



ISO 9001 Registered Quality System.  
Burlington, Ontario, Canada QMI File # 004008

# Flame Retardant Epoxy Encapsulating & Potting Compound 833FRB Instructions

833FRB-2Parts

## 833FRB Epoxy Potting Recommendation

### *Manual Batch Processing*

#### How To Hand Mix the 833FRB Epoxy Potting

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#### Purpose

The procedure outlined here applies to hand processing of the 833FRB epoxy. We have based our procedure on some of industries best practices.

Suggestions must be critically reviewed, altered, or substituted in accordance to the specification and operating constraints of your printed circuit assembly. Component application and geometry do affect recommendations. Further, some changes may be made due to equipment availability, automation capabilities, and production facility requirements.

#### 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 x 48" paddles and one 12" spatula for 20 L [5.2 gal] pail kits.
  - Label paddles *A*, *B*, and the *Mix* spatula, 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 joint mixing. **WARNING!** Failure to properly stir each part before mixing can cause surface defects, degrade the cured properties, or even cause cure failure. Improper mixing 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 base of a part A pail. Lift, break up, and re-incorporate all settled material into solution.
2. Stir slowly in a 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 trap air in mixture leading to bubble problems.

#### To stir part B

Follow instructions for part A, but substitute part B in text.

As long as parts are not cross-contaminated, the shelf-life of each part is 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 Parts A + B of 833FRB Epoxy

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

#### Additional Requirement

- Requires strong upper body strength for proper mixing in pails size containers.

#### To create a potting mixture

1. Measure **two** parts by volume (or weight) of pre-stirred *A*, and pour into the mixing container.
2. Measure **one** part by volume (or weight) of pre-stirred *B*, and slowly pour into 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. Put in a vacuum chamber, bring to 25 Hg/in pressure, and wait for 2 minutes to de-air.  
—OR—  
Let sit for 30 minutes to de-air.
6. If bubbles are present at top, use the mixing paddle to break them.

#### **ATTENTION!**

Follow **2A:1B** ratio as closely as possible. Deviations of  $\geq 10\%$  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 833FRB mixture is 1 hour after first initial mixing. 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 833FRB product does 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 Components with 833FRB Epoxy

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

#### 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 towel with ethyl lactate (Cat. No. 8328-500ML). Ethyl lactate is an excellent solvent for removing uncured epoxies. All cleaning should be done before the 833FRB is cured.



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## Step 4) Curing 833FRB Epoxy

Room temperature cure give more time for air bubble to escape while heat accelerated cures shorten cure time.

### To room temperature cure the 833FRB epoxy

Let stand for 24 hours.

### To heat cure the 833FRB epoxy

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.

### **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 833FRB epoxy protects 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.

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