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

Issued: 2014/01/01
New: 2025/10/27

Glass cloth base epoxy resin
Flame retardant copper clad laminate

NPG-170N

■ 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
- ANSI type: FR-4.1

■ 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 GHz	-	C-24/23/50	4.1-4.3	-	2.5.5.9
Loss Tangent 1 GHz	-	C-24/23/50	0.009-0.012	-	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	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 1 oz (≥0.5mm)	lb/in	288℃x10" solder floating	7-9	6 ↑	2.4.8
Thermal stress	SEC	288℃ solder dipping	300 ↑	10 ↑	2.4.13.1
Glass transition temp	℃	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 X-Y axis Z-axis before Tg Z-axis after Tg	 ppm/℃ ppm/℃ ppm/℃	 TMA TMA TMA	 9-13 30-50 200-230	N/A	2.4.24
Decomposition temperature (Td 5% W/L)	℃	TGA	360	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

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Issued: 2014/01/01
New: 2026/08/17

■ CONSTRUCTION

THICKNESS mm	mil	CONSTRUCTION		THICKNESS mm	mil	CONSTRUCTION	
0.05	2	106	1 ply	0.35	14	7628	2 plies
0.08	3	2112	1 ply	0.38	15	7628	2 plies
0.10	4	1080	2 plies	0.45	18	7628x2+1080x1	
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	1.2	47	7628	6 plies

• 1.2, 1.1, 1.0, 0.9, 0.8, 0.77 mm 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 0.047 (1.2)	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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NO. 390 SEC 6 NANJING E RD, NEIHU DISTRICT, TAIPEI, TAIWAN

Issued: 2014/01/01
New: 2026/04/29

Glass cloth base epoxy resin
Flame retardant prepreg

NPG-170NB

■ 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±5℃

■ PERFORMANCE LIST

Specification: IPC-4101E is applicable
Data shown are nominal values for reference only. (Remained Copper 100%)

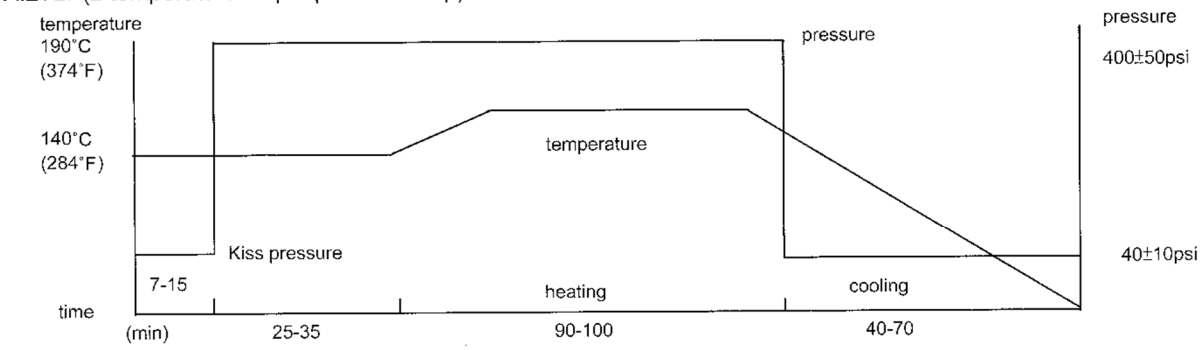
Glass style	RC%	GT sec (171℃)	VC%	After Pressed Thickness (per ply)	
				mm	mil
7628HR	50 ± 3	120 ± 20	1.5↓	0.235 ± 0.01	9.3 ± 0.4
7628MR	47 ± 3			0.215 ± 0.01	8.6 ± 0.4
7628	43 ± 3			0.198 ± 0.01	7.8 ± 0.4
1506MR	52 ± 3			0.193 ± 0.01	7.6 ± 0.4
1506	48 ± 3			0.175 ± 0.01	6.9 ± 0.4
2116HR	58 ± 3			0.147 ± 0.01	5.8 ± 0.4
2116MR	54 ± 3			0.132 ± 0.01	5.2 ± 0.4
2116	50 ± 3			0.119 ± 0.01	4.7 ± 0.4
2113	56 ± 3			0.104 ± 0.01	4.1 ± 0.4
2112	60 ± 3			0.106 ± 0.008	4.2 ± 0.4
1080HR	68 ± 3			0.093 ± 0.008	3.7 ± 0.3
1080MR	65 ± 3			0.083 ± 0.008	3.3 ± 0.3
1080	62 ± 3			0.077 ± 0.008	3.0 ± 0.3
1078HR	68 ± 3			0.093 ± 0.008	3.7 ± 0.3
1078MR	65 ± 3			0.083 ± 0.008	3.3 ± 0.3
1078	62 ± 3			0.077 ± 0.008	3.0 ± 0.3
1067HR	74 ± 3			0.077 ± 0.008	3.0 ± 0.3
1067MR	72 ± 3			0.068 ± 0.008	2.7 ± 0.3
1067	68 ± 3			0.058 ± 0.008	2.3 ± 0.3
106HR	74 ± 3			0.060 ± 0.008	2.4 ± 0.3
106MR	72 ± 3			0.056 ± 0.008	2.2 ± 0.3
106	68 ± 3			0.046 ± 0.008	1.8 ± 0.3
1037HR	74 ± 3			0.058 ± 0.008	2.3 ± 0.3
1037MR	72 ± 3			0.053 ± 0.008	2.1 ± 0.3
1037	68 ± 3			0.046 ± 0.008	1.8 ± 0.3

Storage Stability

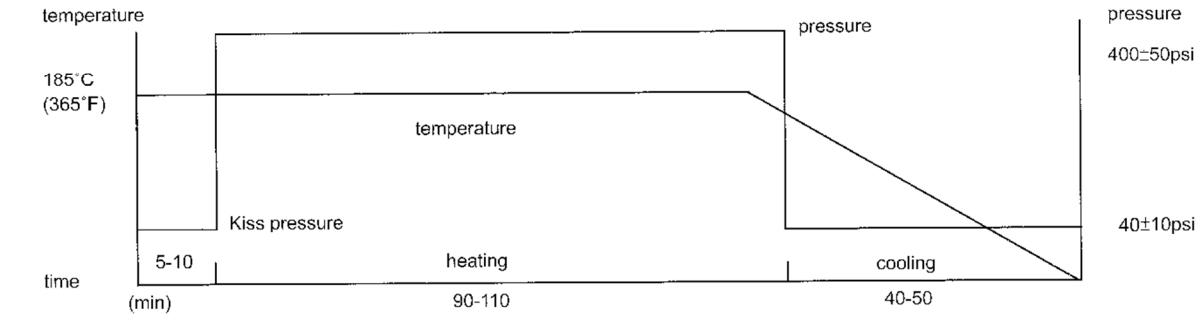
Condition 1: 180 days when stored at <5℃
Condition 2: 90 days when stored at < 23℃ and <50% RH
(Condition 1 or 2 for the applicable specification sheet requirement)

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 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℃(338℉) must be held for at least 60min 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)	Solder Lts Temp ℃	Solder Lts Time sec	UL 94 Flame Class	Max. Operating Temp
0.0016 (0.04)	0.59 (15)	4.08 (102)	2.0 (50.8)	288	30	94V-0	130