



Glass cloth base epoxy resin
Flame retardant copper clad laminate

NPG-200W

■ FEATURES

- Halogen, antimony, and red phosphorous free
- Excellent long term reliability
- UV blocking type
- White material with high reflectance of visible light, much suitable for chip LED substrate.
- Superior anti-yellowing

■ PERFORMANCE LIST

Characteristics	Unit	Condition	Typical Values	SPEC	Test Method
Volume resistivity	MΩ-cm	C-96/35/90	6.5×10^{10}	$10^6 \uparrow$	2.5.17
Surface resistivity	MΩ	C-96/35/90	6.5×10^9	$10^4 \uparrow$	2.5.17
Permittivity 1 MHz	-	C-24/23/50	4.9-5.1	$5.4 \downarrow$	2.5.5.9
Loss Tangent 1 MHz	-	C-24/23/50	0.016-0.018	$0.035 \downarrow$	2.5.5.9
Arc resistance	SEC	D-48/50+D-0.5/23	120 $\uparrow$	60 $\uparrow$	2.5.1
Dielectric breakdown	KV	D-48/50	60 $\uparrow$	40 $\uparrow$	2.5.6
Moisture absorption	%	D-24/23	0.19-0.23	0.7 $\downarrow$	2.6.2.1
Flammability	-	C-24/23/50+E-24/125	HB	HB	UL94
Peel strength 1 oz (≥ 0.5 mm)	lb/in	288°Cx10" solder floating	5-7	4.57 $\uparrow$	2.4.8
Thermal stress	SEC	288°C solder dipping	600 $\uparrow$	10 $\uparrow$	2.4.13.1
Glass transition temperature	°C	DSC	>170	N/A	2.4.25
Dimensional stability X-Y axis	%	E-4/105	0.01-0.03	$0.05 \downarrow$	2.4.39
Thermal conductivity	W/m.K	-	0.65	-	ASTM-D5470
Coefficient of thermal expansion					
X-Y axis	ppm/°C	TMA	12-14	N/A	2.4.24
Z-axis before Tg	ppm/°C	TMA	33-43		
Z-axis after Tg	ppm/°C	TMA	180-220		

NOTE:

The average value in the table refers to samples of .020" 1/1.

Test method per IPC-TM-650

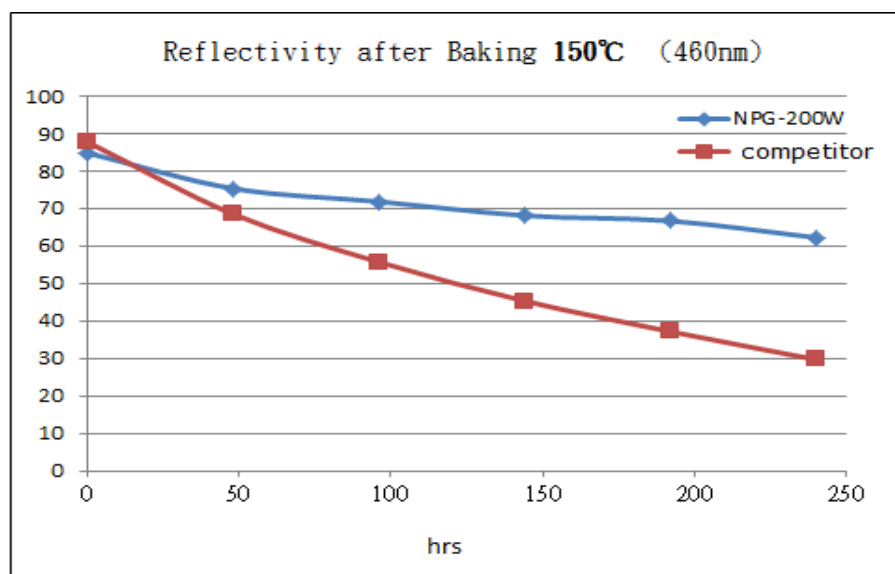
Data shown are nominal values for reference only.



■ CONSTRUCTION

THICKNESS		CONSTRUCTION		THICKNESS		CONSTRUCTION	
mm	mil	Glass style	plies	mm	mil	Glass style	plies
0.04	1.6	1037	1	0.25 3P	10	3313	3
0.05 SP	2	1067	1	0.30 3P	12	2116	3
0.05 2P	2	1027	2	0.40 4P	16	2116	4
0.06 1P	2.5	1078	1	0.46 3P	18	1506	3
0.06 2P	2.5	1037	2	0.50 5P	20	2116	5
0.08 1P	3	1086	1	0.60 6P	24	2116	6
0.08 2P	3	1067	2	0.7 7P	28	2116	7
0.10 1P	4	2116	1	0.8 8P	32	2116	8
0.10 2P	4	1078	2	0.9 9P	36	2116	9
0.15 3P	6	1078	3	1.0 SP	40	2116	10
0.20 2P	8	2116	2				

■ REFLECTIVITY PROPERTIES



■ PRODUCT SIZE & THICKNESS

THICKNESS inch(mm)	COPPER CLADDING oz (μm)	SIZE		THICKNESS TOLERANCE
		inch	mm	
0.0012(0.03)	3/8 (12)	48.8 x 36.6	1240 x 0930	IPC-4101E SPEC CLASS C/M
to	to	48.8 x 40.5	1240 x 1030	
0.047(1.2)	3.0 (102)	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



**Glass cloth base epoxy resin
Flame retardant prepreg**

NPG-200WB

■ FEATURES

- Halogen, antimony, and red phosphorous free
- White material with high reflectance of visible light, much suitable for chip LED substrate
- Excellent long term reliability
- UV blocking type
- Superior CAF-Resistance (Anti-migration)

■ PERFORMANCE LIST

Specification: IPC-4101E is applicable

Data shown are nominal values for reference only

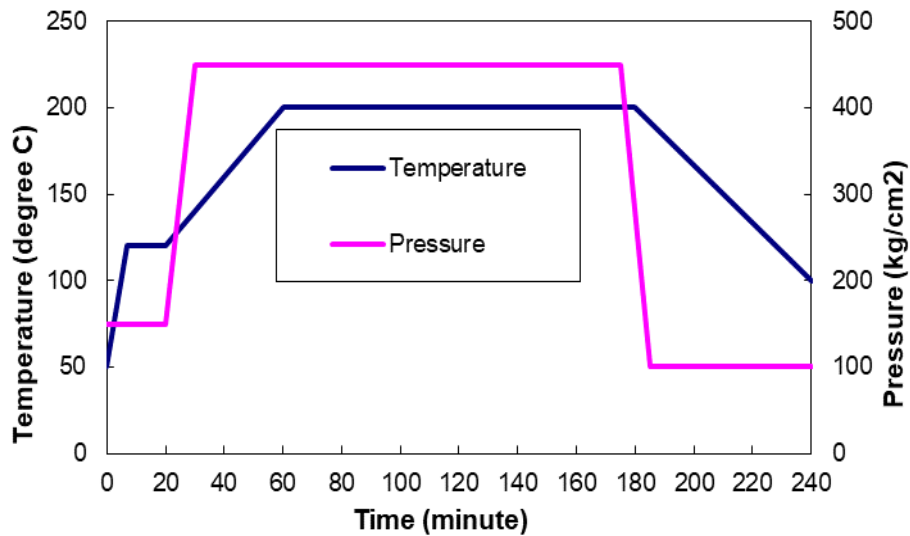
Glass style	RC%	After Pressed Thickness (100%Cu, per ply)	
		mm	mil
2116MR	57 ± 3	0.124 ± 0.010	4.9 ± 0.4
2116	53 ± 3	0.112 ± 0.010	4.4 ± 0.4
1080HR	71 ± 3	0.088 ± 0.008	3.5 ± 0.3
1080MR	68 ± 3	0.079 ± 0.008	3.1 ± 0.3
1080	65 ± 3	0.072 ± 0.008	2.8 ± 0.3
1067MR	75 ± 3	0.065 ± 0.008	2.6 ± 0.3
1037HR / 106HR	77 ± 3	0.057 ± 0.008	2.2 ± 0.3
1037HR / 106MR	75 ± 3	0.052 ± 0.008	2.1 ± 0.3
1037 / 106	71 ± 3	0.044 ± 0.008	1.7 ± 0.3
1027HR	79 ± 3	0.050 ± 0.008	2.0 ± 0.3
1027MR	76 ± 3	0.043 ± 0.008	1.7 ± 0.3
1027	74 ± 3	0.039 ± 0.008	1.6 ± 0.3

Storage Condition : 20℃ 50% RH for 3 months

: Max. 5℃ for 6 months



Recommended press cycles:



Suggestions:

1. Heating rate of material between 90°C(194°F) and 130°C(266°F)
1-3°C/min (1.8~5.4°F/min) is acceptable.
1.5-2.0°C/min (2.7~3.6°F/min) would be better.
2. Temperature of material over 190°C(374°F) 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°C/min (4.5°F/min) when the temperature of material is over 100°C(212°F), in order to avoid introducing twist.

■ CERTIFICATION UL

- UL File No.: E98983