NAN YA PLASTICS CORPORATION
ELECTRONIC MATERIALS DIVISION.
COPPER CLAD LAMINATE DEPARTMENT
NO. 390 SEC 6 NANJING E RD, NEIHU DISTRICT, TAIPEI, TAIWAN

Issued: 2008/03/01
New: 2024/10/11

Glass cloth base epoxy resin
Flame retardant copper clad laminate

NP-140TL

■ FEATURES

- Multi-functional epoxy renders the material outstanding heat resistance, better dimensional stability, and through-hole reliability that benefit the performance of high layer count multilayer boards.
- HTE copper foil applied to prevent corner cracking
- High luminance of epoxy contrast with copper for laser type A.O.I.
- UV solder mask may be applied simultaneously in order to increase yields.
- IPC-4101E specification is applicable.

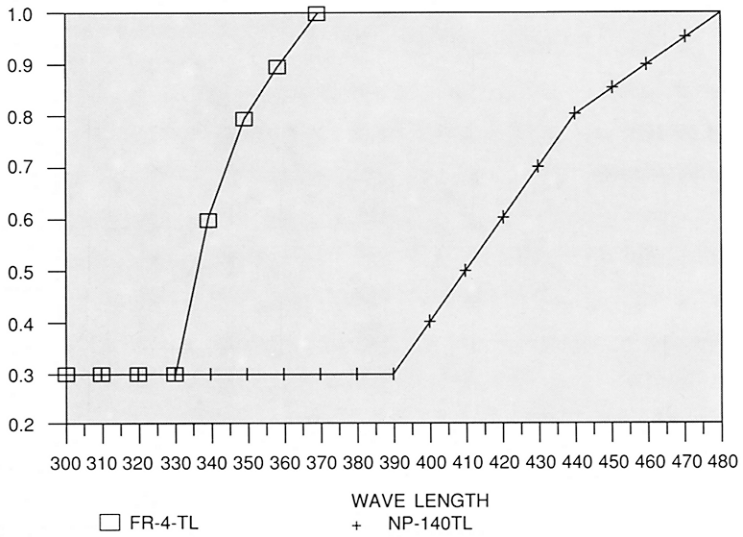
■ PERFORMANCE LIST

Characteristics	Unit	Condition	Typical Values	SPEC	Test Method
Volume resistivity	MΩ-cm	C-96/35/90	5.0 x10^9	10^6 ↑	2.5.17
Surface resistivity	MΩ	C-96/35/90	5.0 x10^7	10^4 ↑	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	0.012-0.014	-	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	0.8 ↓	2.6.2.1
Flammability	-	C-48/23/50	V-0	V-0	UL94
Peel strength 1 oz (≥0.5mm)	lb/in	288℃x10" solder floating	10-14	6 ↑	2.4.8
Thermal stress	SEC	288℃ solder dipping	200 ↑	10 ↑	2.4.13.1
Glass transition temp	℃	DSC	140 ± 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 Z-axis before Tg Z-axis after Tg	 ppm/℃ ppm/℃	 TMA TMA	 50-70 250-350	N/A	2.4.24
Decomposition temperature (Td 5% W/L)	℃	TGA	310	N/A	2.4.24.6

Data shown are nominal values for reference only.

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

■ UV TRANSMISSION CURVE of 0.2mm CCL



■ CONSTRUCTION

THICKNESS mm	mil	CONSTRUCTION		THICKNESS mm	mil	CONSTRUCTION	
0.08	3	2112	1 ply	0.38	15	7628	2 plies
0.10	4	1080	2 plies	0.45	18	7628 x 2 + 1080 x 1	
0.11	4	2116	1 ply	0.50	20	7628	3 plies
0.13	5	1080	2 plies	0.53	21	7628	3 plies
0.13 sp	5	2116	1 ply	0.60	24	7628	3 plies
0.15	6	1506	1 ply	0.77	30	7628	4 plies
0.21	8	7628	1 ply	0.8	31.5	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
0.30 sp	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, 0.8, 0.77 mm, THICKNESS INCLUDES CLADDING. ALL OTHERS EXCLUDE CLADDING.

■ PRODUCT SIZE & THICKNESS

THICKNESS inch (mm)	COPPER CLADDING oz (μm)	SIZE inch	mm	THICKNESS TOLERANCE
0.003 (0.08)	0.5 (17)	48.8 x 36.6	1240 x 0930	
to	1.0 (35)	48.8 x 40.5	1240 x 1030	CLASS C/M
0.047 (1.2)	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.**

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Glass cloth base epoxy resin
Flame retardant prepreg

NP-140B

■ FEATURES

- Rheology of resin controlled to benefit the lamination of the boards.
- Multi-functional epoxy provides outstanding heat resistance, better dimensional stability and through-hole reliability.
- Higher Tg: 138~142℃

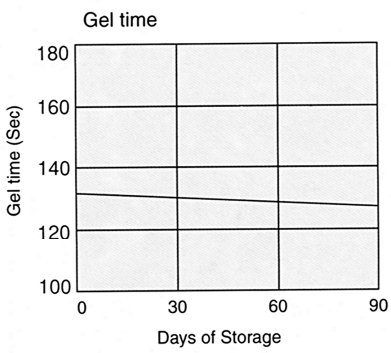
■ PERFORMANCE LIST

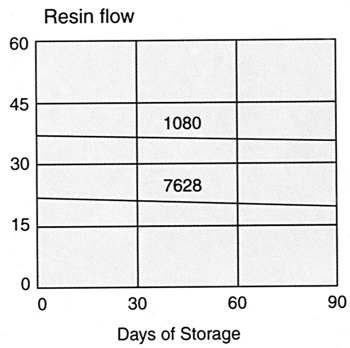
Specification: IPC-4101E is applicable

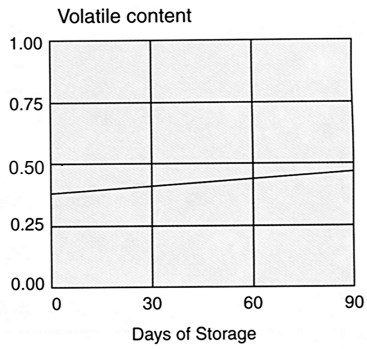
Glass Style	RC%	GT sec (171℃)	VC%	After Pressed Thickness (per ply)	
				mm	mil
7628HR	50 ± 3	130 ± 20	0.75 ↓	0.200 ± 0.01	7.9 ± 0.4
7628MR	47 ± 3			0.190 ± 0.01	7.5 ± 0.4
7628	43 ± 3			0.180 ± 0.01	7.1 ± 0.4
1506MR	52 ± 3			0.160 ± 0.01	6.3 ± 0.4
1506	48 ± 3			0.150 ± 0.01	6.0 ± 0.4
2116HR	58 ± 3			0.130 ± 0.01	5.0 ± 0.4
2116MR	54 ± 3			0.118 ± 0.01	4.6 ± 0.4
2116	50 ± 3			0.105 ± 0.01	4.1 ± 0.4
3313	55 ± 3			0.090 ± 0.01	3.5 ± 0.4
2113	56 ± 3			0.090 ± 0.01	3.5 ± 0.4
2112	60 ± 3			0.075 ± 0.008	3.0 ± 0.3
1086	62 ± 3			0.074 ± 0.008	2.9 ± 0.3
1080HR	68 ± 3			0.071 ± 0.008	2.8 ± 0.3
1080MR	65 ± 3			0.068 ± 0.008	2.7 ± 0.3
1080	62 ± 3			0.065 ± 0.008	2.6 ± 0.3
106	68 ± 3			0.053 ± 0.008	2.1 ± 0.3
* 1086	62 ± 3			0.074 ± 0.008	2.9 ± 0.3
* 1067	68 ± 3			0.056 ± 0.008	2.2 ± 0.3
* 1078	62 ± 3			0.065 ± 0.008	2.6 ± 0.3

*Laser drillable prepreg

Storage Stability





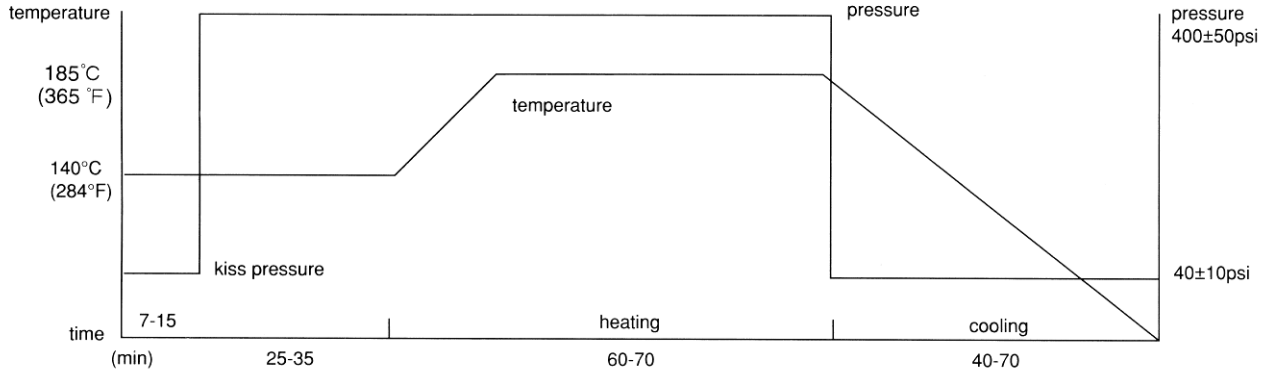


Condition 1: 180 days when stored at <5℃
Condition 2: 90 days when stored at <23℃ and <50%RH
(cond.1 or cond. 2 for the applicable specification sheet requirements.)

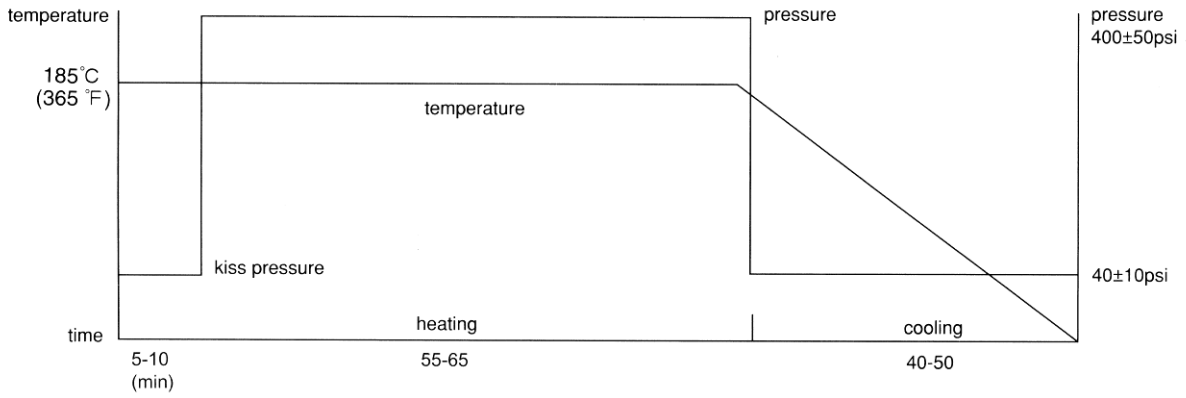
Data shown are nominal values for reference only.

Recommended press cycles:

A:2T2P (2 temperature step/2 pressure step)



B:1T2P (1 temperature step/2 pressure step)



Suggestions:

1. Heating rate of material between 70℃(158℉) and 140℃(284℉)
   1-3℃/min (1.8-5.4℉/min) is acceptable.
   1.5-2.5℃/min (2.7-4.5℉/min) would be better.
2. Temperature of material over 170℃/min(338℉) must be held for at least 40min. to allow epoxy resin to fully cure.
3. The pressure should be kept below 100psi during cooling to amibient temperature.
4. Cooling rate of material should be kept under 2.5℃/min(4.5℉/min) when the temperature of material is over 100℃(212℉), in order to avoid introducing twist.

■ CERTIFICATION UL

- UL File No.: E98983
- ANSI TYPE: FR-4.0
- UL 746 Recognition

Minimum Material Thickness inch (mm)	Clad cond. Thickness Min. mils (μm)	Max. mils (μm)	Max. Area Diameter inch (mm)	Solder Lts Temp ℃	Time sec	UL 94 Flame Class	Max. Operating Temp
0.0016 (0.04)	0.36 (9)	4.08 (102)	2.0 (50.8)	@	@	94V-0	130

@: Preheat 180℃/20min, then 230℃/2min, then 260℃/20sec, then 260℃/20sec