ED130UV

UV-blocking Epoxy Laminate

Processing Guide

The processing guidelines contained in this document were developed through in-house testing and field experience. However, they should be considered to be starting points that will require further adjustment. Read the following review of processes for applicability to your particular Printed Wiring Board (PWB) fabrication environment. Remember that the suggestions contained herein can not account for all possible board designs or processing environments. Additional adjustments by the fabricator will be necessary. Isola can and will assist with this process, but the fabricator, not Isola, is ultimately responsible for their process and the end results. ***Fabricators should verify that PWBs made using these suggestions meet all applicable quality and performance requirements.***

Part 1: Innerlayer Preparation

Isola Group's ED30UV laminates are fully cured and ready for processing. It has been the experience of most fabricators that stress relief bake cycles are not effective in reducing any movement of rigid laminates such as ED130UV. Therefore, it is suggested that the movement of unbaked laminate be characterized and the appropriate artwork compensation factors are used.

Imaging and Etching

ED130UV laminates are imaged using standard aqueous dry films and are compatible with both cupric chloride and ammoniacal etchants.

Part 2: Drill

ED130UV materials exhibit greater modulus properties as a result of the increased thermal stability of the resin system. During drilling, the debris formation with ED130UV is different from the standard FR4 materials. Due to the increased thermal decomposition properties of the resin system, the ED130UV drill debris remains as free particles and will not impact the drill flute relief volumes.

Cutting Speed and Chipload

The parameters in **Table 1** and **Table 2** provide moderate initial starting ranges for typical board designs.

Stack Hight and Hit Count

Stack heights and hit counts will vary with construction and overall thickness of the boards being drilled. Aluminum entry and lubricated backing help create good quality hole walls but are not essential in all applications. Do not exceed 1,000 hits for bits below 0.020″ (0.508 mm) diameter and 1,500 hits for bits above 0.020″ (0.508 mm).

Drill Size		Spindle Speed	Surface Speed Per Minute		Infeed		Chipload	
inch	mm	rpm	SFPM	SMPM	in/min	m/min	mil/rev	mm/rev
0.010	0.25	90,000	235	71	65	1.65	0.70	0.018
0.015	0.40	80,000	315	96	80	2.03	1.00	0.025
0.020	0.50	60,000	315	96	90	2.29	1.50	0.038
0.025	0.65	54,000	350	107	80	2.03	1.50	0.038
0.030	0.80	48,000	375	114	85	2.16	1.80	0.046
0.035	0.90	44,000	400	123	88	2.24	2.00	0.051
0.040	1.00	43,000	450	137	107	2.72	2.50	0.064
0.050	1.30	34,000	450	137	85	2.16	2.50	0.064
0.060	1.50	29,000	450	137	72	1.83	2.50	0.064
0.080	2.00	21,000	450	137	55	1.40	2.50	0.064

Table 1: Suggested Drilling Parameters For Initial ED130UV Setup with Undercut Bits

Drill Size		Spindle Speed	Surface Speed Per Minute		Infeed		Chipload	
inch	mm	rpm	SFPM	SMPM	in/min	m/min	mil/rev	mm/rev
0.004	0.10	180,000	186	57	43	1.10	0.24	0.006
0.010	0.25	180,000	464	141	134	3.40	0.74	0.019
0.020	0.50	95,000	490	149	138	3.50	1.45	0.037
0.040	1.00	48,000	495	151	161	4.10	3.36	0.085
0.060	1.50	32,000	495	151	114	2.90	3.57	0.091

Table 2: Suggested Alternate Drilling Parameters For Initial ED130UV Setup with Undercut Bits and High-Speed Spindles

Part 3: Hole Wall Preparation

General

Good desmear and electroless copper deposition performance are more easily achieved when the drilled hole quality is good. The generation of smooth, debris free hole walls is influenced by the degree of resin cure, drilling conditions and board design considerations.

Factors which influence chemical desmear rates, and therefore the suggestions in this document, include: resin type, chemistry type, bath dwell times, bath temperatures, chemical concentrations in each bath and the amount of solution transfer through the holes.

Factors which influence the amount of solution transfer through the holes include: hole size, panel thickness, work bar stroke length, panel separation in the rack and the use of solution agitation, rack vibration and rack “bumping” to remove air bubbles.

Chemical Desmear

Dwell times and temperatures typically used for most high performance materials should be satisfactory. Extended dwells or double-passes through permanganate will increase resin removal. Cyclic amine chemistry tends to produce more consistent results than permanganate sensitizer baths based on glycol ether. Consult the chemical supplier for suggested conditions.

Part 4: Secondary Drilling, Routing and Scoring

Secondary Drilling

As common with most high Tg epoxy materials with increased modulus properties, the use of entry and backer material may be necessary during the secondary drilling of larger hole sizes to avoid crazing/fracturing at the hole perimeter. Additionally, sharper plunge point angle geometries may be necessary to avoid crazing around secondary drilled hole perimeters.

Routing and Scoring

Table 3: Suggested Routing Parameters for Initial ED130UV Setup

Tool Diameter		Spindle Speed	Spindle Travel Speed	
inch	mm	rpm	in/min	m/min
0.060	1.50	45,000	20	0.50
0.100	2.50	35,000	40	1.00
0.125	3.20	25,000	50	1.27

Due to the greater modulus properties of the ED130UV materials, modifications of the final PWB rout fabrication process may be necessary. **Table 3** lists initial starting parameters using chip breaker or diamond cut tool designs. ***Note that parameters listed may require further adjustment.*** Chip breaker or diamond cut tool designs are recommended.

For PWB designs requiring scored geometries, the testing of various Tg’s and resin content materials has determined that adjustments to the process will be necessary. As the modulus strength of materials increases, the maximum resultant web thickness (dependent on the scored edge depth) must be decreased to avoid excessive fracturing upon breaking away the scored materials.

The customer should contact the scoring equipment and/or bit supplier for application specific suggestions for use with ED130UV materials. Your Isola Technical Account Manager may also be able to provide some initial suggestions, but these should be validated through testing by the individual PWB fabricator.

Part 5: Packaging and Storage

ED130UV finished boards have low moisture sensitivity and good shelf life. However, Isola recommends using best practices in storage and packaging, as noted below, to reduce risk during assembly. Printed boards made from ED130UV, which require a long shelf life, the best protection is provided using a Moisture Barrier Bag (MBB) with a Humidity Indicator Card (HIC) and adequate drying desiccant inside the MBB to prevent moisture absorption during shipment and long-term storage. Upon opening the MBB, the boards should be processed within 168 hours when maximum shop floor conditions are at < 30°C (85°F)/60% RH. MBB bags that are opened for inspection should be resealed immediately to protect the boards from moisture uptake.

Part 6: Health and Safety

Always handle laminate with care. Laminate edges are typically sharp and can cause cuts and scratches if not handled properly. Handling and machining of prepreg and laminate can create dust (see ED130UV Material Safety Data Sheet). Appropriate ventilation is necessary in machining/punching areas. The use of protective masks is suggested to avoid inhaling dust. Gloves, aprons and/or safety glasses are suggested if individuals have frequent or prolonged skin or eye contact with dust. Isola Group does not use polybromidebiphenyls or polybromidebiphenyloxides as flame retardants in any product. Material Safety Data Sheets are available upon request.

Part 7: Ordering Information

Contact your local sales representative or visit: **www.isola-group.com** for further information.

Or contact us at: **info@isola-group.com**

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https://www.isola-group.com/products/all-printed-circuit-materials/ED130UV

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NOTES

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