NAN YA PLASTICS CORPORATION
ELECTRONIC MATERIALS DIVISION.
COPPER CLAD LAMINATE DEPARTMENT
NO. 201. TUNG HWA N. ROAD, TAIPEI, TAIWAN.

Issued: 2013/09/03
New: 2014/04/30

Glass cloth base epoxy resin
flame retardant copper clad laminate

NPG-180ID

■ FEATURES

- Halogen, antimony, and red phosphorous free
- Flammability meets UL 94 V-0
- Excellent long term reliability
- UV blocking type
- Superior CAF-Resistance (Anti-migration)
- Reactive type flame retardants
- High Tg (DMA above300℃) and low C.T.E will provide excellent dimensional stability and through-hole reliability
- ANSI type : No ANSI

■ PERFORMANCE LIST

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method
Volume resistivity	MΩ-cm	C-96/35/90	6.0 x10^9	10^6 ↑	2.5.17
Surface resistivity	MΩ	C-96/35/90	6.0 x10^7	10^4 ↑	2.5.17
Permittivity 1 MHZ	-	C-24/23/50	4.4-5.0	5.4 ↓	2.5.5.9
Loss Tangent 1 MHZ	-	C-24/23/50	0.010-0.016	0.035 ↓	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	%	C-24/23	0.18-0.24	0.7 ↓	2.6.2.1
Flammability	-	C-24/23/50+E-24/125	94V0	94V0	UL94
Peel strength 1 oz	lb/in	288℃x10" solder floating	6-9	6 ↑	2.4.8
Thermal stress	SEC	288℃ solder dipping	600 ↑	10 ↑	2.4.13.1
Glass transition temp	℃	DMA	Above 300	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	 7-9 20-40 60-100	N/A	2.4.24
Decomposition Temperature (Td 5% W/L)	℃	TGA	380	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		CONSTRUCTION		THICKNESS		CONSTRUCTION	
mm	mil	Glass style	plies	mm	mil	Glass style	plies
0.04 1P	1.6	1037	1	0.2	8	2116	2
0.04 2P	1.6	1015	2	0.2 4P	8	1078	4
0.05 1P	2	1037	1	0.25	10	2313	3
0.05 2P	2	1027	2	0.3	12	2116	3
0.06 1P	2.5	1078	1	0.4	16	2116	4
0.06 2P	2.5	1037	2	0.6	24	2116	6
0.10	4	1078	2	0.7 7P	28	2116	7
0.15	6	1078	3	0.7 8P	28	2116	8
				0.8	31.5	2116	8

■ PRODUCT SIZE & THICKNESS

THICKNESS INCH(mm)	COPPER CLADDING OZ (μm)	SIZE INCH	SIZE mm	THICKNESS TOLERANCE
0.0012(0.03)	3/8 (12)	48.8 x 36.6	1240 x 0930	IPC-4101C SPEC CLASS C/M
to	to	48.8 x 40.5	1240 x 1030	
0.047(1.2)	3.0 (105)	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

NPG-180IDB

■ FEATURES

- Rheology of resin controlled to benefit the lamination of the boards.
- Modified phosphorous epoxy provides excellent heat and chemical resistance.
- Tg: DMA above 300℃.

■ PERFORMANCE LIST

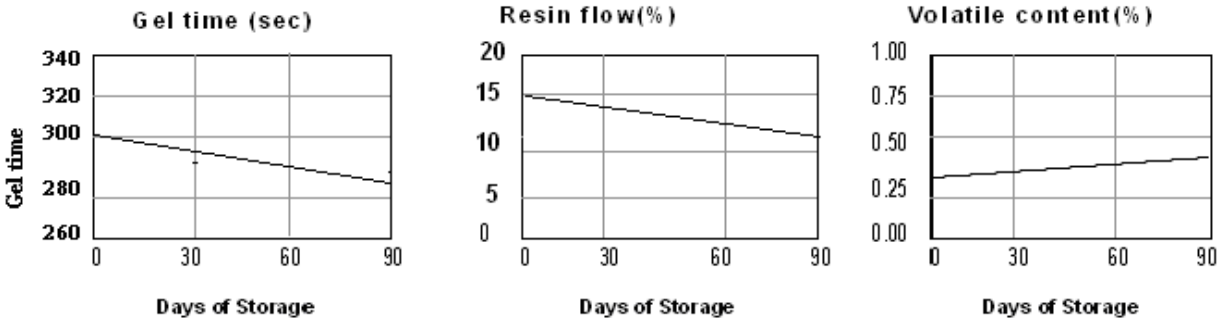
Specification : IPC-4101C is applicable

Glass style	RC%	RF%	GT sec (171℃)	VC%	After Pressed Thickness (per ply)	
					mm	Mil
1506	52 ± 3	10 ± 5	300 ± 20	0.75 ↓	0.162 ± 0.01	6.4 ± 0.4
2116MR	58 ± 3	15 ± 5			0.120 ± 0.01	4.7 ± 0.4
2116	54 ± 3	10 ± 5			0.108 ± 0.01	4.3 ± 0.4
1080	66 ± 3	15 ± 5			0.068 ± 0.008	2.7 ± 0.3
106	72 ± 3	15 ± 5			0.041 ± 0.008	1.6 ± 0.3
1037	72 ± 3	10 ± 5			0.041 ± 0.008	1.6 ± 0.3
1037MR	76 ± 3	20 ± 5			0.049 ± 0.008	1.9 ± 0.3
1037HR	78 ± 3	25 ± 5			0.054 ± 0.008	2.1 ± 0.3
1027	75 ± 3	10 ± 5			0.036 ± 0.008	1.4 ± 0.3
1027MR	77 ± 3	15 ± 5			0.040 ± 0.008	1.6 ± 0.3
1027HR	80 ± 3	20 ± 5			0.047 ± 0.008	1.9 ± 0.3
1015	75 ± 3	10 ± 5			0.032 ± 0.008	1.3 ± 0.3
1000	77 ± 3	10 ± 5			0.022 ± 0.008	0.9 ± 0.3

(Remained 12 μ Copper 70%)

Data shown are nominal values for reference only.

■ Storage Stability



Storage Condition :20℃ 50% RH for 3 months
: Max 5℃ for 6 months

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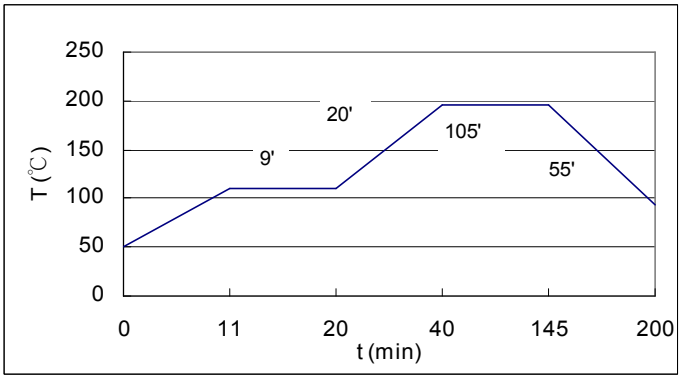
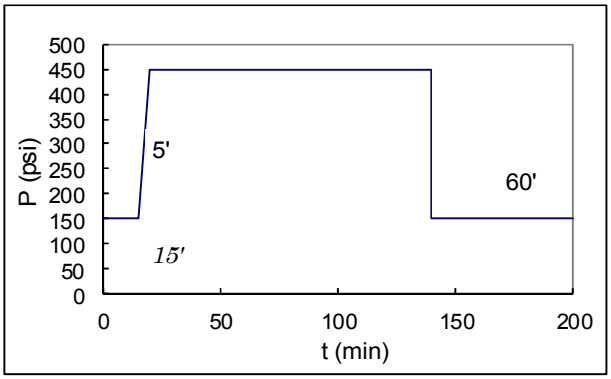
Recommended press cycles:





Suggestions:

1. Heating rate of material between 50℃(122℉) and 120℃(248℉)
   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 190℃(374℉) must be held for at least 60min to allow resin to fully cure.
3. The pressure should be kept below 150psi 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:No ANSI

UL 746 Recognition

Minimum Material Thickness inch (mm)	Clad cond. Thickness Min. Mils (mic)	Max. Mils (mic)	Max. Area Diameter Inch (mm)	Sold Lts Temp ℃	Time sec	UL 94 Flame class	Max. Operating Temp
0.002 (0.051)	0.68 (17)	4.08 (102)	2.0 (50.8)	288	30	94V-0	130