

## PTFE and other Materials Performance Data

Specifications may change without notice, and customers are strongly advised to satisfy themselves of the suitability of these materials for their application prior to purchase. For ease of use, products are listed in order of ascending dielectric constant.

Dielectric Constant <sup>1</sup>	Supplier	Product	Composition	Dissipation Factor <sup>1</sup>	CTE Z (ppm / K)	Thermal Conduct (W / m / K)	Comment
1.15 – 1.35	Arlon	FoamClad 100 (Now discontinued)	Foam / polymer film	0.00200 – 0.00500	7.5%	–	Properties are thickness & copper weight dependant
1.96 ± 0.04	Rogers	RT / duroid 5880LZ		0.00190	22	N / A	Tested at 10 Ghz
2.08 ± 0.02	Neltec (ex Metclad)	NY9208(IM)	–	0.00060	260	0.272	–
2.1	Polyflon	CuFlon	Pure PTFE	0.00045	129	–	Tested at 18GHz Sheets to 12" x 18"
2.15	Taconic	TLP–5A	PTFE / Woven Fibreglass	0.00090	–	–	Low PIM up to 106
2.17, 2.20 ± 0.02	Arlon	DiClad 880 Also -PIM variant	PTFE / Woven Fibreglass	0.00090	252	0.261	Sheets to 36" x 72"
2.17, 2.20 ± 0.02	Arlon	CuClad 217	PTFE / Woven Fibreglass	0.00090	246	0.261	Sheets to 36" x 36"
2.17, 2.20 ± 0.04	Arlon	IsoClad 917	PTFE / Non-woven Fibreglass	0.00130	236	0.263	Sheets to 36" x 72"
2.17 ± 0.02	Neltec (ex Metclad)	NY9217(IM) (Was MY(IM / ST)–217 and before that MY1)	PTFE / Woven Fibreglass	0.00080	260	0.272	920mm
2.17 – 2.33 ± 0.02	Taconic	TLY	PTFE / Woven Fibreglass	0.00090	290	0.410	Low PIM up to 106
2.20	Taconic	605	PTFE / Woven Fibreglass	–	–	–	Still available but superseded by TLY-5
2.20	Taconic	602	PTFE / Woven Fibreglass	–	–	–	Still available but superseded by TLX-8
2.20 ± 0.020	Rogers	RT / duroid 5880	PTFE / Non-woven Fibreglass	0.00090	–	0.200	–
2.20 ± 0.02	Neltec (ex Metclad)	NY9220 (IM) (Was MY(IM / ST)–220 and before that MY2)	PTFE / Woven Fibreglass	0.00090	260	0.272	Sheets to 1220mm x 920mm
2.32	Polyflon	Polyguide	Polyolefin	0.00020	108	–	Tested at 1MHz Sheets to 22.5" x 32"
2.33 ± 0.020	Rogers	RT / Duroid 5870	PTFE / Non-woven Fibreglass	0.00120	–	0.220	–

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2.33 ± 0.02	Arlon	DiClad 870	PTFE / Woven Fibreglass	0.00130	217	0.257	Tested at X-Band. Sheets to 36" x 72"
2.33 ± 0.02	Arlon	CuClad 233	PTFE / Woven Fibreglass	0.00130	194	0.258	Tested at X-Band. Sheets to 36" x 36"
2.33 ± 0.02	Neltec (ex Metclad)	NY9233 (IM) (Was MY(IM / ST)-233 and before that MY3)	PTFE / Woven Fibreglass	0.00110	260	0.272	Sheets to 1220mm x 920mm
2.33 ± 0.04	Arlon	IsoClad 933	PTFE / Non-woven Fibreglass	0.00140	203	0.263	Tested at X-Band. Sheets to 36" x 72"
2.40 – 2.60 ± 0.05	Arlon	DiClad 522	PTFE / Woven Fibreglass	0.00100	173	0.254	Tested at 1MHz. Sheets to 36" x 72"
2.40 – 2.60 ± 0.04	Arlon	CuClad 250GX	PTFE / Woven Fibreglass	0.00220	177	0.254	Tested at X-Band. Sheets to 36" x 36"
2.40 ± 0.05	CLP	CLP3	–	0.0010	60–80	0.150	24"x48" available
2.40 – 2.60 ± 0.04	Rogers	Ultralam 2000	PTFE / Woven Fibreglass	0.00220 Max	–	–	Sheets to 18" x 48"
2.40 – 2.60 ± 0.04	Arlon	DiClad 527	PTFE / Woven Fibreglass	0.00220	182	0.254	Tested at X-Band. Sheets to 36" x 72"
2.40 – 2.60 ± 0.04	Arlon	CuClad 250GX	PTFE / Woven Fibreglass	0.00220	177	0.254	Tested at X-Band. Sheets to 36" x 36"
2.45 ± 0.04	Neltec (ex Metclad)	NX9245 (IM) (Was MX(IM / ST)-245 and before that MX1)	PTFE / Woven Fibreglass	0.00160	150	0.251	Sheets to 1220mm x 920mm
2.45 – 2.65 ± 0.04	Taconic	TLX	PTFE / Woven Fibreglass	0.00190	130–145	0.140	Tested at 10GHz Dk can be specified in range 2.45 – 2.65 Sheets to 36" x 116" Low PIM
2.50	Taconic	601	PTFE / Woven Fibreglass	–	–	–	Still available but superseded by TLX-9
2.50 ± 0.04	Neltec (ex Metclad)	NY9250(IM) (Was MX(IM / ST)-250 and before that MX2)	PTFE / Woven Fibreglass	0.00160	150	0.251	Sheets to 1220mm x 920mm
2.50 ± 0.05	Arlon	AD 250 Also –PIM variant	Commercial Grade PTFE	0.00300	95	0.235	Sheets to 36" x 72"
2.55	Polyflon	NorCLAD	Thermoplastic (PPO)	0.00110	53	–	Tested at 3GHz. Sheets to 20" x 22"
2.55 ± 0.04	Neltec (ex Metclad)	NY9255(IM) (Was MX(IM / ST)-255 and before that MX3)	PTFE / Woven Fibreglass	0.00180	150	0.251	Sheets to 1220mm x 920mm
2.60 ± 0.04	Neltec (ex Metclad)	NY9260(IM) (Was MX(IM / ST)-260 and before that MX4)	PTFE / Woven Fibreglass	0.00200	150	0.251	Sheets to 1220mm x 920mm
2.60	Sheldahl	ComClad HF	Noryl Plastic	0.00250 – 0.00400	59	0.180 – 0.200	Sheets to 18" x 24" Tested at 1 and 12 GHz
2.60	Gore	Microlam 630	BT resin in a continuous toughening matrix	0.00360	56	–	–
2.70 ± 0.05	Arlon	AD 270	Commercial Grade PTFE	0.00300	95	0.235	Sheets to 36" x 72"
2.75 ± 0.05	Taconic	TLC-27	PTFE / Woven Fibreglass	0.00300	70	0.240	–
2.80 ± 0.05	Isola	Astra	–	0.0017	44	0.32	Tested at 2 Ghz

Dielectric Constant <sup>1</sup>	Supplier	Product	Composition	Dissipation Factor <sup>1</sup>	CTE Z (ppm / K)	Thermal Conduct (W / m / K)	Comment
2.80 ± 0.05	Isola	IS680 – 280	–	0.0025	45	0.32	–
2.86	Gore	Microlam 610	–	0.01600	60	–	Tested at 2.9GHz Also 610XT and XTF
2.94 ± 0.04	Rogers	RT / duroid 6002	PTFE / Ceramic	0.00120	24	0.600	Standard sheet 18" x 24"
2.94 ± 0.04	Rogers	RT / duroid 6202	PTFE / Ceramic	0.00150	–	0.680	–
2.94 Nominal	Arlon	CLTE and CLTE-LC	Ceramic Filled PTFE / Woven Fibreglass	0.00250	38	0.500	Sheets to 36" x 72"
2.94 ± 0.04	Neltec (ex Metclad)	NX9294 (Was MX(IM)–294 and before that MX8)	PTFE / Woven Fibreglass	0.00220	150	0.251	Sheets to 1220mm x 920mm
2.94 ± 0.04	Neltec (ex Metclad)	NH9294 (Was MCX-294)	PTFE / Woven Fibreglass / Ceramic	0.00250	71	0.230	Sheets to 1220mm x 920mm
2.95 ± 0.05	Taconic	TLE-95	PTFE / Woven Fibreglass	0.00190	70	0.200	Mechanically stable
2.95 ± 0.05	Arlon	AD 295	Commercial Grade PTFE	0.00300	95	0.235	Sheets to 36" x 72"
3.0 ± 0.04	Rogers	RO3003	PTFE / Ceramic	0.00130	24	0.500	Standard sheet 18" x 24"
3.00 ± 0.05	Isola	Astra	–	0.0017	44	0.32	Tested at 2 Ghz
3.00 ± 0.05	Neltec	NL9300	–	0.0017	N/A	0.38	Tested at 10 Ghz
3.0 ± 0.1	Taconic	RF-30	PTFE / Ceramic / Glass	0.00140	125	0.200	Tested at 1.9GHz 0.030" and 0.060" thickness Low PIM
3.0 ± 0.05	Taconic	TSM-30	PTFE / Ceramic / Glass	0.00150	78	0.270	Tested at 10GHz Sheets to 36" x 48" Thicknesses in increments of 0.005" Temp stable material
3.00 ± 0.04	Neltec (ex Metclad)	NH9300 (Was MHST-300)	PTFE / Woven Fibreglass / Ceramic	0.00230	71	0.230	Sheets to 1220mm x 920mm
3.00 ± 0.04	Neltec (ex Metclad)	NX9300(IM) (Was MX(IM / ST)–300 and before that MX7)	PTFE / Woven Fibreglass	0.00230	150	0.252	Sheets to 1220mm x 920mm
3.00 ± 0.04	Arlon	CTLE-XT	Ceramic / PTFE	0.00130	–	0.640	–
3.00 ± 0.05	Arlon	AD 300 Also -PIM variant	Commercial Grade PTFE	0.00300	95	0.235	Sheets to 36" x 72"
3.00 ± 0.05	Isola	IS680 – 300	–	0.0030	45	0.32	–
3.00	Neltec	N9300-13 RF	Epoxy thermoset / PTFE	0.00400	67	–	0.020" / 0.030" / 0.060"
3.00 ± 0.06	Rogers	RO3730	–	0.00130 – 0.00160	65	0.450	0.030" (24x18) & 0.060" (24"x54")
3.00 ± 0.08	Rogers	RO4730	LoPro	0.00230 – 0.00330	40	0.520	0.030" (24x18) & 0.060" (24"x54")
3.02 ± 0.04	Rogers	RO3203	PTFE / Woven Fibreglass Ceramic filled	0.00160	58	0.470	Sheets to 24" x 18"
3.05	Polyflon	Copper-Clad ULTEM	Thermoplastic (PEI)	0.00600	56	–	Tested at 3GHz
–	GIL	GML1000	–	–	–	–	Discontinued
–	GIL	GML2032	–	–	–	–	Discontinued

Dielectric Constant <sup>1</sup>	Supplier	Product	Composition	Dissipation Factor <sup>1</sup>	CTE Z (ppm / K)	Thermal Conduct (W / m / K)	Comment
–	GIL	GML1032	–	–	–	–	Discontinued
3.2 ± 0.05	Rogers	RO4232	–	0.00180	46	–	Preliminary data – sheets to 1220mm x 3058mm
3.20 ± 0.04	Neltec (ex Metclad)	NH9320 (Was MHST-320)	PTFE / Woven Fibreglass / Ceramic	0.00240	71	0.230	Sheets to 1220mm x 920mm
3.20 ± 0.04	Neltec (ex Metclad)	NX9320(IM) (Was MX(IM / ST)–320 and before that MX9)	PTFE / Woven Fibreglass	0.00250	71	0.230	Sheets to 1220mm x 920mm
3.20 ± 0.05	Isola	IS680 – 320	–	0.0030	45	0.32	–
3.20 ± 0.05	Taconic	TLC	PTFE / Woven Fibreglass	0.00300	70	–	Standard sheet 36" x 48"; up to 120" Other Dk available upon request
3.20 ± 0.05	Arlon	AD 320 also -PIM variant	Commercial Grade PTFE	0.00300	95	0.235	Sheets to 36" x 72"
3.20 ± 0.05	Arlon	AR 320	Commercial Grade PTFE	0.00300	71	0.230	Sheets to 36" x 72"
3.20 ± 0.05	Neltec	NL9320	–	0.0017	N/A	0.38	Tested at 10 Ghz
3.20	Neltec	N9320-13 RF	Epoxy thermoset / PTFE	0.00450	67	–	0.020" / 0.030" / 0.060"
3.27 ± 0.0032	Rogers	TMM 3	Thermoset Resin / Ceramic	0.00200	23	0.700	Standard sheet 18" x 24"
3.33 ± 0.05	Isola	IS680 – 333	–	0.0030	45	0.32	–
3.3	Krempel	Akaflex PCL	Polyester flexible	0.00520	–	–	Tested at 1KHz
3.3	Neltec	N4000-13 SI	Epoxy / glass fabric	0.00700	3.5%	0.294	–
3.30 ± 0.08	Rogers	RO 4533 LoPro	–	0.00200	37	0.600	Tested at 10 Ghz
3.30 – 3.50	Rogers	RO4500	Ceramic-filled, glass-reinforced	0.00200 – 0.00320	–	0.600	–
3.38 ± 0.06	Arlon	25N (To be discontinued Dec '15)	Thermoset Resin with Ceramic filler	0.00250	52	0.450	Low Loss Ceramic-filled Thermoset Resin
3.38 ± 0.04	Neltec (ex Metclad)	NH9388 (Was MHST-338)	PTFE / Woven Fibreglass / Ceramic	0.00300	71	0.230	Sheets to 1220mm x 920mm
3.38 ± 0.05	Isola	IS680 – 338	–	0.0035	45	0.32	–
3.38 ± 0.05	Rogers	RO4003C	Glass reinforced / hydrocarbon / ceramic (Non PTFE)	0.00270	46	0.640	–
3.38	Neltec	N9338-13 RF	Epoxy thermoset / PTFE	0.00460	67	–	0.020" / 0.030" / 0.060"
3.40	Taconic	RF-34	Organic / Ceramic	0.00340	110	0.230	–
3.40	Taconic	TLF34	–	0.00160	85	0.360	Tested at 10 Ghz
3.40 ± 0.08	Rogers	RO 4534 LoPro	–	0.00220	46	0.60	Tested at 10Ghz
3.4	Gore	Microlam 410	–	0.00800	19	0.460 – 0.580	–

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3.4	Krempel	Akaflex KCL	Polyimide flexible	0.00180	–	–	Tested at 1KHz
3.45 ± 0.05	Isola	IS680 – 345	–	0.0035	45	0.32	–
3.48 ± 0.04	Neltec (ex Metclad)	NH9348 (Was MHST-348 and before that MX12)	PTFE / Woven Fibreglass / Ceramic	0.00300	71	0.230	Sheets to 1220mm x 920mm
3.48 ± 0.05	Rogers	RO4350B	Glass reinforced / hydrocarbon / ceramic (Non PTFE)	0.00370	50	0.620	Sheets to 48" x 36"
3.50 ± 0.05	Neltec (ex Metclad)	N9350 (Mercurywave)	–	0.00400	48	0.500	–
3.50 ± 0.05	Rogers	RO3035	PTFE / Woven Fibreglass Ceramic filled	0.00170	24	0.500	–
3.50	Taconic	TLF35	–	0.00160	85	0.360	Tested at 10 GHz
3.50 ± 0.01	Taconic	RF-35	PTFE / Ceramic loaded / Woven Fibreglass	0.00180	64	0.240	Tested at 1.9GHz Also RF-35A and -35P
3.50 ± 0.05	Taconic	RF35A2	–	0.00160 – 0.00180	106	0.282	–
3.5 ± 0.05	Arlon	AD350A	Glass, PTFE and Micro-dispersed Ceramic	0.00300	35	0.450	Sheets 36" x 48"
3.5	Dupont	Type 100 HN Film	Kapton	0.00260	20	0.120	Tested at 1KHz
3.50	Neltec	N9350-13 RF	Epoxy thermoset / PTFE	0.00550	67	–	0.020" / 0.030" / 0.060"
3.50 ± 0.05	Neltec	NL9350	–	0.0017	N/A	0.38	Tested at 10 Ghz
–	GIL	MC3D	–	–	–	–	Discontinued
3.50 ± 0.04	Neltec (ex Metclad)	NH9350 (Was MHST-350)	PTFE / Woven Fibreglass / Ceramic	0.00300	71	0.230	Sheets to 1220mm x 920mm
–	Isola	Gigaver 210	–	–	–	–	Discontinued
3.58 ± 0.06	Arlon	25FR (To be discontinued Dec '15)	Thermoset Resin with Ceramic filler	0.00350	59	0.450	Low loss Ceramic-filled Thermoset Resin
3.60 ± 0.05	Arlon	AD 360	Commercial Grade PTFE	0.00300	95	0.235	Sheets to 36" x 72"
3.6 – 3.75	Hitachi	MCL-LX-67F	–	0.00300 – 0.00350	12–17	–	Tested at 1 GHz
3.6 – 4.2	GE	GETEK ML200 / RG200	Epoxy and polyphenylene oxide resins	0.01000 – 0.01500	3.8%	–	Tested at 1 MHz
3.61 / 3.39max	Rogers	SYRON™ 7100	–	0.00600 Max	57	0.300	0.002" / 0.004"
3.70	Arlon	Multiclad HF	–	0.00450	150	0.640	Tested at 10 GHz
3.7	Neltec	N4000-13	Epoxy / glass fabric	0.00800	3.5%	0.350	–
3.75	Arlon	Multiclad HF	–	0.00400	150	0.640	Tested at 1 MHz
3.75	Isola	ISO620	–	0.00380	120	TBD	Tested at 10 GHz
–	Isola	Gigaver 410	–	–	–	–	Discontinued
4.10 ± 0.15	Taconic	TRF41	–	0.00380	93	0.290	Low Loss alternative to FR-4

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4.30 ± 0.15	Taconic	TRF43	–	0.00330	96	0.300	Low Loss alternative to FR-4
4.50 ± 0.10	Neltec	NH9450	–	0.00300	71	0.230	Tested at 10 Ghz
4.50 ± 0.15	Taconic	TRF45	–	0.00370	96	0.330	Low Loss alternative to FR-4
4.5 ± 0.045	Rogers	TMM 4	Thermoset Resin / Ceramic	0.00200	21	0.700	–
4.5 Nominal	Arlon	AR 450	Ceramic Filled PTFE	0.00260	102	0.320	Sheets to 36" x 72"
4.5 – 4.9	Various	FR-4 / FR-5	Epoxy / glass fabric	0.01300 – 0.02000	110 – 160	–	Typical values at 1 MHz based on Isola's Duraver-E-Cu grade 104 Dk at 10 GHz in range 3.7 – 4.1. Loss factor is constant with frequency
6.00 ± 0.080	Rogers	TMM 6	Thermoset Resin / Ceramic	0.00230	26	0.720	Standard sheet 18" x 24"
6.0 Nominal	Arlon	AR 600	Ceramic Filled PTFE	0.00350	62	0.431	Sheets to 36" x 72"
6.15 ± 0.150	Rogers	RT / duroid 6006	PTFE / Ceramic	0.00270	–	0.480	Panels to 20" x 20"
6.15 ± 0.15	Rogers	RO3006	PTFE / Ceramic	0.00200	24	0.610	Standard sheet 18" x 24"
6.15 ± 0.15	Rogers	RO4360	–	0.00380	N / A	0.800	Tested at 10GHz
6.15 ± 0.25	Rogers	RO3206	PTFE / Woven Fibreglass Ceramic filled	0.00270	45	0.630	Sheets to 24" x 18"
6.15 ± 0.25	Taconic	RF-60	Organic-Ceramic	0.00280	75	0.430	–
9.20 ± 0.230	Rogers	TMM 10	Thermoset Resin / Ceramic	0.00220	20	0.760	Standard sheet 18" x 24"
9.80 ± 0.245	Rogers	TMM 10i	Thermoset Resin / Ceramic	0.00310	20	0.760	Panels to 20" x 20"
10.0 Nominal	Arlon	AR 1000	Ceramic Filled PTFE	0.00350	37	0.645	Sheets to 36" x 72"
10 Nominal	Taconic	CER-10	PTFE / Ceramic loaded Woven Fibreglass	0.00350	46	0.290	Sheets to 36" x 72"
10.2 ± 0.250	Rogers	RT / duroid 6010 / 6010LM	PTFE / Ceramic	0.00230	24	0.780	–
10.2 ± 0.5	Rogers	RO3210	PTFE / Woven Fibreglass Ceramic	0.00270	34	0.810	Sheets to 24" x 72"
10.2 ± 0.30	Rogers	RO3010	PTFE / Ceramic	0.00230	24	0.66	Standard sheet 18" x 24"

If you have any comments, suggestions, or new materials that you would like added, please email us: [enquiries@trackwise.co.uk](mailto:enquiries@trackwise.co.uk)

**Notes:**

1. Measurements made at 10GHz unless otherwise stated.