



Shin-Etsu CA Series Coverlay

Process Guidelines for Laminating Flexible Circuit Coverlay

General

Shin-Etsu Chemical Company, Ltd., suggests these procedures to laminate the CA Series Coverlay. Circumstances will dictate the methods preferred by individual users. These are only guidelines. Users should try their normal lamination cycle first, and then experiment to fit the user's process flow and equipment.

In general, epoxy adhesive will flow and bond at lower temperatures than the acrylic adhesives. Users can laminate at temperatures higher than suggested. This will reduce lamination time and pressures.

These suggested procedures address the lamination of coverlay to high density, fine line - 0.0015" lines and spaces - circuitry to achieve complete fill of the adhesive between adjacent circuit traces. Designs with wider lines and spaces or lower density should not require pressures as high as those mentioned here.

NOTE

Users must refrigerate all coverlay at or below 5° C (40° F) to maintain desired flow and bonding properties. Epoxy products require refrigeration to maintain their flow properties. Prior to use, we suggest that you remove the coverlay from the refrigerator and allow it to equilibrate to room temperature. This will prevent moisture from condensing on the polyimide film and release sheet when in humid environments. Remove the roll from the box but keep it in the plastic bag. This will speed the temperature equilibration step.

After equilibration, unwind the desired quantity of coverlay from the roll and cut it off. Replace the unused portion of the roll in the plastic bag and then in the box. Place the box in the refrigerator. The coverlay at room temperature will give good results for a week or more (see graphs).

Typical Process Conditions

1. Pre-clean

Clean circuit and copper prior to lamination.

Remove dust particles et cetera from the coverlay prior to removing release sheet. Use vacuum or ionization methods to accomplish thorough cleaning.

2. Lay-up



Arrange lay-up as shown in Figure 1. Users may wish to do multiple laminations in a book. Use a separate caul plate and release sheet for each lamination in the book.

Use silicone rubber sheet (or paper) as a press pad for cushioning.

Use polypropylene sheets as the release sheet for press temperatures under 140° C. Use polymethylpentene sheet for press temperatures over 150° C. Skived PTFE will work as a release sheet also.

3. Press Conditions

- a. Set the platen temperature to 160° C. Place lay-up(s) in the press as shown in the figure.
- b. Close press to a pressure of 5-10 kg/cm² (70-140 psi).
- c. Release pressure (bump) at 5 minute intervals 5-10 times to remove entrained air. Or use vacuum bagging (a.k.a. “turkey bag”) with or without an initial nitrogen (N²) purge. Reduced time at this stage will allow reduced pressures in the 3.d because the epoxy will have B-staged less.
- d. Raise pressure to 30-50 kg/cm² (420-700 psi) and maintain for 30 minutes at 160° C.
- e. Cool to less than 50° C (122° F). Release pressure. Remove fully cured coverlay on flexible circuit lay-up(s).

4. Alternate Press Conditions

We suggest the following method to reduce the cycle time in the press.

- a. Follow procedures 3.a through 3.f BUT reduce press time in 3.e from thirty (30) minutes to ten (10) minutes.
- b. Then, post-cure the lay-up in an oven for 3 hours at 130° C (266° F).

OR

-
-
- c. Remove fully cured, laminated coverlay from the oven after cooling to ambient.