



# **PROCESSING GUIDELINES**

**Laminate: S1150G**

**Prepreg: S1150GB**

**High Performance, Mid Tg Halogen Free Material**



This product process guideline uses IPC-4101 Standard as a reference, and Shengyi make some changes according to the product characteristics of the actual situation as to making it more suitable for the Shengyi S1150G/S1150GB product use

Halogen-free: Cl≤900ppm, Br≤900ppm, Cl + Br ≤1500ppm(0.15%)

## 1. Storage condition

### 1.1 Laminate

#### 1.1.1 Storage 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.

#### 1.1.2 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 laminates (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.
- For single-sided copper clad laminates, with a suitable environment and condition for storage, the shelf life can be up to one year.

#### 1.1.3 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

#### 1.2.1 Storage method

- 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.

#### 1.2.2 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: 3 months when stored at <23°C and <50% RH.
  - Condition 2: 6 months when stored at <5°C.
- Note: Relative humidity affect prepreg quality the most, pay special attention on weather (conduct dehumidification process is necessary for wet weather).

### 1.2.3 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.

### 1.2.4 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 PP 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 day, 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.

For IQC inspection, PP test should be finished within 5 days from the date of acceptance according to IPC-4101 specification.

## 2、 PWB Processing

### 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 is able to remove resin powder brought by cutting and avoid etching problem.
- Baking condition: 150°C/4-8H, be sure to avoid laminate directly contact with heater.

### 2.3 Brown/Black oxide

- Suitable for brown or black oxide

### 2.4 Lay-up

- Distinguish prepreg direction of warp and fill at lay-up process. Avoid prepreg reversal or overturn in case of multilayer board distortion problem after press.

### 2.5 Press process

- For multilayer board pressing, it's recommended to keep heat-up rate at 1.0-2.5°C/min when material temperature is from 80°C to 140°C.
- Full pressure setting is recommended at the range of 300 – 420 PSI (oil heated), specified value should be determined by multilayer feature (lay-up construction and resin filled area).
- Apply full pressure when the temperature of top layer ranges 80-100 °C.



- Curing condition: >180°C, >45min.
- Maximum 8-10 layers of every open is recommended.
- 14-16 plies of kraft papers (unit weigh is 161g/m<sup>2</sup>) are suggested using at the upper and bottom for every open.
- If pressed by Adara machine, please inform us for more information..
- When adopted single sided or dummy panel for multilayer, be sure to roughen the unclad surface before use, otherwise poor bonding might happen due to smooth surface. Etching double sided board for that purpose is one of optional measures.

## 2.6 Drilling

- New drill bit is recommended.
- Stack count should not be more than 3 panel/stack (calculated by 1.6mm thickness)
- Maximum hit count should range 2000-2500 hits. (1.0 mm hole size)
- Chip load is decreased 5-10% while compared to that of normal material.
- It's recommended to run trials to get proper drilling parameters. Below parameters are for reference only.

Diameter	Spindle	Feed	Return	Hit counts
mm	kr/min	IPM	IPM	hit
0.15	150	37	450	800
0.2	150	53	600	800
0.25	150	69	600	1000
0.3	140	85	787	1000
0.35	137	97	787	1000
0.4	120	100	787	1500
0.45	106	103	787	1500
0.5	96	107	787	1500
0.55	90	110	787	1500
0.6	86	117	787	1500
0.65	81	123	787	1500
0.7	76	126	800	1500
0.75	71	132	800	1500
0.8	67	142	800	1500
0.85	64	135	800	1500
0.9	62	126	800	1500
0.95	60	120	800	1500
1	58	120	1000	1500
1.05	57	120	1000	1500
1.1	56	116	1000	1500
1.15	55	116	1000	1500
1.2	52	112	1000	1500
1.25	50	112	1000	1500

Diameter	Spindle	Feed	Return	Hit counts
mm	kr/min	IPM	IPM	hit
1.4	46	104	1000	1500
1.45	46	104	1000	1500
1.5	44	100	1000	1500
1.55	44	100	1000	1500
1.6	42	96	1000	1500
1.65	42	96	1000	1500
1.7	40	92	1000	1500
1.75	40	92	1000	1500
1.8	38	88	1000	1500
1.85	38	88	1000	1500
1.9	36	84	1000	1500
1.95	36	84	1000	1500
2.0	34	100	1000	1500
2.05	34	100	1000	1500
2.1	32	95	1000	1500
2.15	32	95	1000	1500
2.2	30	90	1000	1500
2.25	30	90	1000	1500
2.3	28	85	1000	1500
2.35	28	85	1000	1500
2.4	26	80	1000	1500
2.45	26	80	1000	1500
2.5	24	75	1000	1500



1.3	48	108	1000	1500
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For reference only.

## 2.7 Desmear

- Excessive Desmear might cause resin recession or rough edges, recommend to fix proper swelling and Desmear parameters. Below parameters are for reference only.

Process	Temperature	Time
Swell	80°C	5~10min
Desmear	77°C	10~20min
Neutralizer	40°C	5~10min

## 2.8 Solder mask

- Be careful of panel distortion or warpage due to improper stack-up at pose baking process.
- Don't recommend solder mask rework process in case measling occurs.

## 2.9 HAL

- Suitable for lead free HAL process.
- If measling detected, bake at 150°C/2-4h before HAL and processing within 4H.

## 2.10 Punching/Routing

- Punching process is not recommended. However, some customers would like to select punching for thin boards especially for small unit design. Therefore, below recommendation is for reference.
  - The thicker the base board, the poor quality of punching, so take it for consideration when thickness >0.5mm.
  - For punching facility: the higher of punching pressure, the better of punching quality.
  - The matching gap of punching mold and blade condition would affect punching quality, suggest fixing the gap around 0.04-0.05mm.
  - Design some perforation in the punching area would help to improve edge cracks.
- Excessive routing speed would abrade the router bit and might cause corner crack, suggest reducing the speed around 20% when compared to standard FR-4.
- Reduce routing length to avoid corner crack due to routing bit abrasion.

## 2.11 Packaging

- Avoid holding on process for a long time, for chemicals or moisture in process would affect the heat resistance and bonding strength.
- Suggest baking finished boards at 125°C/4~8h before packaging to prevent moisture effect. Be sure of stack height for even heating.
- Consider different packaging materials for moisture prevention and long term storage requirement. For a long time storage, it's advised to wrap by aluminum pack.



## **3. PWB Soldering**

### **3.1 Shelf life of PWB**

- 3 months with packaging protection.
- Bake at 125°C/4~6h before assembly is recommended, especially when stored more than 3 months.

### **3.1 Reflow**

- Suitable for lead free reflow process

### **3.2 Manual soldering**

- For separated or connected pad, manual soldering temperature should range 350-380°C and hold less than 3s for single point.

This process guide is for reference only! Should you have any questions, please feel free to contact us. ShengYi will support you with prompt and effective service.