



# **PROCESSING GUIDELINES**

**Laminate: Synamic8G  
Prepreg: Synamic8GB**

**Halogen-free High Heat Resistance & Ultra-low Loss Material**



This processing guide follows the IPC-4101C standard and is to provide necessary guidance for customer reference, based on Synamic8G/Synamic8GB material features.

## 1. Storage Condition

### 1.1 Laminate core

- **Store Condition**

Pack with original forms on the platform or on the appropriate frame, avoiding stress, prevent sheet deformation caused by inappropriate storage which may impact the subsequent PCB processes.

- **Storage Environment**

Sheets should be stored in ventilated, dry, at room temperature under environment control, avoiding direct sunlight, rain and avoid erosion of corrosive gas (stored environment directly affect the quality of material).

For double-sided copper-clad boards (cores), to minimize shifting as to avoid scratching the surface of the product, with a suitable environment and condition for storage, the shelf life can be up to two years.

- **Operation Manual**

Wear clean gloves and carefully operate the cores. Copper foil collisions, sliding will cause damage of the cores.

Bare hands action will cause contamination to copper foil surface. These defects are likely to cause adverse effects.

### 1.2 Prepreg

- **Storage Condition**

Levels stored in original packaging form, avoiding stress, prevent sheet deformation caused by inappropriate storage condition.

Leftover or cut prepregs should pack and seal with vacuum foil packaging and put it back in the original packaging tray.

- **Storage Environment**

Prepreg sealed packaging should be stored in free of UV irradiation environment, specific storage conditions and the storage period as follows:

Condition 1. At a temperature of  $<5^{\circ}\text{C}$ , storage period for 6 months.

Condition 2. At a temperature of  $<23^{\circ}\text{C}$ , relative humidity  $<50\%$  when stored, storage period for 3 months

Note: Relative humidity affect prepreg quality the most, pay special attention on weather (conduct dehumidification process is necessary for wet weather).

- **Cutting Guideline**

Cutting the best way is left to professional staff wear clean gloves during operation, prevent the pollution of prepreg surface; operation must be careful to prevent prepreg wrinkle or crack, to avoid affect prepregs.

- **Prepregs Use Recommendations**

If moving from a low temperature storage space to a higher temperature or ambient temperature storage space, it must go through the temperature settle process, (8 - 24 hours, settle time is varies depending on



temperature variation in between two storage conditions). Open package after temperature settle process is completed as to avoid affecting the quality and adhesion of prepregs.

For prepreg package stored in above conditions 1 or 2, after open is required to complete the use as soon as possible, for packages opened more than 3 days, it must re-inspect and insure quality before use.

Leftover or cut prepregs should pack and seal with vacuum foil packaging and put it back in the above stated storage condition 1 or 2.

## 2. PCB Process Recommendations

### 2.1 Panel Cutting

- Sawing (preferred) and shearing method is recommended. Be careful of potential edge cracks when using roller cutter or caused by improper gap or cutter blade abrasion.

### 2.2 Thin Core Baking

- Thin core baking depends on actual need. If bake after cutting, it's recommended to rinse cutting panels first, which can remove resin powder brought by cutting and avoid etching problem. Baking condition: 150-175°C/3-5h, be sure to avoid contact directly with heater.

### 2.3 Brown Oxide

- After Brown Oxide treatment, it is recommended to bake 110~120°C/1~2h as to remove moisture before press lamination process. Material should be used within 8 hours after baking.
- For sequential lam or multiple lamination board, suggest baking before brown oxidation, baking condition: 140-150°C/1~2 hour, pile up stack thickness no more than 2 inches. Baking after brown oxidation would be 120°C/1~2 hour.

### 2.4 Lay-up

- Ensure the prepregs direction of warp and fill at lay-up process. Avoid flipping the prepregs during lay-up process to reduce warping, deforming and folding issues.
- Copper compatibility should be evaluated to ensure adhesive reliability. Please contact with SYTECH for more information.

### 2.5 Lamination

- For multilayer pressing, it's recommended to keep heat-up rate at 3-4°C/min (optimal 3.5°C/min) when material temperature at 80-140°C.
- Suggest full pressure set for 400-500psi (optimal 450psi) when material temperature is at 80-100°C. The outer layer temperature per book need to be controlled below 120°C.
- Curing condition: temperature 195-210°C, curing time 100-120min.
- Cooling rate: lower than 3°C/min before cooling down to 130°C.
- If unclad or single-sided core materials are used in multi-layer lamination, surface roughening should be conducted to avoid lack of adhesion.



## 2.6 Drill

- New drill bit, single stack and hit count reduction is recommended for getting better hole quality.
- Control hits counts in the range of 500-1000 hits (for hole diameter 0.5mm or smaller, suggest 500hits). For dense holes area or hole size <0.6mm, LE aluminum cover layer is recommended.
- Reduce chip load 10-20% when compared to standard FR-4. Run trials to get proper drill parameters are necessary. Below parameters are for reference.

**Table 1: Drilling parameters (reference only)**

Diameter		Infeed	Speed	RTR	Max hits	Chipload
(mm)	(inch)	(ipm)	(krpm)	(ipm)	Hit	(mil/rev)
0.20	0.0078	67	95	500	500	0.71
0.25	0.0097	71	95	500	500	0.75
0.30	0.0117	76	95	500	500	0.80
0.35	0.0136	81	95	500	500	0.85
0.40	0.0156	105	63	500	500	1.67
0.45	0.0175	110	60	500	500	1.83
0.50	0.0195	125	62	1000	500	2.02
0.55	0.0214	127	60	1000	500	2.12
0.60	0.0233	130	58	1000	500	2.24
0.65	0.0253	125	55	1000	500	2.27
0.70	0.0272	125	53	1000	500	2.36
0.75	0.0292	125	51	1000	500	2.45
0.80	0.0311	125	50	1000	500	2.50
0.85	0.0331	124	49	1000	500	2.53
0.90	0.0350	123	48	1000	500	2.56
0.95	0.0370	122	47	1000	500	2.60
1.00	0.0389	121	46	1000	500	2.63
1.05	0.0409	121	45	1000	500	2.69
1.10	0.0428	120	44	1000	500	2.73
1.30	0.0506	120	35	1000	500	3.43
1.50	0.0584	115	32	1000	500	3.59
1.70	0.0661	100	28	1000	500	3.57
1.90	0.0739	90	23	1000	500	3.91

- Suggest baking after drill 190°C/3-4h, in racks, and avoid contact of heater directly.

## 2.7 Desmear

- Due to material composition and structure, its chemical resistance is good. Both plasma and chemical desmear are recommended.
- Control etch rate at 0.3 ~ 0.4mg/cm<sup>2</sup> and adjust parameters based on hole quality as to avoid haloing, ICD. Scout lot is suggested prior to manufacturing.
- Detailed parameters follow the actual PCB structure (overall thickness, hole diameter) for setting.



Plasma parameters below are for your reference.

**Table 2: Plasma parameters (Reference only)**

Parameter	Gas Flow Rate (L/min)			Watts (V)	Time (min)	Temp. (°C)	Flow Rate (SLM)	Pressure (mTorr)
	O <sub>2</sub>	N <sub>2</sub>	CF <sub>4</sub>					
Seg 1	2.25	0.25	0.00	9000	45.0	80.0	2.50	250
Seg 2	2.46	0.24	0.30	6500	20.0	105.0	3.00	250
Seg 3	2.50	0.00	0.00	5000	5.0	100.0	2.50	250

### 2.8 Routing/Punching

- Routing process is recommended. Reduce routing speed to prevent edge cracks from outburst mechanical force.
- Punching is NOT recommended for Synamic8G.

## 3. Soldering

### 3.1 Shelf life of PWB

- 3 months with packaging protection.
- Suggest bake at 130-140°C/3~5h prior to assembly.

### 3.2 Reflow

- Synamic8G is compatible for lead-free reflow process

This process guide is for reference only! Should you have any questions, please feel free to contact us.