SCGA-500 SERIES

PROCESS GUIDELINES

This process guide follows the IPC-4103 standard and is to provide necessary guidance for customer reference, based on SCGA-500 series products features

1. STORAGE

1.1 Keep laminates as received packaging onto a flat floor or a proper pallet. Avoid heavy pressure and lean in case of distortion occurring due to incorrect storage method.

1.2 Keep laminates at ventilated, dry and ambient conditions. Avoid direct exposure to sunlight, rain and chemical gas. (Storage conditions will affect material properties)

1.3 This product is suitable for long-term storage at above ambient conditions.

1.4 Avoid unnecessary product transfer during process in case of scratch, which might affect material properties.

2. OPERATION

2.1 PTFE is soft compared to FR-4 and handling carefully is recommended.

2.2 Scratches might happen easily and better to handle carefully by gloves protection Storage and operation platform should avoid any foreign material in case of scratch.

3. NOTICES FOR PROCESS

3.1. Do not use any mechanical brushing/scrubbing during PCB processes.

3.2. Inner layer process

3.2.1 Pre-treatment: Chemical cleaning method is advised.

3.2.2 Photo-image: Same as FR-4. Dry film or wet film are available.

3.2.3 Exposure, developing, etching and oxidation: Same as FR-4.

3.2.4 No extra surface treatment (like plasma) is required after I/L etching process, and go press as soon as possible.

3.2.5 Press program: Depends on prepreg combined and select the one suitable for prepreg properties.

3.3. Drilling

3.3.1 Entry and Back-up
Entry: Aluminum board + phenolic board or similar rigid board.
Back-up: Phenolic board or similar rigid board.

3.3.2 Stack-up quantity
As PTFE is very soft, the stack-up quantity is advised as less as possible to avoid hole shifting
When base board thickness ≤30mil, recommend 2 panels/stack;
When base board thickness ≥60mil, recommend 1 panel/stack;
For 2 panels/stack, please use white paper in-between for isolation, to avoid scratches.

3.3.3 Stack-up construction
Advised: Aluminum board + Phenolic board + PTFE (white paper + PTFE) + Phenolic board

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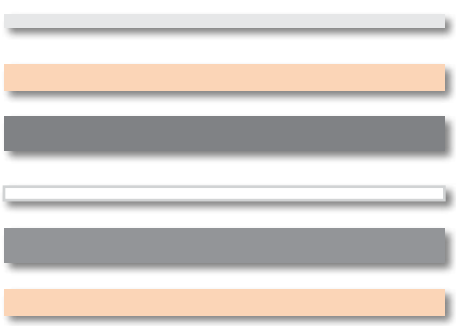
Stack-up sketch



For hybrid multilayers combined with PTFE and FR-4, drilling is recommended to put PTFE at the bottom and FR-4 on the surface.

3.3.4 Drill bit and max hit

- For PTH holes, new drill bits are recommended and do not use re-sharped ones. Max hit count 300-500.
- For Non-PTH holes, re-sharped drill bits are available and re-sharped time depends on drilling quality and not more than 3 times.

3.3.5 Drilling parameters

- PTFE drilling parameters, for reference only.

Diameter mm	Speed(Krpm)	nfeed(IPM)	RTR(IPM)	Maxhit
0.2	70	70	500	300
0.5	50	75	500	400
0.8	30	60	500	500
1	25	50	500	500
2	20	40	500	500
3	20	40	500	400

Remark: Drilling parameters depend on different drilling machine, types of drill bit and hole diameter, and there's relationship among spindle speed, in-feed and return speed, so evaluation for specified drilling parameters is recommended.

- PTFE and FR-4 hybrid drilling parameters, for reference only.

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Diameter mm	Speed(Krpm)	nfeed(IPM)	RTR(IPM)	Maxhit
0.2	120	50	500	300
0.5	77	77	500	400
0.8	55	83	500	500
1	42	83	500 5	00
2	25	50 5	00	z500
3	25	50	500	400

Remark: For hybrid combined with different FR-4 and construction, the drilling parameters should be different and revised correspondingly.

3.4 Smear cleaning

PTFE can't be dissolved by solvents and non-chemical method is preferred for smear cleaning.

We recommend taking plasma treatment. For better cleaning, ultrasonic rinse before plasma is preferred and then bake at 110-120°C/60-90min.

- Plasma parameter 1:

Step	O2	N2	CF4	H2	Pressure (PSI)	RF (w)	Flow Rate	Seg Time (min)
1	80	10	10	0	250	4000	2.5	15
2	0	20	0	80	250	4000	2.5	45

- Plasma parameter 2:

O2	N2	CF4	Mode	Pressure	RF Watts	Flow Rate	Seg Time
80	20	0	V	250	6500	3	30
80	10	10	P	240	6500	3	10
100	0	0	P	250	6500	2.5	5
0	100	0	P	250	6500	3	30

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3.5 PTH

The desmear step in PTH process is not necessary, can directly start from the rinse step. If twice PTH needed, the 2nd PTH can start from pre-dipping step.

3.6 Outer layer AOI

The PTFE surface will gradually become smooth as time goes by, so going through solder mask process as soon as possible after AOI and do not stay for a long time at this process. If needed, less than 8 hours is advised.

3.7 Solder mask

- The bonding between solder mask and base material is only based on mechanical strength but not chemical bonding, so mechanical brushing before solder mask is not recommended in case of destruction of original surface roughness, which might weaken the bonding strength and cause solder mask peel-off problem.
- If solder mask peel-off detected, it's advised to remove solder mask and go through plasma process again to increase the surface roughness, which would strengthen the bonding between solder mask and base material.

3.8 Surface finishing

For antenna application, immersion tin surface finishing is recommended. Immersion silver or gold are also available for other applications. Please avoid HAL surface finishing, if necessary, we recommend as below:

1. Bake production boards at 150°C/2-3H before HAL.
2. HAL temperature should lower than FR-4 requirement and avoid sharply heat-up and cooling during processing.
3. Peak HAL temperature is recommended lower than 255°C

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.

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