

CL Copper

Processing Guidelines

Processing Guidelines- Handling

- As with standard foil, care must be taken to avoid scratching surface.
- Avoid fingerprints by handling by edges or wearing gloves.
- Insure automatic load/unload equipment and process equipment do not damage or contaminate surface.

Processing Guidelines- Pre-clean

- Baking of cores prior to pre-clean is usually not required and may cause surface defects.
- Micro-etch is not required to roughen surface (some use 0.25 to 0.45 microns to clean surface).
- **Recommend the use of acid pre-clean (5- 10% Sulfuric or proprietary mixture), followed by a neutral to slightly caustic rinse (pH 7.0 to 8.0).**
- **Complete drying is critical**

Processing Guidelines- Resist Application

- **Apply Resist immediately after pre-clean**
- Tacky Roll cleaner (“Teknek” style) may be beneficial to remove loose debris
- Liquid or Dryfilm Resists can be used
- **Perform optimization studies of temperature and pressure for dryfilms**
 - Due to better adhesion with CL, may need to reduce temperature (5 to 10°C) or pressure (1 to 2 bar)
- **Minimize hold time between Resist Application and Expose (< 24 hours)**

Processing Guidelines- Expose (Imaging)

- When processing thin core (<250 micron) and/or product with tight registration tolerance, **Artwork may need to be re-scaled (re-sized)**
 - Cores with CL copper show generally less shrinkage than standard cores
 - Fill direction has actually shown growth for certain product
- Artwork lines/spaces can be adjusted to take advantage of better etch factors (spaces can be reduced)
- **Perform stepwedge to optimize expose energy**
- **Minimize hold time between Expose and Develop**

Processing Guidelines- Develop Resist

- **Perform breakpoint and adjust speed accordingly**
 - May need to slow developer, raise temperature or pH
- **Insure Developer has regular cleaning schedule**

Processing Guidelines- Etch Copper

- **Perform breakpoint and adjust speed accordingly**
 - May need to increase etcher speed and/or lower pressures
- **Insure Etcher has regular cleaning schedule**

Processing Guidelines- Strip Resist

- **Perform breakpoint and adjust speed accordingly**
 - May need to slow stripper, raise temperature or concentration
- **Insure Stripper has regular cleaning schedule**

Processing Guidelines- Automatic Optical Inspection

- **Process cores as soon as possible after resist strip (minimize oxidation)**
 - May need to add anti-tarnish to resist strip
- **Optimize inspection parameters**
 - CL is less reflective and thresholds will need to be adjusted.
 - May need to de-sensitize “dishdown” channel (for laser based systems).
 - Once a part number is set-up for CL it should stay CL to avoid going back and forth between settings.
 - Standardize on one foil manufacturer (treatment and surface finishes will vary by supplier)

Processing Guidelines- Oxide

- **Start Process with Alkaline Cleaner (remove any residual resist)**
- **Minimize Micro-etch (0.25 to 0.45 is sufficient)**
- **Optimize Dwell time in Oxide to obtain desired weight gain and cosmetics**
 - Time can usually be reduced to obtain same weight gain
- Insure proper operator training to minimize scratches

Summary

- CL copper provides many benefits in the manufacturing and properties of multilayer circuit boards.
- Existing processes can be used as long as consideration is given to CL properties and adjustments made.
 - Micro-etching, etching and oxidizing times can be reduced
 - Developing and Stripping times may be increased
 - Artwork may need re-scaling and line/spaces adjusted
 - Hold times should be minimized to prevent “lock-in”