

IT-180BS/IT-180TC

High-Tg (Tg>170°C), Multifunctional Epoxy Resin, No Fillers, Phenolic-Curing, Lead-free process Compatible

Specification Sheet IPC-4101C/124/129

IT-180TC (Laminate) Property	Specification (Typical Value)		Units Metric(English)	Test Method	
	<0.50mm[0.0197in]	≥0.50mm[0.0197in]		IPC-TM-650	Ref. Para.
1.Peel Strength, As received A.17 micron [1/2 ounce/Ft2] copper and under B. 35 micron [1-ounce/Ft2]Copper C. 70micron [2-ounce/Ft2]Copper D. 105,140,175micron [3,4.5-ounce/Ft2] Copper and above	>4.0 >4.5 >5.0 >5.5	>5.0 >6.0 >8.0 >9.0	(lb/inch)	2.4.8 2.4.8.2 2.4.8.3	3.9.1.1 3.9.1.1.1 3.9.1.1.2 3.9.1.1.3
2.Volume Resistivity ,minimum A. C-96/35/90 B. After moisture resistance C. At elevated temperature E-24/125	10 ⁶ --- 10 ³	--- 10 ⁴ 10 ³	MΩ-cm	2.5.17.1	3.11.1.3
3.Surface Resistivity ,minimum A. C-96/35/90 B. After moisture resistance C. At elevated temperature E-24/125	10 ⁴ --- 10 ³	--- 10 ⁴ 10 ³	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 (Laminate & Prepreg as laminated)	<5.4 (4.7)	<5.4 (4.7)	-	2.5.5.3 2.5.5.5 2.5.5.6	3.11.1.1 3.11.2.1
7.Loss Tangent at 1 MHz ,maximum (Laminate & Prepreg as laminated)	<0.035 (0.018)	<0.035 (0.018)	-	2.5.5.3 2.5.5.3 2.5.5.9	3.11.1.2 3.11.2.2
8.Flexural Strength, minimum A. Length direction B. Cross direction	- -	415(60,190) 345(50,140)	N/mm ² (lb/in ²)	2.4.4	3.9.1.3
9.Flexural Strength at Elevated Temperature , length direction , minimum	-	-	N/mm ² (lb/in ²)	2.4.4.1	3.9.1.4
10.Arc Resistance ,minimum	60	60	s	2.5.1	3.11.1.5
11.Thermal Srtess 10 sec at 288°C [550.4F], min A. Unetched B. Etched	Pass Visual Pass Visual	Pass Visual Pass Visual	Rating	2.4.13.1	3.10.1.2
12.Electric Strength ,minimum (Laminate & Prepreg as laminated)	30	-	kV/mm	2.5.6.2	3.11.1.7 3.11.2.3
13.Flammability (Laminate & Prepreg as laminated)	V-0	V-0	Rating	UL94	3.10.2.1 3.10.1.1
14.Glass Transition Temperature	--	>170	°C	2.4.24 2.4.25	3.10.1.6
15.Decomposition Temperature	--	>340	°C	TBD (5% wt loss)	3.10.1.10
16.Z-Axis CTE A. Alpha 1 B. Alpha 2 C. 50 to 260 Degrees C	-- -- --	(50) (255) (3.0)	PPM/°C PPM/°C %	2.4.24	3.10.1.11
17.Thermal Resistance (Copper removed) A.T260 B.T288 C.T300	-- -- --	(>60) (20) (5)	Minutes Minutes 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-180BS (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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Process Guideline

1. Prepreg Handling & Storage

- (1) Shelf life is at least 3 months when prepregs stored in a cool dry environment (Temperature: <20 °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 °C after black or brown oxides treatment.
Note: The material temperature is not allowed to >200 °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 1.3~1.8°C/min from 80°C to 140°C, and for Burkle Machinery, the heating rate is 1.5~3.0°C/min from 80°C to 140°C. Cooling rate is below 3°C/min.
- (4) When the board temperature reaches 185°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: 50~150 KRPM	Feed rate: 45~105 IPM
Retract rate: 500~1000 IPM	Max. hit count: <1000 HITS
Stack height: ≤2pnl(2~6layers), 1pnl(≥8layers)	Entry Material: 0.2mm Aluminum
Back-up Material: 1.5mm Phenolic laminate	Drilling Machine: Hitachi ND-6L210E
Baking condition: After Drilling: 170 °C /2 hours	

6. Desmear

The following desmear parameter is reference only :

Horizontal (ATO)

Swell: 60-75°C for 190s Mn+7: 55-65g/l at 85°C for 360s

Horizontal (JETCHEM)

Swell : 75°C for 100 s Mn+7 : 55-65 g/ l at 85°C for 180s

Vertical (ROHMHAAS)

Swell : 65°C for 365 s Mn+7 : 65-75 g/ l at 75°C for 750s

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

7. Others

IT-180 material can not be punched.

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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