

# IT-180ABS/IT-180ATC

High-Tg & Low CTE (Tg>170°C), Multifunctional Epoxy Resin, Phenolic-Curing, Lead-free process Compatible

## Specification Sheet

| IT-180ATC(Laminate) Property   | Specification (Typical Value)             |   | Units<br>Metric(English)                   | Test Method                   |  |
|--|---|---|--|-------------------------------|--|
|  | <0.50mm[0.0197in]                         | ≥0.50mm[0.0197in]                         |  | IPC-TM-650                    | Ref. Para.                                     |
| 1.Peel Strength, As received<br>A. 17 micron [1/2 ounce/Ft2] copper and under<br>B. 35 micron [1-ounce/Ft2]Copper<br>C. 70micron [2-ounce/Ft2]Copper<br>D. 105,140,175micron [3,4,5-ounce/Ft2 ] Copper and above | >4.0<br>>4.5<br>>5.0<br>>5.5              | >5.0<br>>6.0<br>>8.0<br>>9.0              | (lb/inch)                                  | 2.4.8<br>2.4.8.2<br>2.4.8.3   | 3.9.1.1<br>3.9.1.1.1<br>3.9.1.1.2<br>3.9.1.1.3 |
| 2.Volume Resistivity ,minimum<br>A. C-96/35/90<br>B. After moisture resistance<br>C. At elevated temperature E-24/125  | 10 <sup>6</sup><br>---<br>10 <sup>3</sup> | ---<br>10 <sup>4</sup><br>10 <sup>3</sup> | MΩ-cm                                      | 2.5.17.1                      | 3.11.1.3                                       |
| 3.Surface Resistivity ,minimum<br>A. C-96/35/90<br>B. After moisture resistance<br>C. At elevated temperature E-24/125   | 10 <sup>4</sup><br>---<br>10 <sup>3</sup> | ---<br>10 <sup>4</sup><br>10 <sup>3</sup> | MΩ   | 2.5.17.1                      | 3.11.1.4                                       |
| 4.Moisture Absorption ,maximum   | -   | 0.5                                       | %  | 2.6.2.1                       | 3.12.1.1                                       |
| 5.Dielectric Breakdown ,minimum  | -   | 40  | kV   | 2.5.6                         | 3.11.1.6                                       |
| 6.Permittivity at 1 MHz ,maximum<br>(Laminate & Prepreg as laminated)  | <5.4<br>(4.8)                             | <5.4<br>(4.8)                             | -  | 2.5.5.3<br>2.5.5.5<br>2.5.5.6 | 3.11.1.1<br>3.11.2.1                           |
| 7.Loss Tangent at 1 MHz ,maximum<br>(Laminate & Prepreg as laminated)  | <0.035<br>(0.016)                         | <0.035<br>(0.016)                         | -  | 2.5.5.3<br>2.5.5.3<br>2.5.5.9 | 3.11.1.2<br>3.11.2.2                           |
| 8.Flexural Strength, minimum<br>A. Length direction<br>B. Cross direction  | -<br>-                                    | 15(60,190)<br>345(50,140)                 | N/mm <sup>2</sup><br>(lb/in <sup>2</sup> ) | 2.4.4                         | 3.9.1.3  |
| 9.Flexural Strength at Elevated Temperature , length direction , minimum   | -   | -   | N/mm <sup>2</sup><br>(lb/in <sup>2</sup> ) | 2.4.4.1                       | 3.9.1.4  |
| 10.Arc Resistance ,minimum   | 60  | 60  | s  | 2.5.1                         | 3.11.1.5                                       |
| 11.Thermal Strss 10 sec at 288°C[550.4F], min<br>A. Unetched B. Etched   | Pass Visual<br>Pass Visual                | Pass Visual<br>Pass Visual                | Rating                                     | 2.4.13.1                      | 3.10.1.2                                       |
| 12.Electric Strength ,minimum<br>(Laminate & Prepreg as laminated)   | 30  | -   | kV/mm                                      | 2.5.6.2                       | 3.11.1.7<br>3.11.2.3                           |
| 13.Flammability<br>(Laminate & Prepreg as laminated)   | V-0                                       | V-0                                       | Rating                                     | UL94                          | 3.10.2.1<br>3.10.1.1                           |
| 14.Glass Transition Temperature  | --  | >170                                      | °C   | 2.4.24<br>2.4.25              | 3.10.1.6                                       |
| 15.Decomposition Temperature   | --  | >340                                      | °C   | TBD<br>(5% wt loss)           | 3.10.1.10                                      |
| 16.Z-Axis CTE A. Alpha 1<br>B. Alpha 2<br>C. 50 to 260 Degrees C   | --<br>--<br>--                            | (45)<br>(240)<br>(2.8)                    | PPM/°C<br>PPM/°C<br>%                      | 2.4.24                        | 3.10.1.11                                      |
| 17.Thermal Resistance (Copper removed)<br>A.T260<br>B.T288<br>C.T300   | --<br>--<br>--                            | (>60)<br>(20)<br>(5)                      | Minutes<br>Minutes<br>Minutes              | 2.4.24.1                      | 3.10.1.12                                      |
| 18.CAF Resistance  | --  | AABUS                                     | Pass/Fail                                  | 2.6.25                        | 3.12.1.4                                       |

Pass or Fail are determined by Fail Being ≥ 1 decade drop in the sample's initial insulation resistance value.

| IT-180ABS (Prepreg) Property                   | Specification            | Units  | Test Method | Ref. Para |
|--|--------------------------|--------|-------------|-----------|
| 1.Shelf Life, minimum(Condition 1/Condition 2) | 180/90                   | Days   | AABUS       | 3.17      |
| 2.Reinforcement                                | As per IPC-4412 or AABUS |        |             |           |
| 3.Volatile content maximum                     | <1.5                     | %      | 2.3.19      | 3.9.2.2.8 |
| 4.Prepreg Parameters                           | -                        | AABUS  | AABUS       | 1.1.7     |
| 5.Flammability (as laminated)                  | V-0                      | rating | UL94        | 3.10.2.1  |
| 6.Other  | -                        |        |             |           |

\*AABUS =As agreed upon between user and supplier.

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## IT-180ABS/IT-180ATC

High-Tg & Low CTE ( $T_g > 170^\circ\text{C}$ ), Multifunctional Epoxy Resin, Phenolic-Curing, Lead-free process Compatible

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### Process Guideline

#### 1. Prepreg Handling & Storage

- (1) Shelf life is at least 3 months when prepregs stored in a cool dry environment (Temperature:  $< 20^\circ\text{C}$  and Humidity:  $< 50\%$ ).
- (2) Prepreg exposed to humidity should be resealed to minimize moisture of absorption.
- (3) Prepreg should be stored in controlled environment for 12 hours prior to use.
- (4) Prepreg supplied in rolls or panels should be stored horizontally. To avoid damage, no stacking is recommended.

#### 2. Laminate Handling & Storage

- (1) Laminates should be stored in a dry environment
- (2) Laminate should always be stored flat

#### 3. Inner Layer Process

- (1) First around must be take and find a suitable parameter (as dimension compensation, etc) before mass production.
- (2) Inner layers should be baked for at least 40 min at  $120^\circ\text{C}$  after black or brown oxides treatment.  
Note: The material temperature is not allowed to  $> 195^\circ\text{C}$  in lamination process if brown oxide treatment.

#### 4. Lamination Overview

- (1) Stacks must be prepared in lay-up room to avoid moisture absorption.
- (2) Stacks with the core and prepreg is recommended to use the vacuum process for 30 minutes before heated. Recommended pressure ranges should be as follows: Hydraulic/350~400psi Vacuum Hydraulic 300~400psi
- (3) For Lien Chieh Machinery, heating rate is  $1.3\sim 1.8^\circ\text{C}/\text{min}$  from  $80^\circ\text{C}$  to  $140^\circ\text{C}$ , and for Burkle Machinery, the heating rate is  $1.5\sim 3.0^\circ\text{C}/\text{min}$  from  $80^\circ\text{C}$  to  $140^\circ\text{C}$ . Cooling rate is below  $3^\circ\text{C}/\text{min}$ .
- (4) When the board temperature reaches  $180^\circ\text{C}$  during the pressing process, hold for at least 60 minutes.

#### 5. Drilling

Drilling parameters are mainly dependent on hole size, layer thickness, layer number, copper thickness and stack height. The following drilling parameters are for reference only. Typical drilling parameters for 0.4~1.0 mm drills are as follows:

|   |  |
|---|--|
| Spindle speed: 45~105 KRPM  | Feed rate: 50~150 IPM                              |
| Retract rate: 500~1000 IPM  | Max. hit count: <1000 HITS                         |
| Stack height: $\leq 2\text{pnl}(2\sim 6\text{layers})$ , $1\text{pnl}(\geq 8\text{layers})$ | Entry Material: 0.2mm Aluminum                     |
| Back-up Material: 1.5mm Phenolic laminate   | Drilling Machine: Hitachi ND-6L210E                |
| Baking condition:   | After Drilling: $170^\circ\text{C}/2\text{ hours}$ |

#### 6. Desmear

The following desmear parameter is reference only :

Horizontal (JETCHEM)

Swell :  $75^\circ\text{C}$  for 100 s Mn+7 : 55-65 g/l at  $85^\circ\text{C}$  for 180s

Vertical (ROHMHAAS)

Swell :  $65^\circ\text{C}$  for 365 s Mn+7 : 65-75 g/l at  $75^\circ\text{C}$  for 750s

Normally, the typical parameters used to desmear FR-4 product may not produce optimum hole topography for IT-180A, so you should consult with your chemistry supplier to optimize your desmear condition, as desmear two times or adjust other parameter, etc.