



**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 above 240°C) and low C.T.E will provide excellent dimensional stability and through-hole reliability
- Suitable for flip chip application

■ PERFORMANCE LIST

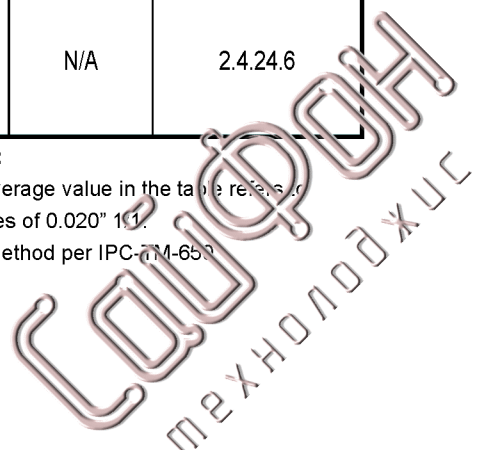
| Characteristics | Unit | Conditioning | Typical Values | SPEC | Test Method | |
|---------------------------------------|------------------|-----------------------------|------------------------|-------------------|-------------|--------|
| Volume resistivity | MΩ-cm | C-96/35/90 | 5.0 x 10 ¹⁰ | 10 ⁶ ↑ | 2.5.17 | |
| Surface resistivity | MΩ | C-96/35/90 | 7.0 x 10 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°C x 10" solder floating | 6-9 | 6 ↑ | 2.4.8 | |
| Thermal stress | SEC | 288°C solder dipping | 600 ↑ | 10 ↑ | 2.4.13.1 | |
| Glass transition temp | °C | 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 | ppm/°C | TMA | 11-13 | N/A | 2.4.24 |
| | Z-axis before Tg | ppm/°C | TMA | 30-50 | | |
| Z-axis after Tg | ppm/°C | TMA | 80-120 | | | |
| Decomposition Temperature (Td 5% W/L) | °C | 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" thick.

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 | COPPER CLADDING | SIZE | | THICKNESS TOLERANCE |
|-------------|-----------------|-------------|-------------|-----------------------------|
| INCH(mm) | OZ (µm) | INCH | mm | |
| 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°C,

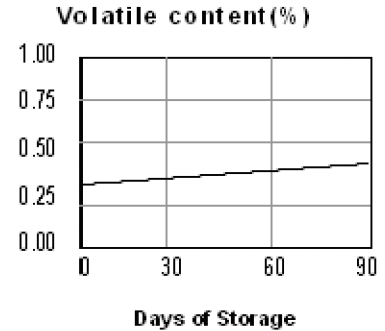
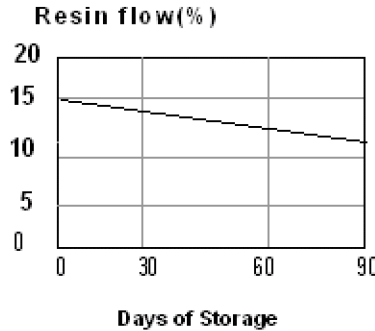
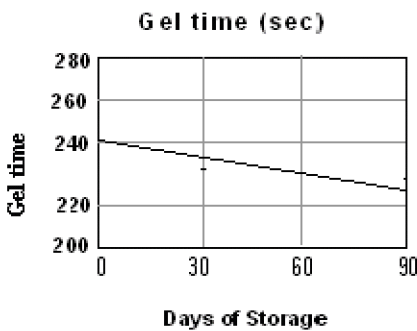
■ PERFORMANCE LIST

Specification : IPC-4101C is applicable

| Glass style | RC% | RF% | GT sec (171°C) | 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

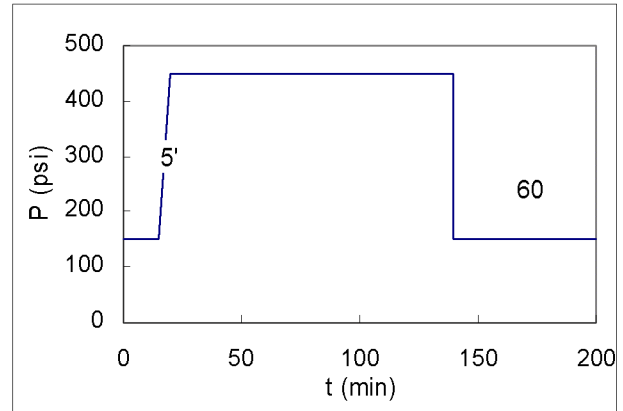
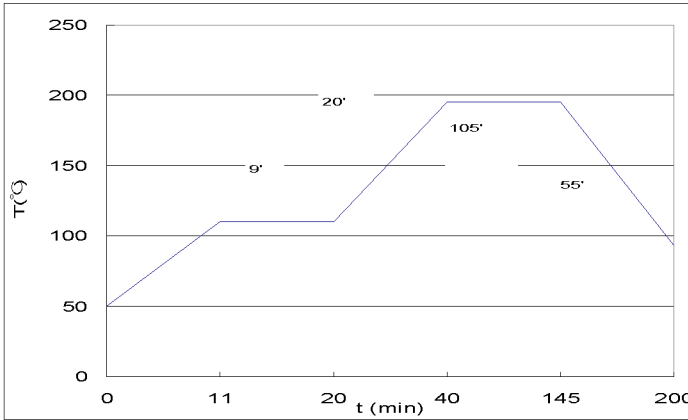


Storage Condition :20°C 50% RH for 3 months
 : Max 5°C for 6 months





Recommended press cycles:



Suggestions:

1. Heating rate of material between 50°C (122°F) and 120°C (248°F)
 1-3°C/min (1.8~5.4°F/min) is acceptable.
 1.5-2.5°C/min (2.7~4.5°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 • ANSI TYPE:No ANSI

UL 746 Recognition

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

