0.02	0.24	9	12	70	12
TacPreg TPG-32	Prepreg	3.20	0.0050					0.22					
TacLam TLG-32	PTFE Ceramic BT Woven Glass	3.20 ^(c)	0.0030 ^(c)	8.2 x 10 ⁷	1.5 x 10 ⁶	20	22.1	0.16	0.27	8	12	61	13
TacLam TLG-34	PTFE Ceramic BT Woven Glass	3.38 ^(c)	0.0031 ^(c)	8.2 x 10 ⁷	1.5 x 10 ⁶	20	22.1	0.16	0.27	8	12	61	13
TacPreg TPG-35	Prepreg	3.50	0.0050					0.13					
TacLam TLG-35	PTFE Ceramic BT Woven Glass	3.50 ^(c)	0.0030 ^(c)	8.2 x 10 ⁷	1.5 x 10 ⁶	20	22.1	0.16	0.27	8	12	61	13
RF-35	PTFE Ceramic Woven Glass	3.50 ^(b)	0.0018 ^(b)	1.3 x 10 ⁹	1.5 x 10 ⁸	>22	>18	0.02	0.24	19	24	64	>10
RF-35A	PTFE Ceramic Woven Glass	3.50 ^(b)	0.0016 ^(b)	1.37x 10 ⁹	3.54 x 10 ⁸	24	14	0.03	0.28	10	13	106	12
RF-35P	PTFE Ceramic Woven Glass	3.50 ^(b)	0.0025 ^(b)	5.0 x 10 ⁸	3.5 x 10 ⁷	>28	>16	0.03	0.27	15	15	110	>10
RF-41	PTFE Ceramic Woven Glass	4.10 ^(d)	0.0038 ^(c)	1.4 x 10 ⁸	1.2 x 10 ⁷	20.7	18.5	<0.02	0.29	9	12	93	8
RF-43	PTFE Ceramic Woven Glass	4.30 ^(d)	0.0033 ^(c)	6.7 x 10 ⁷	6.2 x 10 ⁵	20.1	18.8	≤0.02	0.30	9	11	96	7
RF-45	PTFE Ceramic Woven Glass	4.50 ^(d)	0.0037 ^(c)	1.4 x 10 ⁸	3.3 x 10 ⁶	20.7	19.3	≤0.04	0.33	9	13	96	9
RF-60A	PTFE Ceramic Woven Glass	6.15 ^(d)	0.0028 ^(a)	9.0 x 10 ⁸	2.3 x 10 ⁸	>18.3	>14.6	0.02	0.54	9	8	69	8
CER-10 (0.0620)	PTFE Ceramic Woven Glass	10.0 ^(d)	0.0035 ^(a)	2.1 x 10 ⁸	1.1 x 10 ⁸	>16.5	>15.5	0.02	0.63	13	15	46	>5

UL Rating for all products: 94 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.

^(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)

Copper Cladding

Copper Designation	Surface Roughness R_{MS} Treated side		Surface Roughness R_{MS} Untreated side		Description	Thickness	
	Microinches	Microns	Microinches	Microns		Mils	Micrometers
RH	16	0.4	7	0.2	Rolled-Annealed 1/2 oz	0.7	17.5
R1	11	0.3	7	0.2	Rolled-Annealed 1 oz	1.4	35.0
CLH	13	0.3	20	0.5	Reverse treated Electrodeposited 1/2 oz	0.7	17.5
CL1	13	0.3	25	0.6	Reverse treated Electrodeposited 1 oz	1.4	35.0
CVH (CH)	27	0.7	11	0.3	Very Low Profile Electrodeposited 1/2 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

Omega Ply® and other resistive foils available upon request. Please call for availability of other foils.

Heavy Metal Cladding

The following heavy metal claddings are available upon request.

Heavy Metal	Specific Gravity	Thermal Conductivity W/m/K	Coefficient of Thermal Expansion ppm/°C	Machinability
Brass	8.5	120	20	Good
Copper	8.9	390	17	Fair
Aluminum	2.7	180	24	Poor

Typical Sizes*

Typical Size		Long Laminates		Cut Sizes	
36" x 48"	914mm x 1220mm	36" x 60"	914mm x 1524mm	12" x 18"	304mm x 457mm
		36" x 76"	914mm x 1930mm	16" x 18"	406mm x 457mm
		36" x 102"	914mm x 2590mm	18" x 24"	457mm x 610mm
				16" x 36"	406mm x 914mm
				24" x 36"	610mm x 914mm

*Other sizes available upon request

Specialty Products

HyRelex™ Prepregs & Laminates

Taconic's family of low loss, high reliability, flexible laminates and bonding materials.

HyRelex Laminates			
Material	DK	Thicknesses	
		(')	(mm)
TF-260	2.60	0.0010, 0.0020,	0.03, 0.05,
TF-290	2.90	0.0015, 0.0020,	0.04, 0.05, 0.09
HyRelex Bond-Ply			
Material	DK	Thicknesses	
		(')	(mm)
TPF-27	2.70	0.0045	0.11
TPF-30	3.00	0.0030	0.08
HyRelex Coverlay			
Material	DK	Thicknesses	
		(')	(mm)
TCF-27	2.70	0.0015, 0.0020	0.04, 0.05

TacLamPlus

TacLamPlus is a cost-effective, laser-ablatable, non-reinforced microwave substrate that can be used to create very low loss structures. Applications include MMIC packaging and mm-wave sensors.

Material	DK	Thicknesses	
		(')	(mm)
Taclamplus	2.20	Increments of 0.0020	Increments of 0.05

TacLam® & TacPreg®

Our TacLam & TacPreg materials are available in thin-core constructions for high speed digital, RF multilayer and military applications.

TacLam Laminates			
Material	DK	Thicknesses	
		(')	(mm)
TLG-29	2.90	Increments of 0.0100	Increments of 0.25
TLG-30	3.00	0.0040, 0.0080, 0.0120	0.10, 0.20, 0.30
TacPreg Prepregs			
Material	DK	Thicknesses	
		(')	(mm)
TacPreg TPG-30	3.00	0.0045, 0.0050	0.11, 0.13
TacPreg TPG-32	3.20	0.0045, 0.0050	0.11, 0.13
TacPreg TPG-35	3.50	0.0045	0.11

Standard Sizes & Thicknesses*

Product	Available Thickness		Thickness Tolerance	
	(")	(mm)	(")	(mm)
TLY-3, 5, 5A	0.0050 (TLY-3,5)	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0150	0.38	+/- 0.0010	+/- 0.03
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0250	0.64	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.0900	2.29	+/- 0.0030	+/- 0.08
	0.0930	2.36	+/- 0.0030	+/- 0.08
	0.1250	3.18	+/- 0.0035	+/- 0.09
	0.1870	4.75	+/- 0.0050	+/- 0.13
TacBond HT 1.5	0.0015	0.04		
TLX (TLT)-6, 7, 8, 9, 0	0.0035	0.09	+/- 0.00025	+/- 0.01
	0.0050	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0150	0.38	+/- 0.0010	+/- 0.03
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0250	0.64	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0450	1.14	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.0900	2.29	+/- 0.0030	+/- 0.08
	0.0930	2.36	+/- 0.0030	+/- 0.08
0.1200	3.05	+/- 0.0030	+/- 0.08	
0.1250	3.18	+/- 0.0035	+/- 0.09	
TLC-27	0.0145	0.37	+/- 0.0010	+/- 0.03
TLE-95	0.0015	0.04	+/- 0.00025	+/- 0.01
	0.0035	0.09	+/- 0.00025	+/- 0.01
	0.0052	0.13	+/- 0.0005	+/- 0.01
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0150	0.38	+/- 0.0010	+/- 0.03
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0310	0.79	+/- 0.0020	+/- 0.05
TacPreg TPG-30, 32	0.0045	0.11		
	0.0050	0.13		
TacLam TLG-30, 32, 34, 35	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	as agreed upon between customer and supplier	
	0.1200	3.05	as agreed upon between customer and supplier	
TLC-30, 32	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0450	1.14	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.0930	2.36	+/- 0.0030	+/- 0.08
	0.1250	3.18	+/- 0.0035	+/- 0.09
	0.1870	4.75	+/- 0.0050	+/- 0.13
	0.2500	6.35	+/- 0.0060	+/- 0.15
RF-30	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0110	0.28	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
	0.1000	2.54	+/- 0.0040	+/- 0.10

Product	Available Thickness		Thickness Tolerance	
	(")	(mm)	(")	(mm)
TSM-30	0.0050	0.13	+/- 0.0007	+/- 0.02
	0.0100	0.25	+/- 0.0010	+/- 0.03
	0.0150	0.38	+/- 0.0015	+/- 0.04
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0020	+/- 0.05
	TacPreg TPG-35	0.0045	0.11	
RF-35	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0600	1.52	+/- 0.0030	+/- 0.08
	0.1250	3.18	+/- 0.0050	+/- 0.13
RF-35A	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	+/- 0.0030	+/- 0.08
	0.1250	3.18	+/- 0.0040	+/- 0.10
RF-35P	0.0020	0.05	+/- 0.0005	+/- 0.01
	0.0040	0.10	+/- 0.0005	+/- 0.01
	0.0060	0.15	+/- 0.0005	+/- 0.01
	0.0080	0.20	+/- 0.0007	+/- 0.02
	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0140	0.36	+/- 0.0010	+/- 0.03
	0.0200	0.51	+/- 0.0015	+/- 0.04
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	+/- 0.03
	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	0.0200	0.51	+/- 0.0015	+/- 0.04
	0.0250	0.64	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0620	1.58	+/- 0.0020	+/- 0.05
	0.1250	3.18	+/- 0.0035	+/- 0.09
RF-60A	0.0100	0.25	+/- 0.0007	+/- 0.02
	0.0250	0.64	+/- 0.0020	+/- 0.05
	0.0310	0.79	+/- 0.0020	+/- 0.05
	0.0500	1.27	+/- 0.0030	+/- 0.08
	0.0600	1.52	+/- 0.0030	+/- 0.08
CER-10	0.0040	0.10	+/- 0.0005	+/- 0.01
	0.0080	0.20	+/- 0.0007	+/- 0.02
	0.0110	0.28	+/- 0.0010	+/- 0.03
	0.0150	0.38	+/- 0.0015	+/- 0.04
	0.0250	0.64	+/- 0.0020	+/- 0.05
	0.0300	0.76	+/- 0.0020	+/- 0.05
	0.0470	1.19	+/- 0.0030	+/- 0.08
	0.0500	1.27	+/- 0.0030	+/- 0.08
	0.0620	1.58	+/- 0.0030	+/- 0.08
	0.1000	2.54	+/- 0.0040	+/- 0.10
	0.1250	3.18	+/- 0.0040	+/- 0.10

*Custom sizes & thicknesses available

Contact Us

North & South America

Taconic - Headquarters
136 Coonbrook Road
Petersburgh, NY 12138
Tel: 518-658-3202 / 1-800-833-1805
Fax: 518-658-3988
Web: www.taconic-add.com
Email: addinfo@4taconic.com

Europe

Taconic International Ltd.
Mullingar Business Park
Mullingar, County Westmeath
Republic of Ireland
Tel: +353-44-9395600
Fax: +353-44-9344369
Web: www.taconic-add.com
Email: add@4taconic.com

Asia

Korea Taconic Company
702 Se-Sung Plaza
366-4 Yatap-Dong, Bundang-Ku
SungNam-Si, KyungKi-Do
Republic of Korea
Tel: +82-31-704-1858
Fax: +82-31-704-1857
Web: www.taconic-add.com
Email: ktc@4taconic.com