



PRODUCT BULLETIN

Novaclad[®] G2300 and G2400 Etching

- If you are using acidic copper etching chemistries such as cupric chloride, ferric chloride, or peroxide sulfuric, no secondary etch is required.
- However, if you are using an alkaline etchant chemistry system, a thin conductive "seed coat" will remain on the *Novaclad* dielectric surface. An additional etching procedure must be followed to obtain the good surface resistivity characteristics denoted in the product specification. One successful process for etching the *Novaclad* seed coat is summarized in the following:

NOVACLAD SECONDARY ETCHING SETUP		
Chemicals	Potassium permanganate	0.45% to 0.55% by weight
	Potassium hydroxide	0.45% to 0.55% by weight
	Deionized Water	99% by weight
Plumbing and Tanks	Use polypropylene or titanium Do not use PVC; it becomes brittle Do not expose stainless steel fittings to the bath	
Controls	Bath Temperature	22 to 32°C
	pH	11.5 to 12.5
	Permanganate concentration	Maintain 0.45-0.55% weight

Process:

- With post-etch bath maintained at 22 to 32°C, a dip of etched *Novaclad* material in the above solution for 20-60 seconds will remove the seed coat and ultimately give the exposed polyimide film its original surface resistivity.
- The effectiveness of this etchant will degrade with time and use. The pH of the solution is most critical. Check the pH daily. Maintain the pH at 12 ± 0.5 with gradual addition of potassium hydroxide. The concentration of potassium permanganate must be maintained in the range of 0.45 to 0.55% (use sodium oxalate titration technique).
- A sodium persulfate (10% by weight) micro-etch is needed after the permanganate etch to remove etching residues (brown-colored stain found if materials are wiped with white cloth after permanganate etch). Adjust bath concentration, copper content, temperature or immersion time so copper thickness is reduced no more than 0.3 micron. Rinse materials thoroughly with deionized-water after this micro-etch.
- Periodically test the exposed polyimide surface to verify that surface resistivity is at least 1×10^5 megohms using IPC-TM-650-2.5.17. If the resistivity is low, check the concentration and pH of the permanganate bath.



- Recommended construction materials for modules containing this chemistry are titanium and polypropylene. Do not use PVC; it gets very brittle in this chemistry. Do not use stainless steel unless it is sealed from the chemistry. For example, use polypropylene-coated stainless steel rollers with shafts tipped with titanium, titanium pump blades and shafts, and polypropylene tanks.
- Etching is optimum when using cone-pattern spray nozzles.