## Hole Wall Preparation

fastRise™ requires a PTFE activation cycle. fastRise™ will benefit from a desmear/etchback process performed prior to the PTFE activation.

## Desmear

**Plasma**

If panels have been exposed to moisture, bake the boards at 220°F - 250°F (105°C - 120°C) for one or more hours to drive out moisture. Standard FR4/epoxy desmear processes should then be used. The desmear plasma time is typically half that of standard FR4/epoxy times because fastRise™ resin system tends to etch back very quickly.

**Permanganate**

Permanganate desmear IS NOT RECOMMENDED and has been shown to be very aggressive on fastRise™ resulting in excessive etchback. This is due to the high silica filler content and thermoset content in the resin system. If permanganate baths must be used for desmear or activation of other materials used in conjunction with fastRise™, consult with your AGC technical service representative for specific process recommendations.

## PTFE Activation

**Plasma**

If panels have been exposed to moisture, pre-bake the boards at 220°F - 250°F (105°C - 120°C) for 1 hour. Plasma treat the PTFE resin using 70%/30% Hydrogen/Nitrogen gas mixture. 100% Helium may also suffice. Power settings for the RF-signal generator are typically 60-75% of full rated power for 30-60 minutes, but results may vary. Thick panels or high-aspect ratio holes may require extended plasma cycle times. Thick panels may also benefit from an additional 30 minute O2 plasma process prior to the PTFE activation plasma.

**Sodium Etch**

Sodium Etches (e.g. Fluoroetch) work well with fastRise™ as well as other AGC materials. Follow the manufacturer's recommended treatment process. Subsequently, bake for 1 hour at 250°F (120°C) prior to plating to remove moisture that may have been absorbed during the sodium treatment process.

Chlorine can have adverse effects on the sodium treatment. Do not subject exposed sodium etch treated holes to heavily concentrated chlorine-based chemical processes.

## Process Example

The following table is offered by March Plasma as a basic starting point recipe:

| Power (kW) | Pressure (mT) | Gases | Gas Ratios | Flow (slm) | Pnl Temp (°C) | Time (minutes) | Function |
|---|---|---|---|---|---|---|---|
| **4.5** | 250 | O2 / N2 | 90 / 10 | 2.5 | 90 | A/R | Heating |
| **4** | 250 | CF4 / O2 | 10 / 90 | 2.5 | 99 | 10 | Thermoset etch-back |
| **4** | 250 | O2 | 100 | 2.5 | 99 | 5 | Removes fluorine and cleans the glass |
| **4.2** | 250 | N2 | 100 | 2.5 | 99 | 30 | Activates PTFE. 70/30 H2/N2 Cycle is typically more effective and reliable |

Note: Regardless of which method of hole wall treatment is used, desmearing of the thermoset resin should be done prior to treatment of the PTFE resin.

## Plating

A robust hole wall preparation process is necessary for a successful deposition plating process due to the PTFE content in the fastRise™. Following hole wall preparation, fastRise™ will accept standard electroless copper or direct metallization plating. For high-aspect ratios or other difficult to plate applications, a second pass through the electroless process is sometime used to ensure proper hole-wall coverage. It may also be beneficial to run a short duration of electrolyzed copper, rinse etc., then restart the electrolyzed copper from the beginning to expose the hole wall to fresh chemistry.

## Image, Develop, Etch, Srtip

When copper surface preparation is required, chemical cleaning processes are preferred (e.g. microetch); mechanical scrubbing (e.g. pumice scrub) should be avoided due to possible mechanical damage. Although fastRise™ should be resistant to this damage, typical materials used in conjunction with fastRise™ may not be. Otherwise, standard processing should be used.

## Solder Mask

Panels should be clean and dry. No other special treatment is required if the surface has not been mechanically scrubbed.

## Solder Reflow

A pre-bake cycle of 2 – 3 hours at 300°F (150°C) is recommended prior to thermal stressing. Longer pre-heat times and minimal cycle times may be advantageous depending on design and processes.

## Routing / Milling

fastRise™ can be successfully machined using standard router bits or end mills. Machine parameters will be driven by the laminates used. In general, rigid phenolic entry and a rigid backer should be used. In some cases, adding paper (white paper or craft paper) between the phenolic and the part allows better conformance to surface topography (e.g. circuits, soldermask, etc.) and may reduce burring. For tight tolerances or superior edge quality, a “rough cut” placed 0.005 – 0.010” (0.1 – 0.2 mm) off the part edge may be run prior to the finish cut at the nominal part edge.



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