

IT-180BS

Features

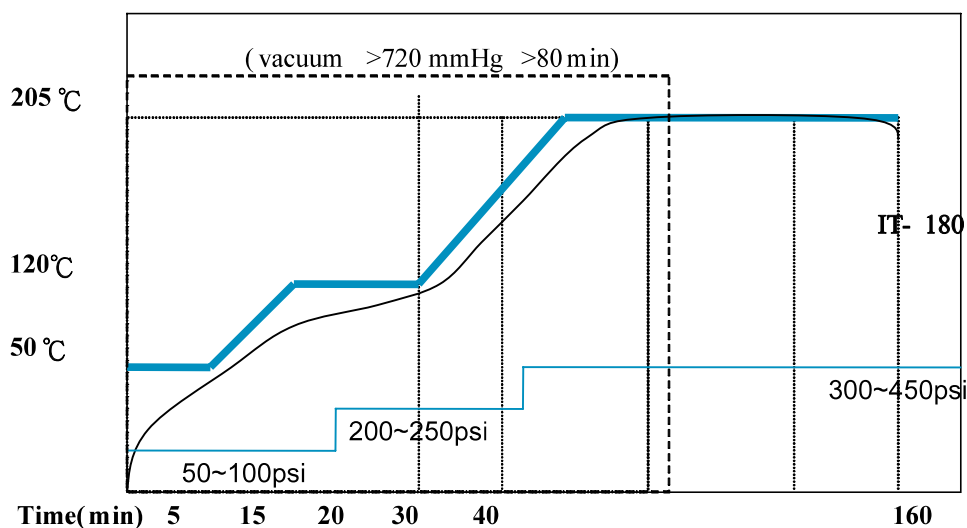
- Multifunctional epoxy resin
- All the prepregs are rheology tested and controlled to achieve consistent dielectric thickness
- Tg: $180 \pm 5^{\circ}\text{C}$ (DSC)

Prepreg specifications

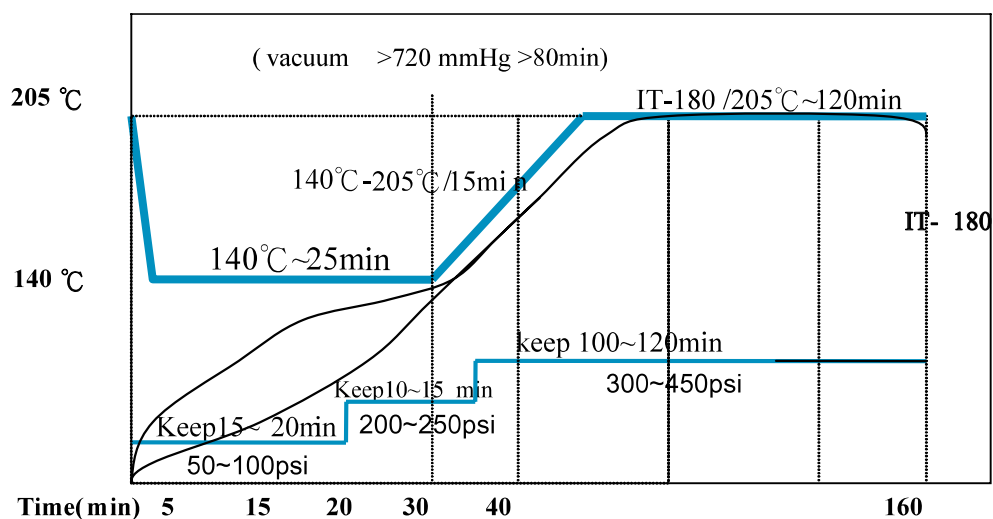
Type	Resin Content ± 2 (%)	Resin Flow ± 5 (%)	Gel Time ± 20 (sec)	Scaled Flow ± 0.4 (mils/ply)	Volatile Content (%)
7628UF	47	24	130	7.2	< 1.2
7628MF	43	21	130	6.9	
7628TF	44	23	130	7	
7628HF	46	25	130	7.3	
7628SF	48	27	130	7.5	
7628LF	46	25	130	7.3	
7629HF	47	29	130	7.2	
7630MF	50.5	31	130	7.7	
7631MF	52	32	130	7.9	
1506MF	48	27	130	5.8	
1506HF	50	29	130	6.1	
1506SF	52	31	130	6.2	
2165HF	52	32	130	5.1	
2116MF	53	30	130	4.1	
2116HF	55	33	130	4.2	
2116TF	50	26	130	4	
2116SF	57	34	130	4.3	
2116UF	47.5	24	130	3.9	
2125MF	50	28	130	4.5	
2125HF	57	36	130	5.8	
2112MF	57	35	130	3.3	
2113HF	56	33	130	3.4	
2113SF	60	37	130	3.5	
3313MF	58	35	130	3.6	
3313IF	54	30	130	3.3	
3313HF	53	31	130	3.3	
1080MF	62	39	130	2.1	
1080LF	63	39	130	2.2	
1080HF	65	42	130	2.3	
1080UF	67	43	130	2.4	
1081	71	50	130	2.6	
106MF	71.5	46	130	1.8	

Recommended Press Cycle for IT-180

(a) Cold Press Cycle



(b) Hot Press Cycle



Suggestion :

1. Heating rate of material between 80°C and 140°C is 1.3~1.8°C/min
2. Curing Condition : 180°C and above for >90min



IT-180TC

Features

- Multifunctional epoxy resin
- Tg 180±5°C (DSC)
- Low Z-axis coefficient of thermal expansion
- Excellent dimensional stability and heat resistance
- Low moisture absorption
- Good drilling properties
- Processable as IT-140
- UL94 V-0
- AOI and UV blocking characteristics

Applications

- Burn-in board
- BGA and CSP substrate
- High layers count (> 10 layers) MLB
- Automotive electronics
- Communication equipment
- Special applications

Laminate Properties

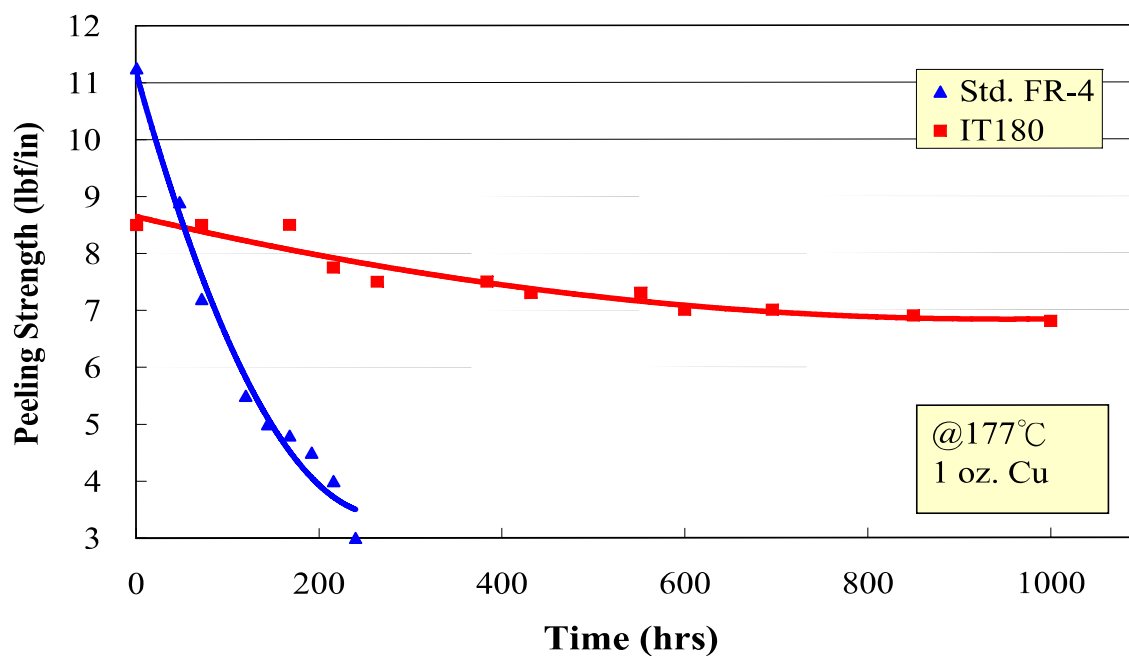
Characteristics	Condition	Units	Value
Tg	DSC	°C	182
Tg	DMA	°C	198
Tg	TMA	°C	172
Z-axis CTE (< Tg)	TMA	ppm/°C	41
Z-axis CTE (> Tg)	TMA	ppm/°C	210
CTE	TMA (50-260°C)	%	2.8
Delamination	TMA (260°C)	min	> 60
Moisture Absorption	PCT/1 hr	%	0.31
Solder Float (Cu)	288°C	min	> 10
Peel Strength (1 oz)	A	lb/in	> 6
Volume Resistivity	A	MΩ-cm	> 7 x 10 ⁶
Surface Resistivity	A	MΩ	> 5 x 10 ⁶
Dielectric Constant	1 M Hz	-	4.6
Dissipation Factor	1 M Hz	-	0.019
Flammability	A	-	94 V-0

* Data shown above are for reference only (1.6mm).

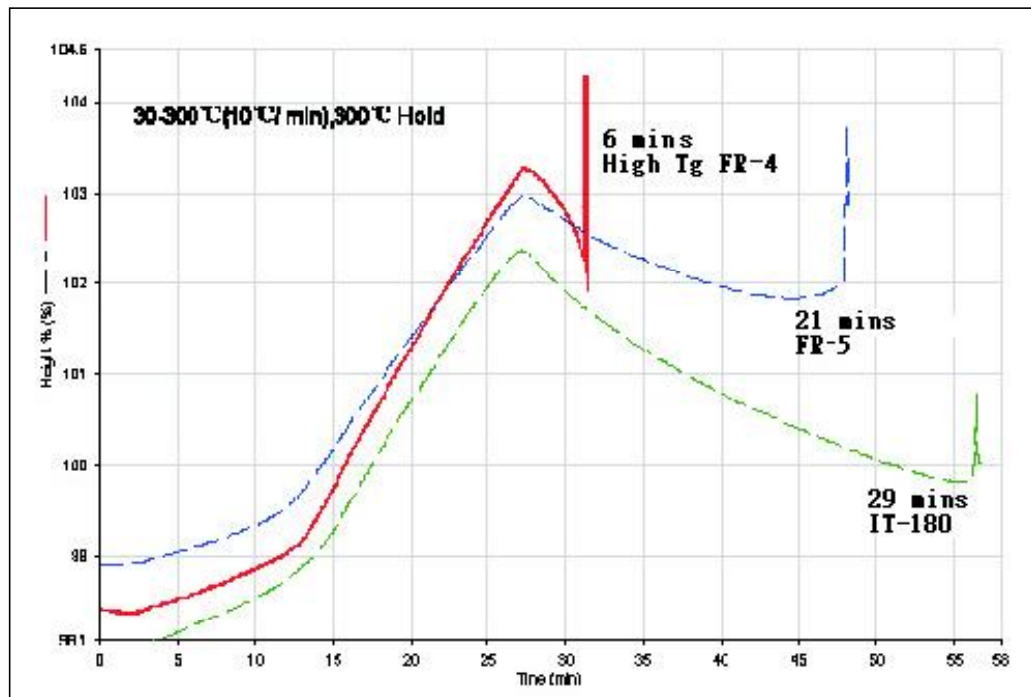
Property Comparison of IT180 Laminate with Various Materials

Test Item	Condition	Unit	Test Results		
			IT-180	FR-5	High Tg FR-4
Tg	DSC	°C	182	178	168
Degradation Temperature	TGA (5% wt. loss)	°C	378	356	316
Decomposition Test	TMA (300°C)	min	29	21	6
Solder Float	288°C	min	> 10	> 10	4
Moisture Absorption	PCT/1 hr	%	0.31	0.32	0.42
Peel Strength (1 oz)	IPC-TM-650	lb/in	8.6	8.5	11.4

Peeling Strength Stability at Elevated Temperature



Decomposition Test by TMA at 300°C



Laminate Constructions

Nominal Thickness		Tolerance		Construction
inch	mm	inch	mm	
0.002	0.05	± 0.0005	± 0.013	106*1
0.0025	0.06	± 0.0005	± 0.013	1080*1
0.003	0.08	± 0.0005	± 0.013	1080*1
0.0035	0.09	± 0.0005	± 0.013	2113*1
0.004	0.10	± 0.0005	± 0.013	2116*1
0.0045	0.10	± 0.0005	± 0.013	2116*1
0.005	0.13	± 0.0007	± 0.018	2116*1
0.0055	0.14	± 0.0007	± 0.018	1652*1 or 2116*1
0.006	0.15	± 0.0007	± 0.018	1506*1
0.0065	0.17	± 0.0007	± 0.018	1506*1 or 1080*2
0.007	0.18	± 0.0010	± 0.025	7628*1 or 3313*2
0.0075	0.19	± 0.0010	± 0.025	7628*1 or 2313*2
0.008	0.20	± 0.0010	± 0.025	7628*1 or 2116*2
0.0085	0.22	± 0.0010	± 0.018	7628*1
0.009	0.23	± 0.0010	± 0.025	7628*1 or 2116*2
0.0095	0.24	± 0.0010	± 0.018	2116*2
0.010	0.25	± 0.0010	± 0.025	2116*2
0.0105	0.27	± 0.0010	± 0.025	2116*2
0.011	0.28	± 0.0010	± 0.025	1652*2
0.012	0.30	± 0.0010	± 0.025	1506*2
0.013	0.33	± 0.0015	± 0.038	1506*2
0.014	0.35	± 0.0015	± 0.038	7628*2 or 2116*3
0.015	0.38	± 0.0015	± 0.038	7628*2
0.016	0.40	± 0.0015	± 0.038	7628*2 or 2116*4
0.017	0.43	± 0.0015	± 0.038	7628*2 + 2113*1
0.018	0.45	± 0.0015	± 0.038	7628*2
0.019	0.48	± 0.0015	± 0.038	7628*2 + 2116*1
0.020	0.50	± 0.0020	± 0.050	7628*2 + 2116*1
0.021	0.53	± 0.0020	± 0.050	7628*3
0.024	0.60	± 0.0020	± 0.050	7628*3
0.025	0.63	± 0.0020	± 0.050	7628*3 + 2116*1
0.026	0.65	± 0.0020	± 0.050	7628*3 + 2116*1
0.028	0.71	± 0.0020	± 0.050	7628*4
0.031	0.80	± 0.0030	± 0.075	7628*4
0.037	1.0 1/1	± 0.0030	± 0.075	7628*5
0.039	1.05 1/1	± 0.0030	± 0.075	7628*5
0.041	1.1 1/1	± 0.0030	± 0.075	7628*5
0.0445	1.2 1/1	± 0.0030	± 0.075	7628*6
0.057	1.5 1/1	± 0.0050	± 0.130	7628*8
0.060	1.6 1/1	± 0.0050	± 0.130	7628*8

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



IT-180 Material Processing Guideline

Prepreg Handling & Storage

- (1) Shelf life is at least 3 months when prepregs stored in a cool dry environment ($< 20^{\circ}\text{C}$ and 50% RH).
- (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.

Laminate Handling & Storage

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

Oxide Treatment

- (1) Innerlayers should be baked for at least 1 hour at $100\text{-}120^{\circ}\text{C}$, if innerlayers are not used within 24 hours after black or brown oxides treatment.

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	350-450 psi
Vacuum Hydraulic	300-400 psi
ADARA Press	200-300 psi
- (3) Heating rate is $1.3\text{-}1.8^{\circ}\text{C}/\text{min}$ from 80°C to 140°C .
- (4) When the board temperature reaches 180°C during the pressing process, hold for at least 90 minutes.
- (5) Cooling rate is below $3^{\circ}\text{C}/\text{min}$.

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	64-105 krpm
Feed Rate	100-149 ipm
Retract Rate	596-600 ipm
Max. Hit Count	1000-2000 hits
Stack Height	2-3 (4-6 layers), 1-2 (> 8 layers)
Entry Material	0.2 mm aluminum
Back-up Material	1.5 mm phenolic laminate
Drilling Machine	Hitachi ND-6L210E

Desmear

The following desmear parameters are for reference only :

Horizontal (JETCHEM)

Swell : 75°C for 150 seconds

Mn+7 : 55-65 g/l at 85°C for 270 seconds

Vertical (SHIPLEY)

Swell : 65°C for 365 seconds for 2 runs

Mn+7 : 65-75 g/l at 75°C for 750 seconds for 2 runs

Typical parameters used to desmear standard FR-4 may not produce optimum hole topography for IT-180. Consult with your chemistry supplier to optimize your desmear conditions.