

PML ADHESIVES FAQ

3/2/03

We say so in all our kit instructions, but make sure you lightly sand any area to be bonded! This is important to get a good "bite" on the materials for the epoxy, and will dramatically increase the strength of your finished rocket!

Adhesives/Epoxy

- PML epoxy is competitively priced. Also, buying PML epoxy is a convenience to the customer; you can get everything you need for your high-power kit from one place.
- We recommend using our epoxy because it's known to work well. We've used it on kits and prototypes we've built.
- PML can answer questions on our epoxy because we use it and have experience with it. We can't answer questions about epoxy from other manufacturers.
- PML does not recommend use of CA (cyanoacrylate, "super glue") in most of our kits. Experienced modelers may find uses for CA, but do not use it in our kits unless specifically instructed to do so, or unless you know for sure from experience that it's OK. CA should never be used as a replacement for epoxy; it should be used as an assembly aid as opposed to as the main bonding agent (unless specified otherwise in the kit instructions). NEVER use CA on or near piston strapping or shock cords. The CA may attack the strapping and dramatically reduce the strength.
- General Rule of Thumb: Slower setting time epoxy = stronger finished kit
- 5 min. epoxy can be used on all PML kits due to the precision fit of components and interlocking design, but 12 min. is often recommended for those who don't have the experience to complete a procedure before the 5 min. type sets up. We recommend 12 minute or 30 minute epoxy for all "super-strength" needs.
- Finishing epoxy:
 - More brittle, but also more sandable.
 - Is very thin, and good to use when fiberglassing because it wets the 'glass cloth well.
 - Should not be used for structural work.
 - It takes 12-24 hours before fully setting up and becoming sandable.
- Mix ratio of the epoxy provided with the Nimbus 'Glassing Kit is 4 parts white to 1 part clear.
- When you see "lightly sand fillets" in our instructions, it means don't sand with too much pressure. High pressure will generate heat and gum up the epoxy while sanding.
- Most brands of epoxy adhesive bond well with no adverse affect to Quantum Tubing. The bonding area must be sanded prior to applying epoxy. Follow the suggestions in "Do's and Don'ts" in the Airframe FAQ Quantum Tubing section.
- Scuff all areas where epoxy will be with 120-grit sandpaper. This includes motor mounts, fins, INSIDE the airframe, etc. Use 220 or 320 on surfaces that will be painted.

Fiberglass Nosecones

If using epoxy in a fiberglass cone to retain nose weight, do just a little at a time, allowing the epoxy to cool between batches. This will prevent the resin used in manufacture of the cone from breaking down due to the heat of the setting epoxy. When you put a lot of quick set epoxy into the tip of the cone the heat generated during curing can exceed 200 degrees F. The resin the cone is made of begins to deteriorate at 170 degrees. Better yet, use a slow-setting (24-hour) epoxy or our Two-Part Expanding Foam (sold on the Adhesives page of the webstore).

PML Two-Part Expanding Foam

This foam is great for fin encapsulation, securing noseweight, etc. It's especially handy for those tight situations where you just can't get into the airframe to get nice internal fillets on your fins, or when you know your rocket is going to see super-heavy-duty flights and you want every bit of strength you can get. PML Expanding Foam is a simple, inexpensive, and easy way to do it.

There is a PDF document on the Adhesives Page of our website explaining how to use the Expanding Foam. The website PDF mentions that open flame and hot-wire cutting can produce dangerous fumes, but the heat of a motor casing next to the foam is not a concern.

Don't be fooled into thinking the expanding foam in a can you can buy at the hardware is the same stuff...it isn't. The main problem with it is, unlike our foam, it needs air to cure, which you don't have inside the rocket in a foam-filled area. The can foam often doesn't completely cure, or even can stop curing, and reactivate months later when you get the rocket in the hot sun. PML foam stops expanding after 4-5 minutes. It will NOT expand any more with heat, sunlight, etc.

The PML Expanding Foam features are:

- Expands up to 25 times its liquid volume. (Dependant on temp. and humidity)
- High temp formula. Perfect for fin root encapsulation.
- High adhesion rate.
- Two equal part (by volume) mix ratio.
- Does not need air contact to cure.
- Fast curing.
- Light weight.
- Easy to cut and sand. Very carvable.
- Shelf life of 1 year at moderate (70-80 F) temps. 2 yrs if kept cool and dry
- Great for strengthening thin wall nose cones or securing nose weight.

However, take care when using the foam in large batches, as it generates enough heat in large batches to deform a fiberglass nosecone. We recommend multiple smaller batches (about 4-6 ounces at a time) to fill large areas.