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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

MG Epoxies Potting Recommendation

Manual Batch Processing

How To Hand Mix the MG Epoxies Potting Compound

Purpose

The generic procedure provided herein is for manual processing of MG epoxies. For more product-specific details, see the specialized technical data sheets or instruction guides for the product. We have based this guide on our experience and industry best practices.

All suggestions must be critically reviewed, and if necessary, altered or substituted in accordance to the specification and operating constraints of your printed circuit assembly. The components, application conditions, and geometry do affect the recommendations. Further, the equipment availability, automation capabilities, and production facility requirements also may require adjustments.

Caution!
It is your responsibility to determine chemical, mechanical, and thermal compatibility of your PCB prior to using the material and methods suggested. Do not exceed the amount of mechanical force or temperature limits that can be safely applied to your components.

M.G. Chemicals Ltd does not warrant that the methods suggested are safe for all types of PCB applications. Use at your own risk and discretion.

Required Equipment and Supplies

- Wiping cloth or paper towel for cleaning tools and equipment
- Gloves and personal protective clothing
- 3 x 12" stainless steel stirring spatula for 1L kits,
  —OR—
  2 × 48" paddles for 20 L [5.2 gal] pail kits.
  - Label paddles *A*, *B*, and *Mix*, respectively.
- A volume or mass measurement or dispensing devices
- One mixing container sufficiently large to hold both epoxy parts while leaving room for stirring. **WARNING!** Mixing entire batch in one step will reduce working time. To avoid flash cure, keep mixing container size below 2 L.
- (Optional) Oven set at 65 °C [149 °F]
- (Optional) Vacuum chamber for de-airing
- (Optional) Ethyl lactate solvent (Cat. No. 8328-500ML) for cleaning uncured epoxy spills

Step 1) Stirring of Individual Epoxy Parts

Thorough stirring of individual parts is required prior to jointly mixing each part together.

WARNING! Failure to properly stir individual parts before joint mixing can cause surface defects, degrade the cured properties, or even cause cure failures. Further, improper pre-stirring of parts can create irrecoverable off-ratio conditions that renders the remainder of the stock material unusable.

Additional Requirement

- Requires strong upper body strength to stir pail size containers well.

To stir part A

1. With a part *A* paddle, scrape the walls and bottom of a part *A* pails to lift, break up, and re-incorporate all settled material into solution.
2. Stir slowly, in one circular direction only; fold the material from the bottom onto the top.
3. Continue stirring until the solution is homogenous. The material should show uniform color and consistency without color tint variations or visible chunks.
4. If material sits for more than an hour, re-stir back to homogeneity prior to processing.

CAUTION!
Do not cross contaminate. To avoid premature curing, use different stirring tools for parts A & B.

CAUTION!
Quickly reversing mixing direction or using a whipping action can traps air in mixture leading to bubble problems.

To stir part B

Follow instructions for part *A*, but substitute part *B* in text. (Do NOT use the same paddle as for A.)

As long as parts are not cross-contaminated, the shelf-life of each part is generally about ≤5 years. Between processing, put the pail cover back on unused parts *A* or *B* to avoid contamination from dust, humidity, or other foreign materials.

Step 2) Mixing of Epoxy Parts (A + B)

Estimate the part A and B volumes that will be needed for your potting application prior to mixing. To avoid waste, mix the needed epoxy amounts only when you are ready to encapsulate your components. Ensure you use up the pot material within that time window. The pot life for the mixed the MG epoxies is generally about one hour at room temperature.

Additional Requirement

- Requires strong upper body strength for proper mixing in pails size containers.
- Ensure the readiness of the molds, assembly, and components prior to mixing. Cleanliness and dryness the material to be potted should be ensured prior to mixing.
- If more than 500 mL are being prepared at a time, the batch should be split across multiple pots. (For extremely high throughput or large volumes, mechanical epoxy dispensing units should be used.)

To creating potting mixture

1. Measure a volume of pre-stirred *A,* and pour in the mixing container.
2. By the given ratio, measure the corresponding volume of pre-stirred *B*, and slowly pour in the mixing container while stirring.
3. With a *Mix* paddle, scrape the walls and bottom of the mixing container.
4. For 3 minutes, stir slowly in a circular unidirectional motion while folding the material from the bottom onto the top to create a homogeneous mixture.
5. Let sit for 30 minutes to de-air.
   —OR—
   Put in a vacuum chamber, bring to 25 Hg/in pressure, and wait for 2 minutes to de-air.
6. If bubbles are present at top, use the mixing paddle to break them.

ATTENTION!
Follow the product A:B mix ratio as closely as possible. Deviations of ≥10% are not acceptable.

ATTENTION!
Without stirring, mixing >500 g [0.4 L] of Part *B* at time into *A* can promote flash cure.

The potting mixture is ready to use. At room temperature, the pot life of the mixture is usually about 1 hour after first initial mixing. See the technical data sheet of the actual pot life for your product. Higher temperatures lower viscosity of the mixture and allows for faster de-airing; however, greater than room temperature shortens the pot life. Similarly, lowering the mixture temperature increases pot life but increases viscosity.

NOTE: The MG Epoxies do not require kit matching. You are free to use Part *A* and Part *B* with different batch numbers without affecting the cured product properties.

Step 3) Potting of the Components

The printed circuit board (PCB) may now be covered or embedded in epoxy. Ensure the cleanliness and dryness of the assembly and components prior to potting.

Additional Requirement

If you are using a mold, the application of mold release agents may be required.

To pot assembly

1. Slowly pour de-aired epoxy mix in the PCB component box or enclosure.
2. Let level before inserting additional components within enclosure. This avoids trapping air.
3. If geometry contributes to air entrapment, use injection, vacuum, or suitable method to help displace any air pockets.

NOTE: Spills of uncured epoxy mix can be wiped with a dry cloth or a paper towel. For better cleaning, moisten the cloth or paper toil with ethyl lactate. Ethyl lactate is an excellent solvent for removing uncured epoxies. All cleaning should be done before the epoxy is cured.

Step 4) Curing the Epoxy

Room temperature cure give more time for air bubble to escape while heat accelerated cures shorten cure time. The flowing curing conditions are typical. See the technical data sheet for the detailed curing schedules.

To cure MG 832B, 832C, 833FRB, 834FRB, 832HT

Let stand at room temperature for 24 hours.
–OR–
Put in oven at 65 °C [149 °F] for 60 minutes.
–OR–
Put in oven at 80 °C [176 °F] for 45 minutes.
–OR–
Put in oven at 100 °C [212 °F] for 35 minutes.

To room temperature cure MG 832TC

Let stand at room temperature for 96 hours.
–OR–
Put in oven at 45 °C [113 °F] for 8 hours.
–OR–
Put in oven at 55 °C [131 °F] for 4 hours.
–OR–
Put in oven at 65 °C [149 °F] for 2 hours.

To cure MG 8321C

Let stand at room temperature for 4 days.
–OR–
Put in oven at 80 °C [176 °F] for 2 hours.

ATTENTION!
Due to exothermic reaction, heat cure temperatures should be at least 25% below the maximum temperature tolerated by the most fragile PCB component.

For larger potting blocks, reduce heat cure temperature by greater margins.

After the initial curing, the epoxy properties should continue to improve with time until it reaches its optimum properties.

Conclusion

Once cured, this self-extinguishing epoxy now protects your potted electronic assembly against moisture, chemicals, dirt and other contaminants. Further, the MG epoxies protect sensitive equipment from static discharges, conductivity, heat shocks, and mechanical impacts.

Contact us if you have any questions, improvement suggestions, or problems with this product or procedure. We can also help with dispensing equipment recommendations.

Email: support@mgchemicals.com
Phone: 1-800-340-0772 Ext. 130 (Canada, Mexico & USA).
1-905-331-1396 Ext. 130 (International)
Fax: 1-800-340-0773 or 1-905-331-2682

Mailing address:

Manufacturing & Support
1210 Corporate Drive
Burlington, Ontario, Canada
L7L 5R6

Head Office
9347–193rd Street
Surrey, British Columbia, Canada
V4N 4E7