

IT-180A

Features

- Multifunctional Epoxy Resin
- $T_g \geq 175^\circ\text{C}$ (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 \geq 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						
A. Low profile copper foil and very low profile copper foil - all copper weights > 17 μm [0.669 mil]	0.88(5.0)	0.70(4.0)	0.88(5.0)	0.70(4.0)	N/mm (lb/inch)	2.4.8 2.4.8.2 2.4.8.3
B. Standard profile copper foil						
1. After Thermal Stress	1.23(7.0)	0.80 (4.57)	1.40(8.0)	1.05 (6.00)		
2. At 125°C [257 F]	1.05(6.0)	0.70 (4.00)	1.23(7.0)	0.70 (4.00)		
Volume Resistivity, minimum						
A. C-96/35/90	3.0x10 ⁶	10 ⁶		---	M Ω -cm	2.5.17.1
B. After moisture resistance	-	—	3.0x10 ⁷	10 ⁴		
C. At elevated temperature E-24/125	5.0x10 ⁷	10 ³	1.0x10 ⁸	10 ³		
Surface Resistivity, minimum						
A. C-96/35/90	3.0x10 ⁶	10 ⁴		---	M Ω	2.5.17.1
B. After moisture resistance	---	—	3.0x10 ⁶	10 ⁴		
C. At elevated temperature E-24/125	4.0x10 ⁷	10 ³	4.0x10 ⁷	10 ³		
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						
A. Length direction	-	—	580(84,300)	415 (60,190)	N/mm ² (lb/in ²)	2.4.4
B. Cross direction	-	—	450(65,400)	345 (50,140)		
Arc Resistance, minimum	125	60	125	60	S	2.5.1
Thermal Stress 10 s at 288°C [550.4F],minimum						
A. Unetched	Pass	Pass Visual	Pass	Pass Visual	Rating	2.4.13.1
B. Etched	Pass	Pass Visual	Pass	Pass Visual		
Electric Strength, minimum (Laminate & Prepreg as laminated)	45	30	-	—	kV/mm	2.5.6.2

Flammability, (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 (5% wt loss)
Z-Axis CTE						
A. Alpha 1	-	--	45	-	PPM/°C	2.4.24
B. Alpha 2	-	--	210	-	PPM/°C	
C. 50 to 260 Degrees C	-	--	2.4	-	%	
Thermal Resistance						
A. T260	-	--	>60	-	Minutes	2.4.24.1
B. T288	-	--	>20	--	Minutes	

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($T_g > 175^\circ\text{C}$), Multifunctional Epoxy Resin, Phenolic-Curing, Lead-free process Compatible

Processing Guideline

1. Prepreg Handling & Storage

- (1) Shelf life is at least 3 months when Prepreg must be stored in a cool dry environment ($< 20^\circ\text{C}$ 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 taken and find a suitable parameter (as dimension compensation, etc) before mass production.
- (2) Inner layers should be baked for at least 1 hour at $100-120^\circ\text{C}$, 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 $1.3-1.8^\circ\text{C}/\text{min}$ from 80°C to 140°C , and for Burkle Machinery, the heating rate is $1.5-3.0^\circ\text{C}/\text{min}$ from 80°C to 140°C , Cooling rate is below $3^\circ\text{C}/\text{min}$
- (4) When the board reaches 180°C 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 °C/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

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