

TU-768

Process Guideline

High thermal performance
for lead-free application



- Laminates & Prepregs
- Mass Lamination Service
- Insulated Metal Substrate Materials

tuc 台燿科技
Taiwan Union Technology Corporation (TUC)

www.tuc.com.tw 台灣新竹廠 · 江苏常熟厂 · 广东中山厂
TUC Taiwan · TUC Changshu · TUC Zhongshan



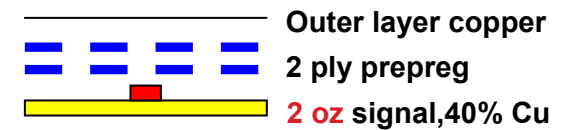
Stack up



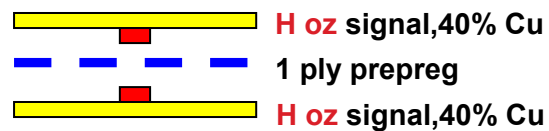
Use any type of prepreg for this dielectric layer



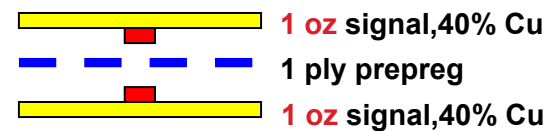
Use 1080 RC66% and above prepreg for this dielectric layer



Use 2 ply 106 and above prepreg for this dielectric layer



Use 1080 RC66% and above prepreg for this dielectric layer



Use 2116 high resin content or any prepreg that is above 2116

Ensure there is no glass stops and good resin encapsulation after lamination by selecting the appropriate prepreg/ bonding sheet. The above serve as a general guide, micro-section should be made during the 1st article run.

Art work compensation factors



The following are the factors affecting the artwork compensation factors :

- Lamination machine and its recipe
- Circuitry design
- Copper density in the inner layers
- Inner layer trace thickness
- Inner layer dielectric thickness
- Type of prepreg/bonding sheet

Start with a current high Tg art work compensation factors and run a prototype before embark to a mass production

Oxide Treatment



For PC board designs to have a better thermal resistance performance, **oxide replacement treatment** is highly recommended.

Note: Perform oxide peel strength test and ensure it is minimum 3 lb/in.

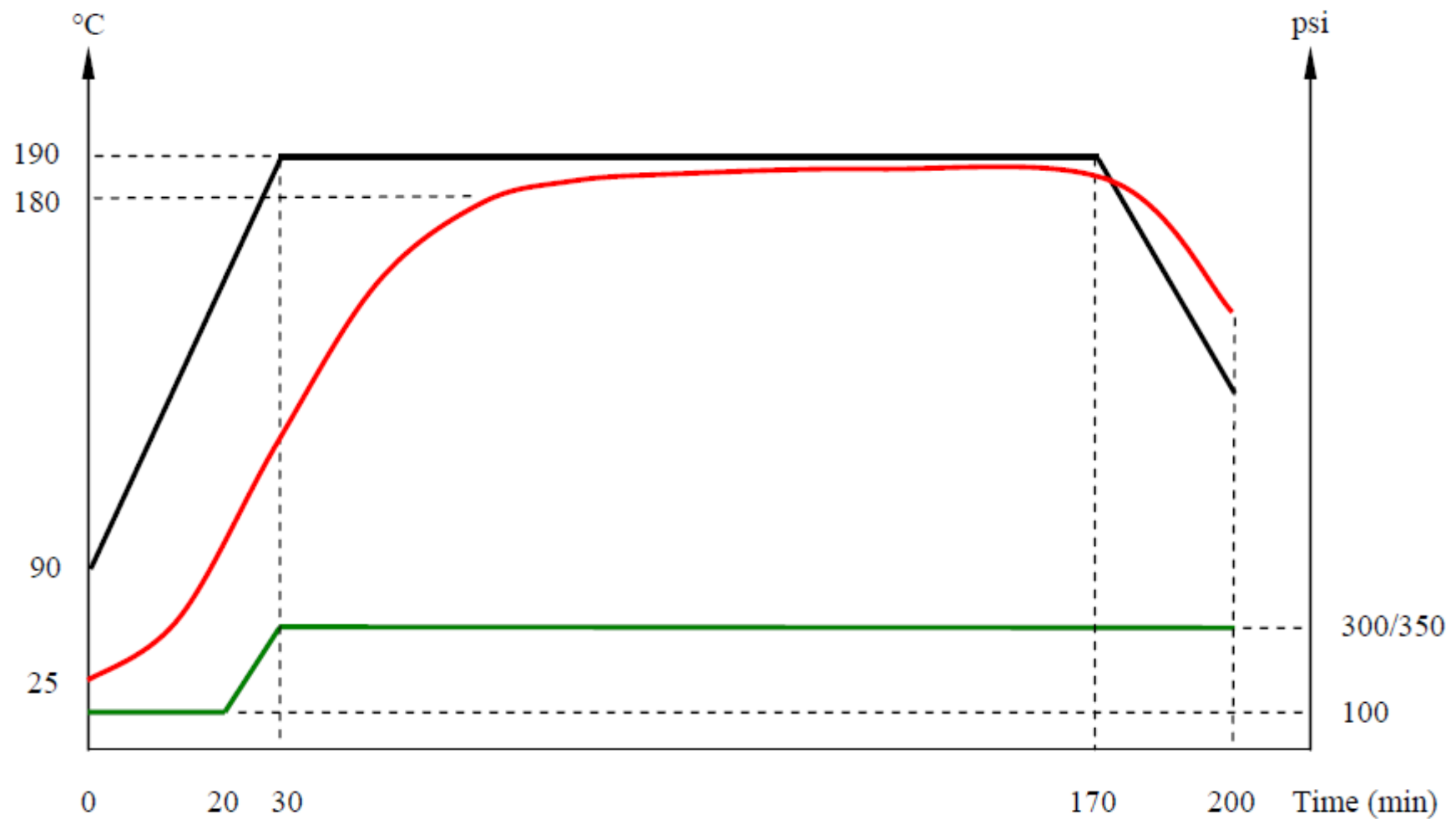
If the inner layer processed through horizontal oxide treatment, bake all the inner layers for **30~45 minutes at 105°C in hot air oven prior to lamination lay-up**. This is to improve the drying effectiveness as the inner-layers have processed through horizontal oxide line.

Laminate



Press type	Hydraulic vacuum press
Platen Temperature	185~195°C depends on the difference between platen and product temperature
Curing	180°C (material temperature) x 80 min
Material Heat Rise	1.5~3.0°C/min (from 70°C to 140°C)
Pressure	–Kiss pressure: 100 psi for 20 minutes, –Apply Full pressure 300~350 psi when the material's temperature reaches 90°C
Cooling Rate	< 3°C/min from
Vacuum	–28 mm Hg
Hot Press Duration	200 minutes typical

Lamination



Drilling



Drill Size		Feed		Speed	Chip load		Max Hit
(mm)	(in)	IPM	m/min	rpm (K)	mil/rev	um/rev	
0.40	0.0157	93	2.36	100	0.93	23.60	1200
0.45	0.0177	101	2.57	100	1.01	25.70	1200
0.50	0.0197	95	2.41	90	1.06	26.78	1200
0.55	0.0217	97	2.46	80	1.21	30.75	1200
0.65	0.0256	101	2.57	75	1.35	34.27	1200
0.70	0.0276	95	2.41	70	1.36	34.43	1200
0.75	0.0295	87	2.21	65	1.34	34.00	1200
0.80	0.0315	80	2.03	60	1.33	33.83	1200
0.85	0.0335	77	1.96	55	1.40	35.64	1200
0.90	0.0354	73	1.85	55	1.33	33.64	1200
0.95	0.0374	69	1.75	50	1.38	35.00	1200
1.00	0.0394	65	1.65	50	1.30	33.00	1200
1.05	0.0413	62	1.57	50	1.24	31.40	1200
1.10	0.0433	69	1.75	45	1.53	38.89	1200
1.15	0.0453	67	1.70	45	1.49	37.78	1200
1.20	0.0472	63	1.60	40	1.58	40.00	1200
1.25	0.0492	62	1.57	40	1.55	39.25	1200
1.30	0.0512	70	1.78	40	1.75	44.50	1200
1.35	0.0531	65	1.65	40	1.63	41.25	1200
1.40	0.0551	63	1.60	35	1.80	45.71	1200
1.45	0.0571	61	1.55	35	1.74	44.29	1200
1.50	0.0591	60	1.52	35	1.71	43.43	1200
2.00	0.0787	55	1.40	30	1.83	46.67	1200
2.50	0.0984	55	1.40	30	1.83	46.67	1200
3.00	0.1181	65	1.65	30	2.17	55.00	1200
3.50	0.1378	55	1.40	30	1.83	46.67	1200
4.00	0.1575	55	1.40	30	1.73	46.67	1200

- Use peck drilling technique when board thickness over 2 mm
- Use under cut drill when there is critical design
- Use good lubricated entry material and backup board when there is a critical design

Post Baking



- Bake the board for 2 hrs @ 180°C after drilling process. This is to release the stresses and enhance the copper plating quality.

Note : Place the PC board in the oven when it has reached 180°C

Smear Removal



Chemical Desmear

- TU-768 can be processed in most of the desmearing chemistry available in the market. Process under high Tg FR4 conditions with one pass or maximum two passes depend on the through hole quality

Processes	Temperature	Duration
Butyl-Hydroxide	75 ~ 80°C	6 ~ 8 min
KMnO ₄	75 ~ 80°C	12 ~ 15 min