



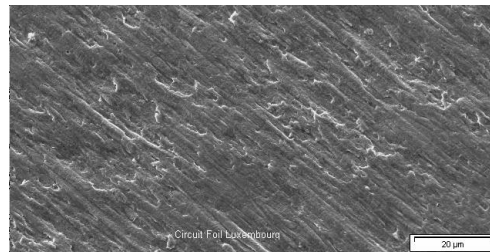
TWLS

Technical Characteristics

TWLS represents an advanced arsenic free high performance matte-side treated copper foil designed to provide improved bond strength on high T_g substrates and very low loss resin systems. The base foil is characterized by enhanced high temperature elongation properties [IPC-Grade 3] and thermally stable microstructure.

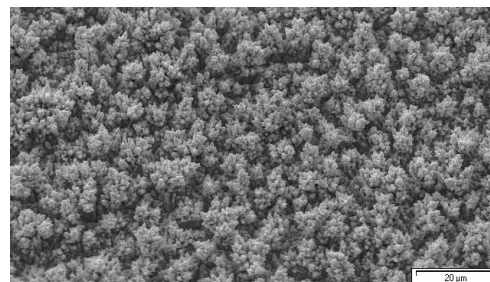
The product is designed for external layer re-lamination on very low Dk prepregs with reduced transmission losses.

Typical applications include today's commercial RF and microwave printed circuit designs, cost-effective alternatives to PTFE and high speed digital servers and communication devices.



Shiny side

Treated matte side



Typical average properties*

TWLS						
MEASURED PARAMETERS	UNITS	PRODUCT GAUGE			IPC	
Nominal Thickness	μm oz.	12 3/8	18 1/2	35 1	Specification IPC-4562A	Test Method IPC-TM-650
Area Weight	oz/ft ²	0.35	0.51	0.96	(a)1.2.5, table 1-1	2.2.12
	g/m ²	108	157	292	(b)3.4.4	
	g/254 in ²	17.7	25.7	47.9	(c)4.6.3	
Untreated Side Roughness (Ra)		0.20 - 0.40 (8 - 16)			3.5.6	2.2.17
Treated Side Roughness Rz	ISO	5 - 7 (197 - 276)	6.5 - 8.5 (256 - 335)	7 - 11 (276 - 433)	3.4.5	
	JIS	4.1 - 5.8 (161 - 228)	5.4 - 7.1 (213 - 280)	5.8 - 9.3 (228 - 366)	-	
Tensile Strength Transverse at RT	MPa (k.Lb/in ²)	≥ 276 (≥ 40)			3.5.1	2.4.18
Tensile Strength Transverse at 180 °C		≥ 138 (≥ 20)				
Elongation Transverse at RT	%	≥ 3	≥ 6		3.5.3	
Elongation Transverse at 180 °C		≥ 2	≥ 3			
Peel Strength (RT) ^[1]						
FR-4	N/mm (Lb/in)	≥ 1.3 (≥ 7.4)	≥ 1.5 (≥ 8.6)	≥ 1.7 (≥ 9.7)	3.5.4	2.4.8
High Temp. Tarnish Resistance	-	120 min @ 180 °C in air: pass			-	
Solderability	-	Complies with IPC specification			3.6.3	2.4.12

[1] Laminate construction with thickness ≥ 0.5 mm

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* All of this Technical Information has been determined with due care and thoroughness. However, because the conditions of use and process and application technologies employed can substantially vary, the provided data and figures can only serve as non-binding guidelines. They do not constitute a guarantee that the purchased item will possess certain attributes. For this reason, no liability whatsoever can be assumed for them. The buyer is obliged to check the suitability of all supplied products.