How To Get An Award-Winning Finish On Your Rockets

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How To Get An Award-Winning Finish On Your Rockets

James Bassham

Creating an award winning finish is all about 3 things: preparing the surface, getting smooth coats of paint, and effectively masking colors. In this article I will share with you my techniques for achieving all three of these steps just using ordinary spray-paint cans. You don’t need a thousand dollars of equipment to get a million-dollar finish on your rocket.

Surface Preparation

You can’t get a perfect finish if you are painting an imperfect surface. In finishing, surface preparation is half the battle. Most of the materials used to construct rockets are not very paint friendly. Balsa wood, cardboard and paper make up the surfaces of most model rockets, and are really lousy at taking paint. Cardboard tubes have spiral marks, paper and cardboard warp and get “fuzzy” when painted, and balsa shows wood grain. The main culprit behind these surface problems is that all of these materials are porous and absorb paint unevenly. It would be much better if everything had a uniform, smooth, plastic-like surface, wouldn’t it? The key to getting these materials to take paint like plastic is to properly seal them.

There are several surface prep materials you can use. Testors and other paint companies make “sanding sealers” which are usually thick primer paints. These can work, but usually require a lot of coats and add a lot of weight. Some modelers use a mixture of white or yellow wood glue thinned with water. This can work as well, but tends to be very heavy and dries to a rubbery consistency that is difficult to sand. What I have found that is cheap, light and dries quickly is Elmer’s Carpenter’s Wood Filler. This material is used like spackle to patch and smooth wood. It dries fairly quickly and is extremely easy to sand. It thins and cleans up with water and has very little shrinkage. In its pure form it is the consistency of airy cookie dough, and you can actually sculpt shapes with it that will dry in place.

To get a plastic-like finish on fins, first shape them with sandpaper to the profile you want. Then thin the wood putty with water until it has a thick, milky consistency. I then brush this onto all surfaces of the fin, especially the root edges. Balsa has a tendency to warp when it gets wet, so I place the fins between layers of wax paper and press them with a heavy book while they dry; usually overnight is long enough. After the fin is completely dry, I sand it with 220 grit sandpaper until smooth again. I next thin the wood putty a little more and repeat the process. At two coats, the fins will look like they are ready for paint, but a third coat thinned to the consistency of milky water and sanded with 400 grit sandpaper will provide a finish hard and smooth enough for paint.

I prefer to prep my fins in this manner before I glue them to the rocket. Before I begin assembling the rocket I surface prep all the balsa. I find it much easier to sand the fins when they are off of the rocket, and I can prevent warps by pressing them between books. I really don’t recommend trying to seal the fins after assembly, as shown in so many kit instructions.

Tubes and Nosecones

The spiral grooves in body tubes don’t look like much until you paint the rocket and then they just pop out and destroy the look of scale models and make even sport rockets look like they are made out of a paper towel roll. The

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way to cure these? Elmer’s Wood Filler again. If you take
the full-strength putty and apply it in a bead to the grooves
on the tube with a toothpick, you can easily sand it off
when it dries, and make that groove disappear. One thing
to watch for in most body tubes is that there are actually
two grooves on the tube. One is usually darker and easy to
spot and one is almost invisible unless you tilt the tube in
the light. This second groove is located in the middle of the
dark bands on the tube. Even though it is hard to see, this
groove is usually the most visible after painting. It is formed
when the tube is wrapped and the layers of paper don’t
meet perfectly. It is usually deeper than the dark band and
will pop out when painted, so be sure to cover this groove
as well. Lastly, don’t forget the launch lug. It also has a
very noticeable groove that can be eliminated with wood
putty.

Balsa nose cones are just like fins and require three
coats of wood filler to get a smooth finish. With nose cones

![Figure 2: The spiral groove in this blue-tube rocket is obvious when filled with wood putty.](image)

you don’t have to worry about warping, but you have to be
careful to not distort their shape when sanding them. I also
like to coat the shoulder and the blunt end of the cone with
wood filler. I find that the cone’s shoulder will expand less in
extreme humidity and an eyehook will hold better in the end
grain that is coated, and is less likely to tear out.

Paper Parts

Even paper can be made hard and smooth with wood
filler, but be careful. Paper is particularly vulnerable to

![Figure 3: These balsa parts are on their second coat of wood filler. By drying them on end, air can circulate and they are less likely to warp. For the final stages of drying I will press them under a book.](image)
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warping when it gets wet, so start with a very thin, very dry coat of wood filler and let each layer dry thoroughly before sanding and adding another coat.

Once your wood parts are sealed, build your rocket as you normally would. The Elmer’s Carpenter’s Wood Filler works especially well with white and wood (yellow) glues but also works well with CA glues and epoxy. You can form fillets with wood glues as normal, but if you want large decorative fillets like the ones on the silver rocket pictured, you can form them using the wood filler. Just apply it thickly with your finger and smooth it into the groove. Once dry it is easier to sand than glue fillets and is easier to get a smooth finish with. One note of caution though, the wood filler does not form a strong bond, so any fillets made with it are purely decorative. They should not be relied on to hold your fins in place.

Figure 4: The finished balsa parts, ready for assembly.

Figure 5: This rocket is made entirely of balsa and cardboard, yet looks like liquid metal because of three layers of wood filler.

Figure 6: The nozzle on this rocket is a simple paper cone that is painted with three thin coats of wood filler. It is now as smooth and hard as plastic.

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Wood putty can also be used to smooth the joints between various parts such as launch lugs and tubes and transitions from one part of the rocket to another.

**Painting**

Once your model is completely assembled and sanded smooth, lightly dampen a cloth and wipe it down thoroughly. Do this several times until you are satisfied that all the dust has been removed. It doesn’t take much moisture at all to do this so don’t wipe with a wet rag, just use a cloth damp enough to get the dust. I do not recommend a tack cloth for this. Most tack cloths are saturated with an oily wax that will leave a residue on the surface that is incompatible with enamel paints. Since most hobby paints are of this type, a tack cloth can cause more problems than it solves, so I avoid them.

![Figure 8: The completed rocket, wiped down and ready for paint.](image)

When you wipe down your model, look it over carefully. You may find that the smooth surface you thought you had was actually formed by sanding dust and in reality you have pockmarks or bubbles in the finish. Now is the time to fix them with another coat of wood filler. Imperfections in the surface do not get better when you paint them, so fix them now before the first paint hits the surface. Even though it is a hassle, it is a lot easier to fix at this stage than later.

Once you have the smoothest, cleanest surface you can possibly make, it is time to start painting. If you want a good finish, you must always, always, prime the model first.

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A coat of primer masks the differences between materials, and provides an even base to build upon.

There are many choices of primer on the market. Some modelers even prime with ordinary flat gray paint. If you want a great finish, find a true, sandable primer. You don’t want one that will go on too thick, or turn gummy when sanded. An excellent paint that is low cost and readily available is Rust-Oleum Painter’s Touch Ultra Cover 2X. They make both a gray and a white primer. It is the only paint I use at this point unless I just cannot find the exact color I need in their product line.

I prefer to start with a medium coat of gray primer. You want to be sure to coat the surface completely. Once you do this, any flaws you missed in your preparatory sanding will become immediately visible. If you find any dents or deep scratches, you can use more wood filler. It will still adhere at this point. Otherwise, once the paint is dry, wet sand the entire surface with 400 grit sandpaper. Unless there are serious flaws, this should only take a couple of minutes and will do a world of good. Wipe the model down as you did before with a moistened cloth until you have removed all the sanding dust. If it takes more than a couple of minutes for the model to dry, you used too much water. Immediately, paint the model with white primer before any dust can settle on the surface. There are several good reasons to alternate the colors of primer. The first is you can only really tell if you are getting full coverage of the model if you paint in contrasting colors, and when you sand between coats, you can tell if you are sanding too hard if you reveal the undercoat.

Once dry, repeat the wet sanding and priming.

Two coats of primer are sufficient for your average paint job, but to get the best finish, I recommend three or four total. The final color of primer will influence the look of your finish coat. For bright colors, like yellow and red, you should finish with a white primer. A gray primer will darken light colors if that is the effect you want. A gray primer and gloss red will produce a deep red, whereas a white primer will create a bright “hot rod” red.

When you have completed your coats of primer, apply at least two coats of the base color. It is better to apply two light coats than one heavy coat. A heavy coat of paint is much more likely to run and be uneven. For the color coats, I recommend gloss paint, even if your final finish will be flat. Gloss paints produce a smoother finish, and are an absolute must if you will be applying decals. Flat paints also do not mask well and have a greater tendency to “bleed.” Before you move on to masking, make sure the model is completely dry. The best way to be sure is to use the sniff.
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Put your nose right on the surface of the paint and take a whiff. If you can smell the paint, it is not dry enough yet. Give it another 24 hours before masking. The worst thing in the world is to get a perfect masked edge and then pull up the undercoat when you peel off the tape.

Masking

If all our rockets were solid colors, I think most of us would not have any trouble painting. It only takes a little practice to get an even coat of paint. The difficult part of painting comes when we want multi-colors separated by crisp, clear lines. The real challenge of painting is in the masking.

Masking, like all the steps that come before, depends on a good surface. If your surface is rough, then your masking tape will not stick properly and the paint will slip under the edge of the tape and “bleed” across the undercoat. A smooth, glossy surface is a must for a crisp line.

The next most important element of a good masking job is the quality of the tape. There is really no substitute for a quality tape. I have tried everything from plain masking tape to specialty painter’s tapes. In my opinion, there is really only one tape that works and that is Tamiya modeler’s tape. Tamiya is a Japanese model company that makes an excellent line of finishing supplies. Their paints are some of the best in the world, but their tape is the best. It is worth the price if you can find it. A distant second is green painter’s tape, which you can get at most big-box hardware stores. The green tape will work in a pinch, but once you try Tamiya tape, you will never go back.

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Since quality tape is so expensive, it is not practical to cover the entire model with it, so I only use it for the actual paint edge. To mask large areas, I use blue, low-tack, painter’s tape. This won’t pull up the undercoat, and is relatively cheap so you can cover large areas with it.

When applying the tape to the surface always keep in mind that the only important part is the edge of the tape; everything else is simply a drop cloth. The only part of your tape that does any work is the very knife-edge of the tape. It must stop the paint at the tip of the edge; anything that gets past will be bleed through. With this in mind, always focus on the edge of the tape as you lay it down and do your best to keep it smooth and unwrinkled. Use the longest piece of tape you can, and always use a continuous piece on a continuous edge. Any place that tape crosses will create a slight crease where one piece goes over another and paint will be drawn under that seam by capillary action. Also, never cut the tape against the surface with a knife blade. This will create a groove in the surface that will wick paint under the edge. If you have to let tape cross because of the pattern of lines, always burnish the edge where the line is. Once you have the edge defined, cover any remaining exposed sections with blue painter’s tape, plastic bags (the bag that the kit came in is often an excellent item to cover one end of the model if you are painting a half-and-half pattern) or even paper cutouts, whatever will stop the paint.

The next step is to paint the masked edges with the undercoat paint. What this does is prevent bleed-through problems. If you didn’t quite get that edge rubbed down perfectly, then the next coat of paint will wick under the edge and create the dreaded bleed. If the paint you use is the same color as the undercoat, then the bleed won’t show. You aren’t preventing bleed through, you are just preventing it from showing. The next coat can’t bleed through, because the gap is all ready filled with paint. An alternative to using the same color is to use a clear coat. Dullcoat works well here because it will wick under, but not show and the flat surface will help the next coat of paint adhere better.

Once you have the model masked and the edge painted with the undercoat color, take the time to really shake up the next can of paint. Even a fresh can of paint requires at least two full minutes of vigorous shaking to give an even coat. Old paint, or inferior quality paint, can take even longer. If you just have to use that spray can of cheap paint from the dollar store because it is the perfect color, try this trick. Leave the paint in your car when you go to work, and then shake it on your drive home. This will give

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you the time to get the paint thoroughly mixed before you use it. Sitting in a warm car will also help. You must be sure the temperature of the paint is warm enough to give a good coat. Most paints are labeled for use in temperatures above 70 degrees. That may not always be possible to achieve when you are painting in your garage in January. What I have found is that the temperature of the air is not as important as the temperature of the paint. In the winter, I always warm my paint in a bowl of hot water in my kitchen. 30 minutes in a hot water bath before you go and paint in cold weather will do wonders for the smoothness of the application. (Always use your head when warming paint - don’t leave it on the dash in 120 degree weather, and don’t put it in a pan of boiling water on the stove. Paint works best at temperatures between 70 and 100 degrees. Don’t get crazy with the warming part.)

Next, apply the contrasting coat of paint. It is always best to paint from light to dark. If you have a white, black and red rocket, paint the white, then red, then black. It is always hard for light colors to cover dark ones. Try to cover the painted area evenly, and in one coat. That is why it is so important to prepare the paint properly, because you should remove the masking as soon as you possibly can, preferably while the paint is still wet.

When the second coat of paint is allowed to dry too long, there is a chance it will bond to the tape rather than the model. When you peel the tape up, the paint sticks to it and pulls up. This results in chipping of the finish coat.

To avoid this, let the paint dry for just a couple minutes, and then carefully peel up the tape. The paint should be dry enough that it won’t run, but wet enough that it is not sticky. Sticky paint can peel off the model like electrical tape. It is a fine line between too wet and too dry, but I try to remove the tape between two minutes and ten minutes of applying the second coat. Any longer than that and you should just leave it until it is thoroughly dry.

Dry paint can chip if it has stuck to the tape. Test a small area before pulling off a long strip. If you encounter problems, get a brand new X-acto® (www.ApogeeRockets.com/modeling_tools.asp#xacto) or razor blade and draw it lightly down the edge of the tape. You don’t need to cut the model - all you are doing is scoring the surface of the paint. This is usually all you need to break the paint-tape bond and allow the tape to come off cleanly.

Once the masked edges are removed, let the model dry thoroughly before handling.

Decals and finishing

Decals adhere best to a glossy surface. That is why I always paint models that take decals with gloss paints. Wipe the surface down with a dry rag to clean off any dust, and apply the decals per instructions. If you have trouble with decals tearing or curling up on you, try painting them with a few coats of Microscale liquid decal film. This thickens the decals and makes them more durable. If you have

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surface details that the decals have to conform to, try undercoating with Microset, and then once they are in place, paint over them with Microsol. If, like me, you get your decals on the model perfectly only to find the next day that they have fallen off the model, or if they come off in your hands days later, try wearing latex gloves while you apply them. The skin oils in some people’s hands can prevent the adhesive on the decals from bonding properly, so you have to protect the decals from touching your bare skin.

Once you have your model completely decaled and the decals have dried completely, spray the model with a coat of clear gloss. Testor’s Model Master “wet finish” gloss

Figure 12: This Saturn 1B was painted using the techniques described in this article and took first place in the Missiles and Real Spacecraft category at the Reno Highroller’s International Plastic Modeler’s Society model contest. It was built for my NARTREK Advanced Level: Static Display entry.

Figure 13: The completed Firecat rocket used for several illustrations in this article.

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is one of the best for this. It is also a lacquer paint and will dry in ten minutes or less. This last coat of gloss will sandwich your decals between two layers of gloss paint, effectively laminating them into the surface. If you want a flat finish, now spray the model with a dull coat. Spraying the decals directly with dull coat can cause them to stick around the edges, and with some poor quality paints, can actually cause them to peel off the model - so always gloss coat over them. For particularly difficult or old decals, or areas that will get a lot of handling, you can also brush paint Microscale liquid decal film over the surface before you gloss coat. This will form a thicker protective barrier and make the decals much tougher.

This may seem like a lot of steps, but if you really want a contest-winning finish, it is the way to go.

Additional References on Painting Rockets


Fixing cracked fins - Peak-of-Flight Newsletter #166 (www.ApogeeRockets.com/Education/Downloads/Newsletter166.pdf)

How to achieve sharp paint lines on your rocket - Peak-of-Flight Newsletter #167 (www.ApogeeRockets.com/Education/Downloads/Newsletter167.pdf)

Painting the tip of the a nose cone - Peak-of-Flight Newsletter #175 (www.ApogeeRockets.com/Education/Downloads/Newsletter175.pdf)


Videos!


“AltimeterOne - See how high your rocket flew. AltimeterTwo - See how fast and high your rocket went. Penny shown for size comparison. www.ApogeeRockets.com/AltimeterOne.asp
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Getting Started: com/getting_started.asp

How To Fill Body Tube Spirals - www.apogeerockets.com/Rocketry_Videos/Rocketry_Video_43.asp


Sanding down the primer - http://www.apogeerockets.com/Rocketry_Videos/Rocketry_Video_69.asp

Building Skill Level 1 Model Rockets - http://www.apogeerockets.com/skill_level_1_video.asp


About the Author

Jim Bassham grew up building Estes and Centuri rockets in the 70’s. One of his fondest childhood memories is successfully flying an Estes space shuttle boost glider. After a 30 year hiatus, Jim rediscovered rocketry in 2008 when he witnessed a mid-power flight which renewed his interest in the hobby. Since becoming a born-again rocketeer he has flown everything from micro-max up to J impulse and has found a special love of contest rocketry. When not building and flying rockets, Jim is a single father of a precocious 12-year-old girl (with no interest in rockets) and works as an estimator for an HVAC company.