

Ten Tips for Modeling with Resin Kits, Conversions and Parts

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Resin casting of kits, conversions and parts has been a part of plastic modeling since the 1970's. Resin allows limited run kits to be produced by both mainstream and garage shop makers, and because of the use of silicone moulds, produces detail that can be sharper and more complex than is possible with injection moulded styrene.

Resin comes in a variety of formulas, from hard and durable tooling resins to some fairly soft low-density casting resins. The harder and denser the resin, the more stable the part will be, and the more longevity the model will have. Lower density materials can exhibit an unfortunate tendency to shrink and warp over time and should be avoided. Generally, resin parts from major manufacturers, like CMK and Verlinden, will be made from harder and more stable materials, while those from garage shops often come in softer low-quality resin. As a rule of thumb, in addition to the obvious characteristic of relative hardness, in my experience the heavier and smellier the resin is, the more likely it is to be a more stable over time.

Resin Safety

The polymer resins used in making resin parts are an irritant, and the dust produced in cleaning up the parts is harmful to your health if inhaled. When performing tasks that produce large amounts of resin dust, like sawing off casting blocks or sanding the parts, wear a dust mask or painting respirator. Using edged tools where possible will reduce the amount resin dust generated.

Wet sanding with water is an excellent way to reduce the amount of dust produced when sanding resin parts. A spray bottle filled with distilled water is a handy source of mineral free water during this process. Scraping the resin with an edged tool will also help avoid creating dust. Regardless of the means used, clean up your workspace at the end of a resin clean up session to prevent stirring up and breathing the resin dust later.

Adhesives for Resin

Resin does not respond to the solvent based adhesives used to bond styrene. The classic adhesive used to assemble resin is Alpha Cyanoacrylate (ACC or CA), which is a familiar material to most modelers. Other adhesives that bond by mechanical action are also useful, including epoxy adhesives and UV cured resins. I have found the long cure version of JB Weld epoxy particularly useful in bonding and filling resin parts, as it can be cleaned up with water and has a very slow setting time, allowing precise parts placement. However, any of the variety of "5-Minute" epoxies on the market are useful as well – I find the Gorilla Glue version of this product is very reliable, and can be cleaned up with acetone based nail polish remover before hardening. Sanding mating surfaces helps any of these adhesives form a stronger bond.

Parts Clean Up

Unlike a styrene kit, resin kits generally have lower parts counts. However, the parts themselves are usually attached to large casting blocks or pour stubs. As a result, freeing the parts is more work on a resin kit. The first step is to remove the pour blocks and clean up the parts. Generally, it is best to use a modeler's saw to remove the pour blocks. Micro saws, such as the JLC Micro Saw sold by UMM-USA are ideal for this, though larger saws, such as the X-Acto modeling saw, can be necessary for larger parts. Sharp edged side cutters can be used on smaller parts as long as the resin is not too brittle.

Don't Cut too Close. Always cut the resin part free with some safety margin, as it is easy for the cut to wander and spoil the part. Once freed, most parts will lend themselves to being flat sanded on a sheet of wet-or-dry sand paper (320 grit works well) but remember to use water and wet-sand to avoid producing and inhaling the dust. Again, scrapers and side cutters can be used to trim much of the remaining pour block, reducing the amount of sanding needed.

Clean up can be done as a continuing process as the kit is assembled or all at once. The advantage of doing much of the clean up in advance is the ability to examine the parts and perform minor filling and repair tasks before construction, when the surfaces of the parts are more accessible and the cure time for the fillers will not unduly delay the project.

Wash your Parts. As a final note, once the resin parts are cleaned up, they should be washed. Resin casters typically use mould release, and though some makers wash their, residual mould release will interfere with adhesives and paint, so you want to be sure its gone. Simple Green works well, but any dish detergent will suffice. Put the parts in a bowl of warm water and detergent, and scrub each one with an old toothbrush, dropping them back in the bowl for a bit more of a soak. When they are all done, rinse each part in clear water and put it on a towel to dry. It is best not to work over a sink, as small parts love to head for the drain.

Repairing and Filling Bubbles and Pin Holes.

Because resin is mixed from two parts immediately before being poured, it can have trapped air. In the worst case this produces large bubbles in the parts, and more often, smaller pin hole bubbles. Often a larger bubble will have only a small open area, or may be entirely encapsulated just under the surface. Fixing bubbles is not hard, but it takes a little time.

Closed Bubbles. Closed bubbles may look innocuous, but if not deep in the part, over time they will collapse, spoiling your project. In my experience the best way to fill these is to open the bubble from the back of the part and fill it with long-cure JB Weld, which does not shrink and bonds well to resin. This material is very thin when mixed and can be pushed into the hole with a toothpick and smoothed with a spatula. JB Weld is dark grey, so it shows up well through the generally translucent resin, allowing you to see if you have filled the void. If the exposed surface of the part wants to bulge, reinforce it with a piece of masking tape until the filler is set.

Open Faced Bubbles. Larger open bubbles on an exposed surface leave you no options – you have to fill these. Again, long-cure JB Weld works very well, and can be pushed into the hole with a toothpick and smoothed with a spatula and some water. If the part is flat, filling the hole level and pressing a small bit of masking tape over the repair as it cures will cause the material to set nearly perfectly flat, minimizing or eliminating sanding.

The Dreaded Pin Hole. Filling pin holes can be very frustrating. Sometimes the holes are not apparent until the primer sets, and open as it dries. Other times they will be visible on first examination. In either case, filling pin holes requires a thin bodied filler that can be forced into these small holes, which have a larger internal area than the opening, making them hard to fill.

If the number of pin holes is limited, gap filling ACC can be used, pushed into the hole with a small bit of stretched sprue or a pin. When using ACC, it works well to push a bit of stretched sprue or small resin scrap into the hole as a filler block, trimming it off and sanding the filled area flush when the ACC sets. ACC alone can be used (best with accelerator) if the hole can be successfully filled completely without packing material, again sanding when the ACC sets. As a tip, don't wait to sand, ACC gets harder over time, and won't sand well after fully cured.

For larger areas of multiple pin holes caused by foam in the resin, filler putty is necessary. Solvent based putties, such as Mr. Surfacer, can be troweled into the holes, but will shrink, so multiple applications are often needed. Again, JB Weld epoxy can thinned a little with water and troweled into the holes and any excess cleaned up with more water. Although a more involved process, using JB Weld has the advantage of not shrinking.

Removing Warpage

Sometimes a resin part will have significant warpage that will not allow assembly. Generally, dipping the part in hot water (like 180 degrees or so – you have to experiment as each resin is a little different) will soften the part enough to remove the warp. Hold the part in the correct shape while it cools. If the part is complex, building a simple jig to hold it in alignment and pouring hot water over it works. When a major part is warped and then straightened, it will have internal stresses, and the heat can affect the hardness of the resin. If the part is thick enough to distort itself or the parts it is attached to, internal structure should be added. For gun barrels, this means an internal pin. For structural elements, adding bulkheads and girders as discussed below is recommended.

Adding Internal structural support

Some resin parts are moulded as solid blocks. Those are nice because they typically won't change shape over time. Others are hollow cast. Because resin is inherently less stable than styrene, I have learned over time that adding internal structure to any large unsupported areas can avoid a lot of disappointment due to post construction warpage. The best material for adding internal bracing is the left over pour blocks from the kit itself, as these will be made of the same material, and will match its thermal expansion rate. Styrene can also be used.

Typically, I add girders in front of and behind the turret opening in the upper hull to support the weight of the turret (this is a good idea in a styrene kit as well) and add a firewall/bulkhead to the lower hull that matches up to and supports the aft upper hull girder. Adding a transverse bulkhead under the turret roof on hollow cast turrets will insure that the turret roof does not dish over time.

Aligning Parts During Assembly

Once your parts are prepared for assembly, the process is a lot like building a limited run styrene kit. The biggest challenge can be the fast setting time of ACC adhesives, which requires that parts alignment be precise at the time of initial assembly. Generally, resin parts will not have locating pins, though many more recent resin kits have locator blocks. Often parts are also structurally indexed. Using clamps or tape to temporarily hold parts in position while adding the ACC adhesive is a helpful technique, allowing the ACC to be flowed into the joint after the parts are aligned, and keeps them aligned while it sets. If they are not properly aligned, you will need some de-bonder and colorful language. Acetone nail polish remover works well as a de-bonder if you don't have a dedicated product, but check compatibility with the resin on some pour block scrap first.

For parts that do not have locators, adding pins can help greatly with accurate positioning. Also, locating pins add useful strength to the model. Metal or styrene pins can be used, and obviously metal pins will add more materially to the strength of the final joint than plastic pins. Longer pins can also be added to parts that need to stay straight or need reinforcement, such as gun barrels and wheel axles. On heavier resin models, pinning key elements of the suspension to the hull can avoid it collapsing under the weight of the model over time.

When to Use Epoxy

Where it works, ACC is an ideal adhesive as it has a fast set time. However, large parts like hulls and turrets can be hard to position and assemble accurately due to warpage and gaps. Using ACC often produces problems with large parts, as it sets in part of the joint before the parts can be fully aligned and clamped. When dry fitting suggests that the parts will not fit well without some persuasion, its time to go to epoxy adhesive. At the risk of sounding like a broken record, again long cure JB Weld is your friend here. With a long setting time the parts can be assembled, and alignment adjusted with clamps, rubber bands, tape and whatever else is needed, and left to set. Excess JB Weld can be removed with water and an old paint brush, and the remaining adhesive can be left to fill minor gaps. The resulting bond will be very strong. Five-minute epoxies are also a good choice, but most don't clean up as easily as the JB Weld.

Priming Resin Models

It is always best to prime a resin model, or any resin parts you have added to a styrene model. The primer will reveal small imperfections that can easily be fixed before paint is applied and that will be very hard to correct after. There are two classes of primers that work well on resin.

Solvent based lacquer primers and water based polyurethane primers. Both have their advantages.

Generally, the solvent based primers, such as Mr. Surfacer and Tamiya rattle can primer are good choices when a lot of work has already been done to correct minor imperfections in the parts. Solvent based primers fill and sand well, allowing a second round of corrections to blend in perfectly. Solvent primers are less sensitive to contaminants on the surface of the parts as well, if your post construction clean-up has been spotty. They have the disadvantage of building up paint film thickness fairly quickly. Proper respiratory protection is needed when using solvent primers.

Polyurethane primers such as Vallejo and MIG Ammo, don't sand as well, but they dry very thin, even when laid on fairly heavy. Their bond strength to resin is very good, but only if the material has been washed with detergent and rinsed clean before painting. Badger Stynlrez dries harder, and sands well, making it a good choice for any resin model. Although they are not solvent based, because they have polyurethane in them, all water-based polyurethane primers should also be applied wearing proper respiratory protection.

Displaying Resin Models

Unfortunately, especially for the contest minded, resin kits are a very challenging medium. Because of their tendency to be ever-so-slightly alignment challenged, not to mention being prone to dimensional change *after* assembly, they will often not sit level a month after they go on the shelf even though they did on the evening you finished them. This is where we need to remember the oft repeated words of our own Jim Wechsler: ***put it on a base !***.

Gluing the model to the groundwork will stabilize the suspension, and with any luck you won't get dinged out of the competition for track alignment or lifted wheels out of the gate. A base also will reduce handling damage, which is a bigger problem with resin kits due to the inherently finer details and less durable material. After all, with the hard work you put into your resin masterpiece, it deserves a nice frame, does it not?