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

Issued: 2025/06/12
New: 2026/08/13

Glass cloth base epoxy resin
Flame retardant copper clad laminate

NPG-170D(C)

■ FEATURES

- Halogen, antimony, and red phosphorous free
- Flammability meets UL 94V-0
- Excellent long term reliability
- UV blocking type
- Superior CAF-Resistance (Anti-migration)
- Reactive type flame retardants
- High Tg 170℃ (DSC) and low C.T.E will provide excellent dimensional stability and through-hole reliability
- IPC-4101E L127/128

■ 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 (RC50%/70%) 10GHz (Cavity Resonator) Impedance simulation Er	-	C-24/23/50	3.96/3.38 3.3	-	2.5.5.13
Loss tangent (RC50%/70%) 10GHz (Cavity Resonator)	-	C-24/23/50	0.0077/0.0082	-	2.5.5.13
Arc resistance	SEC	D-48/50+D-0.5/23	120 ↑	60 ↑	2.5.1
Dielectric breakdown	KV	D-48/50	45 ↑	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 1oz DFLP(≥0.5mm)	lb/in	288℃x10" solder floating	4-6	4 ↑	2.4.8
Thermal stress	SEC	288℃ solder dipping	600 ↑	10 ↑	2.4.13.1
Glass transition temperature	℃	DSC	170 ± 5	N/A	2.4.25
Dimensional stability X-Y axis	%	E-4/105	0.005-0.02	0.05 ↓	2.4.39
Coefficient of thermal expansion X-Y axis Z-axis before Tg Z-axis after Tg 50-260℃	 ppm/℃ ppm/℃ ppm/℃ %	 TMA TMA TMA TMA	 10-12 30-40 200-220 2.1	N/A	2.4.24
Decomposition temperature (Td 5% W/L)	℃	TGA	385	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

■ CONSTRUCTION

THICKNESS mm	mil	CONSTRUCTION		THICKNESS mm	mil	CONSTRUCTION	
0.05 sp	2	1067	1 ply	0.45 sp	18	1506	3 plies
0.08 1p	3	1086	1 ply	0.50	20	7628	3 plies
0.10	4	1080	2 plies	0.53	21	7628	3 plies
0.11	4	2116	1 ply	0.60	24	7628	3 plies
0.13 sp	5	2116	1 ply	0.77	30	7628	4 plies
0.15	6	1506	1 ply	0.8	31.5	7628	4 plies
0.21	8	7628	1 ply	0.9	36	7628	5 plies
0.26	10	2116	2 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
0.38	15	7628	2 plies				

・1.2, 1.1, 1.0, 0.9, 0.8, 0.77mm thickness include cladding, all others exclude cladding

■ PRODUCT SIZE & THICKNESS

THICKNESS inch(mm)	COPPER CLADDING oz (μm)	SIZE inch	SIZE mm	THICKNESS TOLERANCE
0.002 (0.05) to 0.039 (1.0)	H (17) 1.0 (35) 2.0 (70) 3.0 (102)	48.8 x 36.6 48.8 x 40.5 48.8 x 42.5	1240 x 0930 1240 x 1030 1240 x 1080	IPC-4101E SPEC CLASS C/M

■ **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

NPG-170D(C)B

■ FEATURES

- Halogen, antimony, and red phosphorous free
- Rheology of resin controlled to benefit the lamination of the boards.
- Modified phosphorous epoxy provides excellent heat and chemical resistance.
- Tg: 170℃

■ PERFORMANCE LIST

Specification: IPC-4101E is applicable
Data shown are nominal values for reference only.

Glass style	RC%	GT sec (171℃)	VC%	After Pressed Thickness (per ply)	
				mm	mil
7628HR	52 ± 3	180 ± 20	1.5 ↓	0.237 ± 0.01	9.3 ± 0.4
7628MR	49 ± 3			0.219 ± 0.01	8.6 ± 0.4
7628	45 ± 3			0.198 ± 0.01	7.8 ± 0.4
1506	50 ± 3			0.178 ± 0.01	7.0 ± 0.4
1506LR	48 ± 3			0.167 ± 0.01	6.6 ± 0.4
2116HR	60 ± 3			0.150 ± 0.01	5.9 ± 0.4
2116MR	56 ± 3			0.134 ± 0.01	5.3 ± 0.4
2116	52 ± 3			0.120 ± 0.01	4.7 ± 0.4
3313MR	61 ± 3			0.123 ± 0.01	4.8 ± 0.4
3313	57 ± 3			0.110 ± 0.01	4.3 ± 0.4
1080HR / 1078HR	70 ± 3			0.096 ± 0.008	3.8 ± 0.3
1080MR / 1078MR	67 ± 3			0.086 ± 0.008	3.4 ± 0.3
1080 / 1078	64 ± 3			0.078 ± 0.008	3.1 ± 0.3
106HR	76 ± 3			0.062 ± 0.008	2.4 ± 0.3
106MR	74 ± 3			0.057 ± 0.008	2.2 ± 0.3
106	70 ± 3			0.048 ± 0.008	1.9 ± 0.3

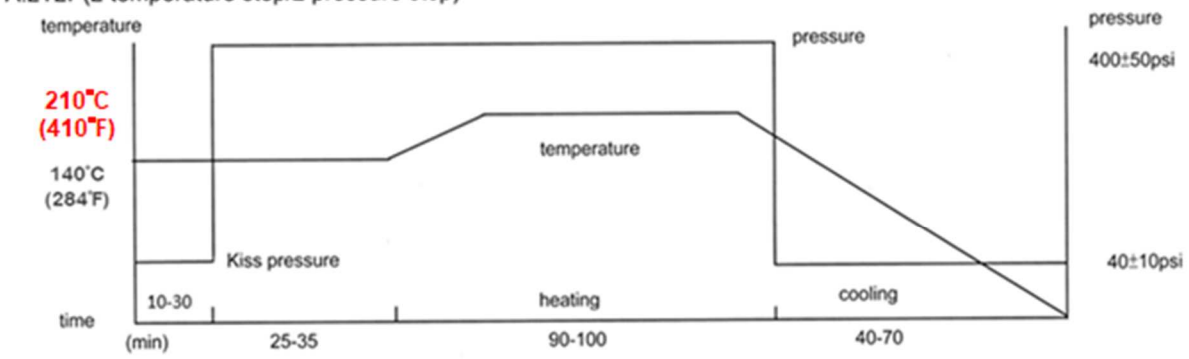
- Requirement for not listed glass fabrics types, please contact our technical customer service team for discussion in advance.

Storage Stability

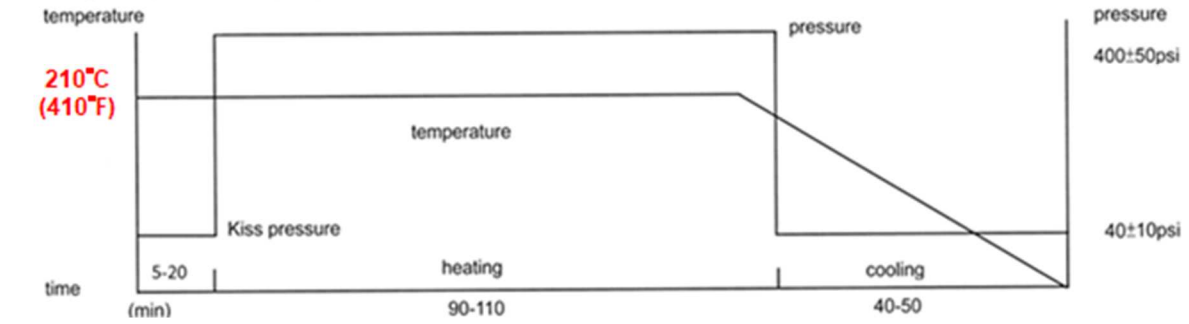
Condition 1: 180 days when stored at <5℃
Condition 2: 90 days when stored at < 23℃ and <50% RH
(Condition 1 or 2 for the applicable specification sheet requirement)

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 80℃(176℉) and 140℃(284℉)
   1-3℃/min (1.8~5.4℉/min) is acceptable.
   2-3℃/min (3.6~5.4℉/min) would be better.
2. Temperature of material over **200**℃(392°F) must be held for at least **90mins** to allow resin to fully cure.
3. The pressure should be kept below 100psi during cooling to ambient 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-4.1
- UL 746 Recognition

Minimum Material Thickness inch (mm)	Clad cond. Thickness Min. mils (μm)	Clad cond. Thickness Max. mils (μm)	Max. Area Diameter inch (mm)	Max. Operating Temp	Solder Lts Temp ℃	Solder Lts Time sec	UL 94 Flame Class
0.0016 (0.04)	0.59 (15)	4.02 (102)	2.0 (50.8)	130	288	30	94V-0