# IT-180A

## Features

- Multifunctional Epoxy Resin
- Tg ≥ 175℃ (DSC)
- Low Z-axis Coefficient of Thermal Expansion
- Excellent Dimensional Stability and heat resistance
- Low Water Absorption
- Good Drilling Properties processing Like IT158
- UL 94 V-0
- AOI and UV blocking characteristic

## Properties

**ITEQ Laminate/ Prepreg : IT-180ATC / IT-180ABS**

Spec IPC-4101C/99&101&126

**LAMINATE(** IT-180ATC)

| Property | Thickness<0.50 mm [0.0197 in] | | Thickness≧0.50 mm [0.0197 in] | | Units | Test Method |
|---|---|---|---|---|---|---|
| | Typical Value | Spec | Typical Value | Spec | Metric (English) | IPC-TM-650 (or as noted) |
| Peel Strength, minimum<br>A. Low profile copper foil and very low profile copper foil - all copper weights > 17µm [0.669 mil]<br>B. Standard profile copper foil<br>1. After Thermal Stress<br>2. At 125˚C [257 F] | 0.88(5.0)<br><br><br>1.23(7.0)<br>1.05(6.0) | 0.70(4.0)<br><br><br>0.80 (4.57)<br>0.70 (4.00) | 0.88(5.0)<br><br><br>1.40(8.0)<br>1.23(7.0) | 0.70(4.0)<br><br><br>1.05 (6.00)<br>0.70 (4.00) | N/mm (lb/inch) | 2.4.8<br>2.4.8.2<br>2.4.8.3 |
| Volume Resistivity, minimum<br>A. C-96/35/90<br>B. After moisture resistance<br>C. At elevated temperature E-24/125 | $3.0x10^6$<br>-<br>$5.0x10^7$ | $10^6$<br>—<br>$10^3$ | <br>$3.0x10^7$<br>$1.0x10^8$ | ---<br>$10^4$<br>$10^3$ | MΩ-cm | 2.5.17.1 |
| Surface Resistivity, minimum<br>A. C-96/35/90<br>B. After moisture resistance<br>C. At elevated temperature E-24/125 | $3.0x10^6$<br>---<br>$4.0x10^7$ | $10^4$<br>—<br>$10^3$ | <br>$3.0x10^6$<br>$4.0x10^7$ | ---<br>$10^4$<br>$10^3$ | MΩ | 2.5.17.1 |
| Moisture Absorption, maximum | | - | 0.12 | 0.8 | % | 2.6.2.1 |
| Dielectric Breakdown, minimum | - | - | 60 | 40 | kV | 2.5.6 |
| Permittivity at 1 MHz, maximum (Laminate & Prepreg as laminated) | 4.6 | 5.4 | 4.6 | 5.4 | — | 2.5.5. |
| Loss Tangent at 1 MHz, maximum (Laminate & Prepreg as laminated) | 0.014 | 0.035 | 0.0144 | 0.035 | — | 2.5.5. |
| Flexural Strength, minimum<br>A. Length direction<br>B. Cross direction | <br>-<br>- | <br>—<br>— | <br>580(84,300)<br>450(65,400) | <br>415 (60,190)<br>345 (50,140) | $N/mm^2$ ($lb/in^2$) | 2.4.4 |
| Arc Resistance, minimum | 125 | 60 | 125 | 60 | S | 2.5.1 |
| Thermal Stress 10 s at 288˚C [550.4F],minimum<br>A. Unetched<br>B. Etched | <br>Pass<br>Pass | <br>Pass Visual<br>Pass Visual | <br>Pass<br>Pass | <br>Pass Visual<br>Pass Visual | Rating | 2.4.13.1 |
| Electric Strength, minimum (Laminate & Prepreg as laminated) | 45 | 30 | - | — | kV/mm | 2.5.6.2 |

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|---|---|---|---|---|---|---|
| Flammability,<br>(Laminate & Prepreg as laminated) | V-0 | V-1 | V-0 | V-1 | Rating | UL94 |
| Glass Transition Temperature | 180 | 150 - 200 | 180 | 150 - 200 | ˚C | 2.4.25 |
| Decomposition Temperature | | -- | 345 | - | ˚C | 2.3.40<br>(5% wt loss) |
| Z-Axis CTE<br>A. Alpha 1<br>B. Alpha 2<br>C. 50 to 260 Degrees C | <br>-<br>-<br>- | <br>--<br>--<br>-- | <br>45<br>210<br>2.4 | <br>-<br>-<br>- | <br>PPM/˚C<br>PPM/˚C<br>% | 2.4.24 |
| Thermal Resistance<br>A. T260<br>B. T288 | <br>-<br>- | <br>--<br>-- | <br>>60<br>>20 | <br>-<br>-- | <br>Minutes<br>Minutes | 2.4.24.1 |

PREPREG( IT-180ABS)

| | Typical Value | Specification | Units | Test Method |
|---|---|---|---|---|
| 1. Shelf Life, minimum (Condition 1/Condition 2) | Meet requirement | 180/90 | Days | AABUS |
| 2. Volatile content maximum | 0.5 | 1.5 | % | 2.3.19 |

*AABUS = As agreed upon between user and supplier.

## Laminate Construction

| Nominal Thickness | | Tolerance | | Construction |
|---|---|---|---|---|
| mil | mm | mil | mm | |
| 2 | 0.05 | ±0.5 | ±0.013 | 106*1 |
| 3 | 0.08 | ±0.5 | ±0.013 | 1078*1 or 1086*1 |
| 3.5 | 0.09 | ±0.5 | ±0.013 | 2113*1 |
| 4 | 0.10 | ±0.5 | ±0.013 | 2116*1 or 106*2 |
| 5 | 0.13 | ±0.7 | ±0.018 | 2116*1 |
| 6 | 0.15 | ±0.7 | ±0.018 | 1506*1 or 1080*2 |
| 7 | 0.18 | ±1.0 | ±0.025 | 7628*1 |
| 8 | 0.20 | ±1.0 | ±0.025 | 7628*1 |
| 9 | 0.23 | ±1.0 | ±0.025 | 7628*1 or 2116*2 |
| 10 | 0.25 | ±1.0 | ±0.025 | 2116*2 |
| 12 | 0.30 | ±1.0 | ±0.025 | 1506*2 |
| 14 | 0.35 | ±1.5 | ±0.038 | 7628*2 |
| 15 | 0.38 | ±1.5 | ±0.038 | 7628*2 |
| 16 | 0.40 | ±1.5 | ±0.038 | 7628*2 |
| 18 | 0.45 | ±1.5 | ±0.038 | 7628*2 or 7628*2+2116*1 |
| 20 | 0.50 | ±2.0 | ±0.050 | 7628*2+2116*1 |
| 21 | 0.53 | ±2.0 | ±0.050 | 7628*3 |
| 24 | 0.60 | ±2.0 | ±0.050 | 7628*3 |
| 26 | 0.65 | ±2.0 | ±0.050 | 1506*2+7628*2 |
| 28 | 0.71 | ±2.0 | ±0.050 | 7628*4 |
| 31 | 0.80 | ±3.0 | ±0.075 | 7628*4 |
| 37 | 1.0 1/1 | ±3.0 | ±0.075 | 7628*5 |
| 39 | 1.05 1/1 | ±3.0 | ±0.075 | 7628*5 |
| 41 | 1.1 1/1 | ±3.0 | ±0.075 | 7628*5 |
| 45 | 1.2 1/1 | ±3.0 | ±0.075 | 7628*6 |

| | | | | |
|---|---|---|---|---|
| 57 | 1.5 1/1 | ±5.0 | ±0.130 | 7628*8 |
| 60 | 1.6 1/1 | ±5.0 | ±0.130 | 7628*8 |

Scope : This specification covers ANSI FR-4 thin laminate for use in manufacture of multilayer printed wiring board

## Recommended Process Guideline for IT-180A

# IT-180ABS/IT-180ATC

Mid-Tg(Tg>175℃),Multifunctional Epoxy Resin, Phenolic-Curing, Lead-free process Compatible

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**Processing Guideline**

### 1.Prepreg Handling & Storage

(1) Shelf life is at least 3 months when Prepreg must be stroed in a cool dry environment(<20℃ and 50% RH)

(2 Prepreg exposed at atmosphere should be resealed to minimize moisture of absorption.

(3) Prepreg should be stored in dehumidifier 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 1 hours at 100-120℃,if Inner layers are not used within 24 hours after black or brown oxides treatment

### 4.lamination Overview

(1)Stacks must be prepared in dry 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 is as follow :

Hydraulic /350-450 psi

Vacuum Hydraulic / 300-400 psi

Adara Press /200-300 psi

(3)Heating rate is 1.3-1.8℃/min from 80 ℃ to 140℃,and for Burkle Machinery, the heating rate is 1.5~3.0℃/min from 80 ℃ to 140℃, Cooling rate is below 3℃/min

(4)When the board reaches 180℃ during the pressing process, and hold for at least 60 minutes

### 5.Drilling

Drilling parameter were mainly dependent on hole size, layer thickness, layer number ,copper thickness and stack height, The following drilling parameter is reference only Typical drilling parameters for 0.4-1.0 mm drills

Spindle speed: 110-149KRPM Feed Speed: 45~105 IPM

Retract Rate: 500~1000 IPM Max. hit count: < 1000HITS

Stack height: ≦2 pnls ( 2-6 Layers), 1(≧8 Layers) Entry a Board: 0.2 mm Aluminum

Back-up Board :1.5mm Phenol /paper laminate Drill machine: Hitachi ND-6L210E

Baking condition: After drilling :150 ℃/2hours

## 6.Desmear

The following Desmear parameter is reference only :

Horizontal (JETCHEM)

Swell : 75 C for 100 s

Mn+7 : 55-65 g/ l at 85C for 180s

Vertical (SHIPLEY)

Swell : 65 C for 365 s

Mn+7 : 65-75 g/ l at 75C for 750s

If typical parameters used to desmear FR-4 product may not produce optimum hole topography for IT-180A. Consult with your chemistry supplier to optimize your desmear condition

**Design of initially Compensation factors**

| Thickness | configuration | Direction | Compensator(inch/inch) |
|---|---|---|---|
| 0.010~0.015 | signal/signal | warp | 0.0002~0.004 |
| | signal/signal | fill | 0.0002~0.004 |
| | signal/ground | warp | 0.0001~0.0003 |
| | signal/ground | fill | 0.0001~0.0003 |
| | ground/ground | warp | 0.0000~0.0002 |
| | ground/ground | fill | 0.0000~0.0002 |
| 0.07~0.010 | signal/signal | warp | 0.0004~0.006 |
| | signal/signal | fill | 0.0003~0.005 |
| | signal/ground | warp | 0.0001~0.0003 |
| | signal/ground | fill | 0.0001~0.0003 |
| | ground/ground | warp | 0.0000~0.0002 |
| | ground/ground | fill | 0.0000~0.0002 |
| 0.004~0.006 | signal/signal | warp | 0.0005~0.007 |
| | signal/signal | fill | 0.0003~0.005 |
| | signal/ground | warp | 0.0002~0.0004 |
| | signal/ground | fill | 0.0001~0.0003 |
| | ground/ground | warp | 0.0002~0.0004 |
| | ground/ground | fill | 0.0000~0.0002 |
| ≦0.003 | signal/signal | warp | 0.0007~0.009 |
| | signal/signal | fill | 0.0005~0.0007 |
| | signal/ground | warp | 0.0003~0.0006 |
| | signal/ground | fill | 0.0002~0.0004 |

| | | | |
|---|---|---|---|
| | ground/ground | warp | 0.0002~0.0004 |
| | ground/ground | fill | 0.0001~0.0003 |

For reference

www.iteq.com.tw

| Factory | Address | Tel | Fax | Contact | E - Mail |
|---|---|---|---|---|---|
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