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PAINTING TIPS AND TRICKS

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Painting Tips and Tricks

By Phil Woolfson

Introduction

Have you ever seen a rocket that looks really nice with smooth, shiny paint and wondered how to get your rockets to look that way? With a little extra time spent on prepping and painting your rockets, you will be able to achieve a nice end result and have a rocket that will fly better as well. A smooth rocket is more slippery in the wind and has less aerodynamic drag. The engine provides energy to move your rocket through the air. Any drag that the rocket has takes up some of that energy and as a result, flies slower and achieves less altitude.

Painting your rocket helps to protect it and gives it some personality too. This article details paint and tool options and is intended to help you to decide what to use for your project. Prep work is the beginning of any good paint job so we'll discuss that as well.

Preparing your rocket for paint

There are three basic areas of your rocket that need preparation to make them ready for paint.

1. **Fins,** which are most often made from balsa on low-power rockets, come to you unfinished and have a pronounced grain. If they are painted without proper preparation, they will have a rough, grainy surface that has a greater surface area and will create more resistance to the wind. There are a few methods that you can use to smooth your fins and help to improve your rocket's performance.
2. **Paper body tubes** are spiral-wrapped, and the spirals must be filled in to get a smooth finish on your project. Some spirals are more pronounced than others, so we'll look at a few options for filling these.
3. Many kits have a one-piece **plastic nose cone** and these usually have to be sanded before painting, as they often have molding lines and burrs and also may have a rough finish that could show through the paint. A well-prepped nosecone makes the whole rocket look and fly better.

FIGURE 1: THE TOP NOSECONE NEEDS SANDING, THE BOTTOM ONE HAS BEEN SANDED WITH 320-GRIT SANDPAPER TO REMOVE IMPERFECTIONS.

Ways to Seal Fins

First is to coat the fins with thinned, water-soluble wood filler. You want to work the filler into the grain fully, and once it dries, sand it smooth. You want to retain a thin

FIGURE 2: FINS CAN BE SEALED WITH THESE PRODUCTS AND OTHERS TO PROVIDE A SMOOTH SURFACE FOR PAINT.

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FIGURE 3: YOU SHOULD ALWAYS SEAL FINS ON BOTH SIDES AT ONCE. THIS SIMPLE SETUP HOLDS THE FINS FOR THE APPLICATION OF SEALER. SEWING PINS ARE STUCK THROUGH SCRAP BALSA FROM THE FIN SHEET AND TAPED DOWN.

coating of the filler over the fin without exposing the balsa, except for the root edge of the fin, which must be raw wood to optimize the glue joint. Tim Van Milligan can be seen performing this procedure here: https://www.youtube.com/watch?v=plnvslb1MN0

Another good choice for filling fins is to brush on several coats of a lacquer-based sanding sealer, such as Deft. You brush it onto your fin, let it dry, sand, and repeat until all of the grain is filled in. This method takes a bit more time than the first method but does fill in the grain, adding a bit of strength.

Either of these two techniques requires shaping the edges of the fin first and then sealing the surfaces. In either case, you are free to shape the fin edges as you like

FIGURE 4: AFTER 5 COATS OF SEALER AND SANDING, THE FINS ARE READY FOR SANDING WITH A FINISHING 320-GRIT PAPER. SAND TILL THE GLOSS IS GONE.

- rounding, tapering or creating an airfoil. For more details on fin shaping, check out the *Peak of Flight #442* article: https://www.apogeerockets.com/education/downloads/Newsletter442.pdf

The third option is to paper the fins. For minimum weight, printer paper secured with a minimal amount of yellow glue provides quite a lot of strength to your fins. Work quickly, use a scrap of balsa to spread the glue - a 1/2" spot of glue is plenty for average-sized fins. You want a paper-thin coating at most. Cut the paper about 1/4" oversize and smooth it out over the glued surface. Immediately do the other side. Set the fins between a couple of smooth boards with wax paper between the boards and the fins, and either clamp them all the way around or use a vacuum bag to hold them until fully set up, around 3 hours. Once dry, trim the fins with a sharp hobby knife, trim all excess paper, and lightly and carefully sand

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FIGURE 5: PRINTER PAPER GLUED TO THESE FINS MAKES THEM VERY STRONG, WHILE ADDING VERY LITTLE WEIGHT.

the edges using 320-grit paper. Papered fins work best with a rounded leading edge. I show this process in a bit more detail in a previous *Peak-Of-Flight #588* article: https://www.apogeerockets.com/education/downloads/Newsletter588.pdf

Filling Body Tube Spirals

Body tube spirals can be filled using either wood filler if they are deep/wide, or primer if they are reasonably tight. Work the body filler into the spirals or paint them with primer. Sand when dry. Check to be sure that the tube is smooth before moving on to the next step. Here, Tim Van Milligan demonstrates filling the body tube with primer: https://www.youtube.com/watch?v=sigDwXV-UHw

FIGURE 6: THESE TUBES HAVE TIGHT BUT NOTICEABLE GROOVES. HIGH-BUILD PRIMER (2-3 COATS) AND SANDING WILL TAKE CARE OF THE GROOVES.

Paint and Primer Selection

Paint selection will depend on a few things. Is this your first rocket, or have you built a number of them and are looking to achieve a smoother finish? Are you a young builder, or perhaps working in a limited space where there are others, pets, etc? Are you building a high-powered rocket in the hopes of higher speeds and higher flights? Your resources are another consideration, as different paints and different tools can be very affordable, or they can get quite expensive.

Primers

Many primers are available. Some are meant for prep, building the surface so that you can smooth it by sanding, and others provide adhesion for your paint. Many paints available today have a primer built in, which takes care of

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adhesion, but your surface must be as smooth as you want the final finish to be before painting.

Paints

Paints may be enamel, acrylic, lacquer, or polyurethane, among others. For low-power rockets, enamel or acrylic are most commonly used. Larger high-power rockets may get a polyurethane finish. Lacquer-based sanding sealer is one option for sealing fins. Please note - if you seal your fins with the lacquer-based material, you cannot finish them with polyurethane. Polyurethane does not set up over lacquer. Acrylic offers the convenience and relative safety of being relatively non-toxic, and is great for beginners and younger builders, yet can also work quite well for more experienced hobbyists.

Acrylics

Acrylic paint has been around for quite a long time and comes in many varieties. House painters, artists, and hobbyists all use variations of acrylic paint due to its low odor, affordability, and quick drying times. Acrylic paint can be applied by brushing or spraying. You can even use a foam brush, as these paints contain no solvents which would otherwise dissolve the foam rather quickly. Any foam pieces on a rocket are best painted using acrylics instead of any solvent-based paint. The Estes Merv is a good example of this. Much of the airframe on that rocket was made from styrofoam, and as I discovered (to my dismay) when I went to paint it, it was not very enamel friendly. While acrylic paint has these benefits, you should also know that it is not as durable as enamel, and unlike enamel, dries only to a matte finish. This is not always a problem, however, especially for scale models which often call for a matte finish.

FIGURE 7: ACRYLIC LOOKS LUMPY WHEN SPRAYED, BUT DON'T WORRY. THE WATER THAT CARRIES THE PIGMENT WILL EVAPORATE LEAVING A SMOOTH FINISH.

Enamel

Enamel paints come in various formats - 1/4 ounce bottles, small spray cans, and large spray cans to name a few. They have the advantage of self-leveling, which allows them to provide a smoother finish when brushing than what is possible with acrylic, and they can also produce a gloss finish. They are more durable and provide somewhat better protection than acrylic paints, however they do have an odor and are costlier.

Polyurethane

If you are building a high-powered rocket, you might consider a polyurethane finish, such as an automotive finish. These paints are highly durable and will hold up to the rigors of high-speed flight better than the others, though on a very high-speed rocket, aerodynamic forces will probably put a lot of wear on your paint, especially on

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the fins. Automotive polyurethanes come in either solvent-based or water-based varieties, and the two cannot be used together. With these paints, you must stay with a single product line from a single manufacturer. You cannot mix and match. These paints can provide the ultimate finish, but they are by far the costliest option. You'll need an epoxy primer, hardener, sealer, catalyst, base coat (color) clear coat, hardener for the clear coat, and reducer. You will also need a full-scale spray setup, including a good-sized air compressor, the proper air filtration and drying, and a space to work.

The overspray will get on everything in the room, so if you are working in your garage, you need to have it empty. Note also that solvent-based paints are highly flammable, so this has to be a warm-weather project (no heaters running), and do not turn lights on or off while the vapors linger. You'll need good ventilation and especially, a very high-quality paint respirator.

Lacquer

Laquer is less expensive but has the same precautions as poly, and is not as flexible. I do not recommend using lacquer for your overall paint job, however, it has a couple of good applications for our hobby. First is sanding sealer for the balsa components, and second is paint pens which are simple and convenient to use for small, accessible details.

Application

Brushing

There are many benefits to spraying your rocket, however, you can also get some good results by brushing. For very small rockets, a brush is fine to apply either acrylic or enamel, and a brush is also more convenient for painting small details, doing touch-ups, and getting into recessed places. When brushing, you will likely need to apply 2-3 or more coats, depending on the color selection and what is under it (primer, various colors of materials - white nose

FIGURE 8: HERE ARE THE MATERIALS I USE FOR THE ROCKETS SHOWN.

cone, brown body tube, etc) in order to get an even finish. A decent quality flat or chisel-tip artist brush will give better results in a larger area than a crafting brush, and with care should last a long time. Crafts stores and art suppliers carry these brushes, and you might want to get a few different sizes.

Brushing is neater than spraying, and there is a lot less odor. The setup and clean-up are way easier. Brushing acrylic is not only something you can do anywhere you care to work, but is also by far the most kid-friendly, being non-toxic and needing only soap and water for cleanup.

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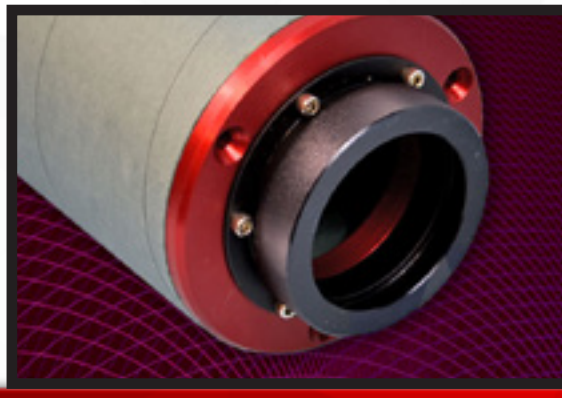

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When brushing your paint, you want to test on scrap and get a feel for how much paint you want on your brush. Less is usually more. Brushes and paints are all a bit different so you will want to experiment a bit before you start painting your rocket. It is better to paint around the body tube than along its length because you want to try and maintain a wet edge. This means that you are painting over wet paint and not over paint that has already begun to dry. This will help you to achieve a smoother finish. You will need multiple coats. You want the first coat to be dry to the touch before applying the next one. Add coats until the color and surface appear uniform.

Spray application

Spray cans are one of the simplest and most economical means of getting a smooth finish on your rocket. Usually, you will get a sandable primer and paint in your desired color. Spray paints are one of the simplest ways to get a good, uniform finish when used properly.

Is there an economical way to spray paint and still be able to mix colors, use different types of paint, etc? The Preval sprayer, introduced in 1969, is basically a can of aerosol with a jar on the bottom. Simply mix/thin your paint as needed, pour it into the jar and you are ready to spray. The aerosol canister is even replaceable. The cost of a Preval sprayer is about the same as a can of spray paint, and they are available at many home centers, hobby shops, and online. They should be cleaned after use and should last a long time.

Spray paint, whether applied either by “rattle can” or a Preval sprayer is best applied using the following recommendations:

1. Always begin spraying away from the model and move onto and across it, moving evenly across the surface, and stop spraying after you are past the surface. This helps to prevent spots of heavy build-up where you start and stop.
2. Hold the sprayer or spray can about 8 - 12 inches from the work. Too far will result in a rough finish that won’t adhere well. Too close will result in runs and drips.
3. Always start with a light coat. It is best to build up the paint using several light coats. For metallics, you want a light coat, a couple of intermediate coats, and end with a very even light coat. Different brands of paint will have different recoat times. Please refer to the instructions on the can. If using a Preval sprayer, spray an area on a scrap. Test it with your finger. Once it is tacky but not wet, you can apply the next coat to your model.

Always wear breathing and eye protection and work in a well-ventilated area or outside. If using solvent-based paints, be sure that there are no sources of ignition present. Whenever spraying anything, it is always a good idea to do a practice spray on a piece of paper to know how the spray is going to apply. Make your adjustments there before moving on to your rocket.

Airbrushing

For details, adding weathering or effects, touching up, or painting your whole rocket, an airbrush is probably the most versatile painting tool there is. Many makes and models are available, ranging in price from about fifteen or twenty dollars for a basic model to high-precision professional models costing from about $100 to $350 or more. Add a can of propellant, hose, and adapter and you can get started for right around $35 or so, and basic kits with a compressor start around $85. Compressors work better than propellent, and nicer airbrushes have better adjustments, so find the one that will work best for you.

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www.apogeerockets.com/Rocket-Kits/Skill-Level-2-Model-Rocket-Kits/SkyMetra

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FIGURE 9: THE 2-STAGE ROCKET WAS PAINTED WITH SPRAY ENAMEL. THE BABY BERTHA WAS PAINTED WITH ACRYLIC PAINT USING A PREVAL SPRAYER. THE NOSECONES WERE AIRBRUSHED USING TESTOR'S MODEL PAINT.

When airbrushing, you will need to thin the paint so that it will pass through the airbrush. Start with around 10% thinner and test spray on a piece of paper. Add thinner gradually and test different settings on the airbrush to find what works best. Adjust your brush to get the desired amount of spray. You will want to consult the instructions to learn how to adjust your particular airbrush, as there are many varieties with different adjustments.

Airbrushing is similar to spraying with a spray can with respect to the procedures. Two differences are that the airbrush uses a small percentage of the paint of a spray can and that you MUST clean your airbrush immediately after each and every use. That being said, you can actually follow one color after another without cleaning, you need only to spray out any residual first color onto some paper before you spray your model. The exception is if for example you are spraying red first and then white, in which case you may need to clean out the airbrush in between. To clean your airbrush, first empty the cup and fill it with thinner, and spray it out. The next step is to disassemble your airbrush and thoroughly clean the needle, tip, and all paint passages and moving parts. Refer to your instructions for the disassembly and cleaning of your particular unit, and work in an area where you are unlikely to lose any parts.

Airbrushes can have various sized needles/tips for finer or heavier spraying. Many models offer interchangeable needles and tips. Smaller needles and tips are great for small details and excellent levels of control. Larger needles and tips are better for getting glossier finishes and larger areas. Always switch out the needles and tips as a pair.

Always test spray to be sure that your airbrush is set up to give you the spray pattern that you want. It's a good idea to practice a bit before you start painting your project.

Spray guns

For very large rockets, you may find that spray cans or airbrushing are inefficient for applying the amount of paint

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that you'll need. In this case, a spray gun may be the best choice. There are a wide variety of spray guns available.

Be aware that some sprayers, such as powered electric sprayers or conventional airless sprayers are designed for heavy-bodied house paints and are not really ideal for painting rockets.

So let's look at some options for spray guns that we can use for painting our biggest rockets. Standard spray guns, automotive guns which can be either conventional or HVLP, or High Volume Low Pressure are pretty much standard. Because of the reduced overspray, HVLP is the best choice. These guns come in a variety of sizes, quality levels, and prices. For most of us, a moderately priced unit will be just fine, and I have even found that a $20 Harbor Freight gun can do a reasonable job if set up and used correctly.

Spray guns come in four feed systems. They use either a gravity feed in which the cup of paint is above the gun, a siphon feed where the cup sits below the gun, a pressurized line feed where the paint is fed from a pressurized pot connected to the gun by a hose, or an open pot siphon feed, which requires the use of a specialized type of pump, called an airless air assist system. Of these, the gravity feed or siphon feed (on the gun) is the most practical for a number of reasons, and for purposes of material efficiency and yield, the gravity feed is the most efficient. For this reason it is the choice of most body shops, as it will spray every last drop of paint before it runs out.

Spray guns require a fairly good-sized air compressor, have to be properly maintained, work best with rigid plumbing, and you'll need an air dryer and filter. Pricing for these systems can add up quickly.

As an alternative to a compressor-driven system, turbine sprayers use an electric fan in a specialized housing to provide air for spraying. The air that comes through the line is heated, which is not always beneficial as it can affect how the paint lays down, though it is also rather dry so there are benefits and drawbacks. Most turbine sprayers include the turbine, hose, and spray gun, and prices start below $500.

When spraying with a spray gun, you need to learn the gun, and you need to learn the paint. When building a large high-power rocket, you may want to get the beauty and durability of automotive paint. Some paints are formulated for DIY while others are really made for professional use by body shops and the like. The advantage of the DIY paints, available from vendors such as https://www.eastwood.com for example, is their relative simplicity and low cost when compared to more elaborate professional use paint systems. I say systems because they require multiple products to complete a paint job. These typically include an epoxy primer, hardener, guide coat, sealer, basecoat, reducer, clear coat, and clear coat hardener, as well as a thorough understanding of how to mix, apply and clean for each step. Prices for these paints can vary wildly depending on the brand and color, with reds, blues, and metallics often priced at a premium. These premium quality products will only yield professional results once you learn to use them correctly along with your spray equipment. If you want to try working with these materials, please understand the following:

1. Proper training is a must. Find a paint store that will walk you through all of the necessary procedures. You must complete your basecoats and clear coats in a single

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session.

2. You need good ventilation and plenty of space. A spray booth is required in a great many locations in order to work with these materials.

3. You must wear a high-quality respirator and eye protection whenever working with these materials. Do not mix or even open the cans without wearing your respirator.

4. You will need to thoroughly clean your spray gun immediately after spraying each material. As with the airbrush, you'll first spray enough solvent through the gun to get it coming out clear (in the case of clear, you'll see the viscosity of the spray change as the solvents push the residues out), and then you'll want to clean the needle, tip, and all paint passages.

FIGURE 10: A NICELY FINISHED ROCKET LOOKS AND FLYS BETTER

Finishing

Whether you have used a brush, spray can, airbrush, or spray gun, once you have applied the paint and you are sure that you have enough on, you may want to buff out the finish. Many factors play a part in determining how smooth your finish turns out. If you do everything just right, you may wind up with a very smooth finish, which is ideal. If your finish looks gritty, you did not have enough material coming out of the gun. The spray should be glossy when wet, not stippled. This may not always sand out without having to respray. If you get orange peel (where the paint finish looks like an orange's peel texture), you should be able to sand that out, it will just take one more sanding step.

Wet sanding is the first step to perfecting a paint finish. You want to work carefully so as not to sand through the paint surface. With orange peel, which looks like curvy ridges on the surface of the paint, start by wet sanding with 1000 grit and then 1500 grit sandpaper. If starting with a smooth surface, you can begin wet sanding with 1500 grit. In either case, continue on to wet sand with 2000 grit paper and then you can polish. Always block sand; for a round body tube, a foam sanding block will provide excellent results and make the job easier. Sanding without a block increases the possibility of sand-through and makes for an uneven result. The first sanding step should eliminate any glossiness and give you an even, flat surface. Subsequent steps should eliminate any fine scratches from previous sanding steps.

Final finishing requires a polisher, along with a polishing compound and a couple of different polishing pads. A coarse pad removes fine scratches while a fine pad will clarify the finish for a high gloss result. These finishing steps will work with most if not all methods of application with enamel or urethane paints. To get a gloss finish with acrylics, you'd first need to apply a few coats of a spray clear finish. If you follow the tips from this article that apply to your project and practice a bit beforehand, then you should end up with great-looking rockets!

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Where to find painting tools…

Here's a nice basic Turbine Spray system:
https://www.amazon.com/gp/product/B00D4NPPQY

Airbrush setup with two brushes and compressor:
https://www.amazon.com/dp/B0796M9QVJ

Airbrush Starter set with 3 needles / tips:
https://www.amazon.com/dp/B0B757WWD8

Airbrush Propellent:
https://www.amazon.com/dp/B009MIZZGK

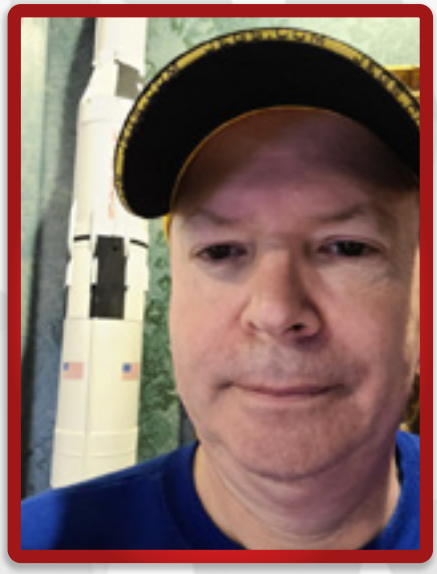
Adapter for airbrush propellent (not needed for use with compressor, only canned propellent):
https://www.amazon.com/dp/B0006MZLQA

Preval Sprayer:
https://www.amazon.com/dp/B00CW809ZO

Deft sanding sealer:
https://www.amazon.com/dp/B000SKZT9Y

Paint Guns:
Harbor Freight offers some of the lowest prices on paint guns, and here is one that works well for what it is. They also have nicer ones. You will need a sizable air compressor to go with it, as well as hoses and filters.
https://www.harborfreight.com/20-oz-hvlp-gravity-feed-spray-gun-56982.html

Brushes and paints can be found at most hobby/craft stores or online. Happy Painting!



About the author:

I'm Phil Woolfson and I first got into the rocket hobby back in the late sixties. I like many kids at the time was quite fascinated with the early manned spaceflight program, and I did have various exposures to model rockets prior to getting into the hobby. Though I only was a rocketeer for a few years in the early days, I never lost my interest in space or in rockets, so I took up the hobby again about 10 years ago.

I have spent most of my adult life as a master craftsman producing fine wood custom furnishings, and though retired, I have a nice shop at my home. When I first got back into building rockets a decade ago, the first thing I realized was that all one needs to build low-powered rockets are a hobby knife, sandpaper, and a few marking and painting tools. I like building a variety of styles of rockets, including scale and sport rockets from companies such as Estes, Dr. Zooch, and Semroc (I still have a couple left in my build pile) as well as scratch builds. I continue to learn more about the hobby as I build and fly more rockets, and I enjoy sharing my knowledge with others who enjoy the hobby.