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-180IF

■ 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 above240℃) and low C.T.E will provide
- excellent dimensional stability and through-hole reliability
- Suitable for flip chip application

■ PERFORMANCE LIST

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method
Volume resistivity	MΩ-cm	C-96/35/90	5.0 x10^{10}	10^6↑	2.5.17
Surface resistivity	MΩ	C-96/35/90	7.0 x10^8	10^4↑	2.5.17
Permittivity 1 MHZ	-	C-24/23/50	4.6-4.9	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	0.15-0.18	0.35↓	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 240	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	 11-13 30-50 80-120	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 0.020" 1/1.
Test method per IPC-TM-650

■ CONSTRUCTION:

THICKNESS		CONSTRUCTION		THICKNESS		CONSTRUCTION	
mm	mil	Glass style	plies	mm	mil	Glass style	plies
0.06	2.5	1037	2	0.25	10	2313	3
0.10	4	1078	2	0.3	12	2116	3
0.15	6	1078	3	0.4	16	2116	4
0.2	8	2116	2	0.8	31.5	2116	8

• ALL THICKNESS EXCLUDE CLADDING.

■ PRODUCT SIZE & THICKNESS

THICKNESS INCH(mm)	COPPER CLADDING OZ (μm)	SIZE INCH	SIZE mm	THICKNESS TOLERANCE
0.008 (0.2)	0.375 (12)	48.8 x 36.6	1240 x 0930	IPC-4101C 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

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NPG-180IFB

■ FEATURES

- Rheology of resin controlled to benefit the lamination of the boards.
- Modified phosphorous epoxy provides excellent heat and chemical resistance.
- Tg: DMA above 240℃,

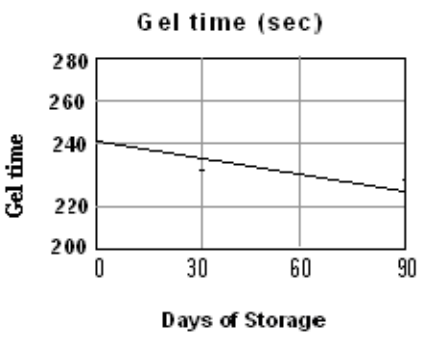
■ PERFORMANCE LIST

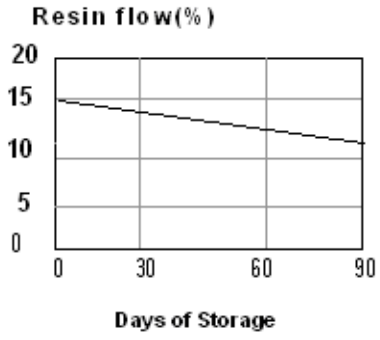
Specification : IPC-4101C is applicable

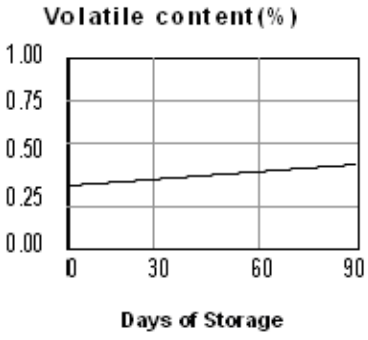
Glass style	RC%	RF%	GT sec (171℃)	VC%	After Pressed Thickness (per ply)	
					mm	Mil
1506	52 ± 3	15 ± 5	240 ± 20	0.75 ↓	0.145 ± 0.01	5.7 ± 0.4
2116MR	58 ± 3	15 ± 5			0.109 ± 0.01	4.3 ± 0.4
2116	54 ± 3	15 ± 5			0.097 ± 0.01	3.8 ± 0.4
1080	66 ± 3	15 ± 5			0.058 ± 0.008	2.3 ± 0.3
106	72 ± 3	15 ± 5			0.040 ± 0.008	1.6 ± 0.3
1037	72 ± 3	15 ± 5			0.038 ± 0.008	1.5 ± 0.3

Data shown are nominal values for reference only.

■ Storage Stability

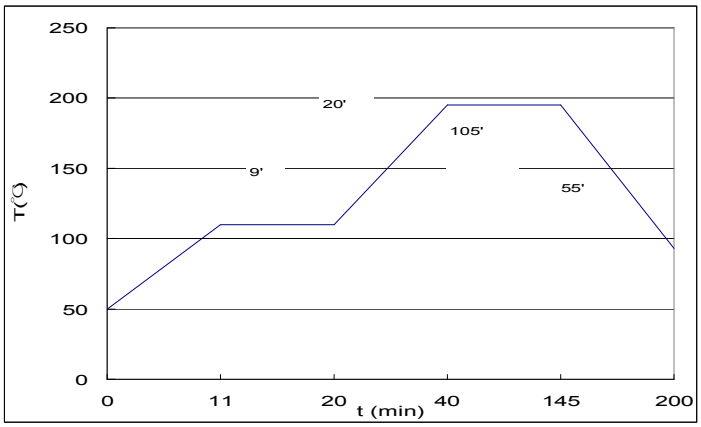


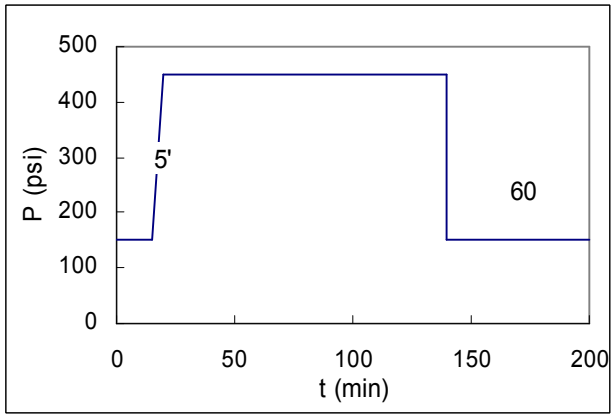




Storage Condition :20℃ 50% RH for 3 months
: Max 5℃ for 6 months

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 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:No ANSI

UL 746 Recognition

Minimum Material Thickness inch (mm)	Clad cond. Thickness Min. Mils (mic)	Clad cond. Thickness Max. Mils (mic)	Max. Area Diameter Inch (mm)	Sold Lts Temp ℃	Sold Lts 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