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**NAN YA PLASTICS CORPORATION**  
ELECTRONIC MATERIALS DIVISION.  
**COPPER CLAD LAMINATE DEPARTMENT**

**Glass cloth base epoxy resin  
flame retardant copper clad laminate**

NO. 201. TUNG HWA N. ROAD,  
TAIPEI, TAIWAN.

**NP-170TL**

**FEATURES**

- High Tg 170°C (DSC)
- Excellent dimensional stability and through-hole reliability
- Excellent electrical, chemical and heat resistance properties
- IPC-4101B specification is applicable
- U. L designation: ANSI grade FR-4
- U.L file number E98983
- Outstanding heat resistance
- High luminance of multi-functional epoxy contrast with copper for A.O.I
- Traditional FR-4 methods processability

**PERFORMANCE LIST**

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	5.0 x10 <sup>9</sup>	10 <sup>6</sup> ↑	2.5.17	
Surface resistivity	MΩ	C-96/35/90	5.0 x10 <sup>7</sup>	10 <sup>4</sup> ↑	2.5.17	
Permittivity 1 MHZ	-	C-24/23/50	4.2-4.4	5.4 ↓	2.5.5.9	
Permittivity 1 GHZ	-	C-24/23/50	3.8-4.0	-	2.5.5.9	
Loss Tangent 1 MHZ	-	C-24/23/50	0.015-0.020	0.035 ↓	2.5.5.9	
Loss Tangent 1 GHZ	-	C-24/23/50	0.013-0.015	-	2.5.5.9	
Arc resistance	SEC	D-48/50+D-0.5/23	120 ↑	60 ↑	2.5.1	
Dielectric breakdown	KV	D-48/50	60 ↑	40 ↑	2.5.6	
Moisture absorption	%	D-24/23	0.20-0.30	0.35 ↓	2.6.2.1	
Flammability	-	C-48/23/50	94V0	94V0	UL94	
Peel strength 1 oz	lb/in	288°Cx10" solder floating	8-12	6 ↑	2.4.8	
Thermal stress	SEC	288°C solder dipping	200 ↑	10 ↑	2.4.13.1	
Glass transition temp	°C	DSC	170 ± 5	N/A	2.4.25	
Dimensional stability X-Y axis	%	E 4/105	0.01-0.03	0.05 ↓	2.4.39	
Coefficient of thermal expansion	ppm/°C	TMA	50-70	N/A	2.4.24	
						Z-axis before Tg
						Z-axis after Tg

**NOTE:**

The average value in the table refers to samples of .020" 1/1.  
Test method per IPC-TM-650

Data shown are nominal values for reference only.

**■ CONSTRUCTION:**

THICKNESS		CONSTRUCTION		THICKNESS		CONSTRUCTION	
mm	mil			mm	mil		
0.10	4	1080	2 plies	0.38	15	7628	2 plies
0.11	4	2116	1 ply	0.45	18	7628x2+1080x1	
0.13	5	1080	2 plies	0.50	20	7628	3 plies
0.13sp	5	2116	1 ply	0.53	21	7628	3 plies
0.15	6	1506	1 ply	0.60	24	7628	3 plies
0.16	6	2112	2 plies	0.77	31	7628	4 plies
0.21	8	7628	1 ply	0.8	32	7628	4 plies
0.26	10	2116	2 plies	0.9	36	7628	5 plies
0.30	12	2116	3 plies	1.0	39	7628	5 plies
0.30sp	12	1506	2 plies	1.1	43	7628	6 plies
0.35	14	7628	2 plies	1.2	47	7628	6 plies

• 1.2, 1.1, 1.0, 0.9 0.77 mm THICKNESS INCLUDE CLADDING, ALL OTHERS EXCLUDE CLADDING

**■ PRODUCT SIZE & THICKNESS**

THICKNESS INCH(mm)	COPPER CLADDING OZ (µm)	SIZE		THICKNESS TOLERANCE
		INCH	mm	
0.004 (0.1)	0.5 (17)	48.8 x 36.6	1240 x 0930	IPC-4101B SPEC CLASS C/M
to	1.0 (35)	48.8 x 40.5	1240 x 1030	
0.039(1.0)	2.0 (70)	48.8 x 42.5	1240 x 1080	

**■ Keeping the core and prepreg in the same grain direction is crucial to ensure the flatness of multilayer boards.**

**Grain direction is shown on the Certificate of Conformance**

**■ CERTIFICATION UL**

• UL File No.: E98983

UL 746 Recognition

Minimum Material Thickness Inch (mm)	Clad cond. Thickness min. max. mils mils (mic) (mic)		Max. Area Diameter Inch (mm)	Sold Lts Temp Time °C sec	UL 94 Flame class	Max. Operating Temp
	0.002 0.051	0.68 (17)				