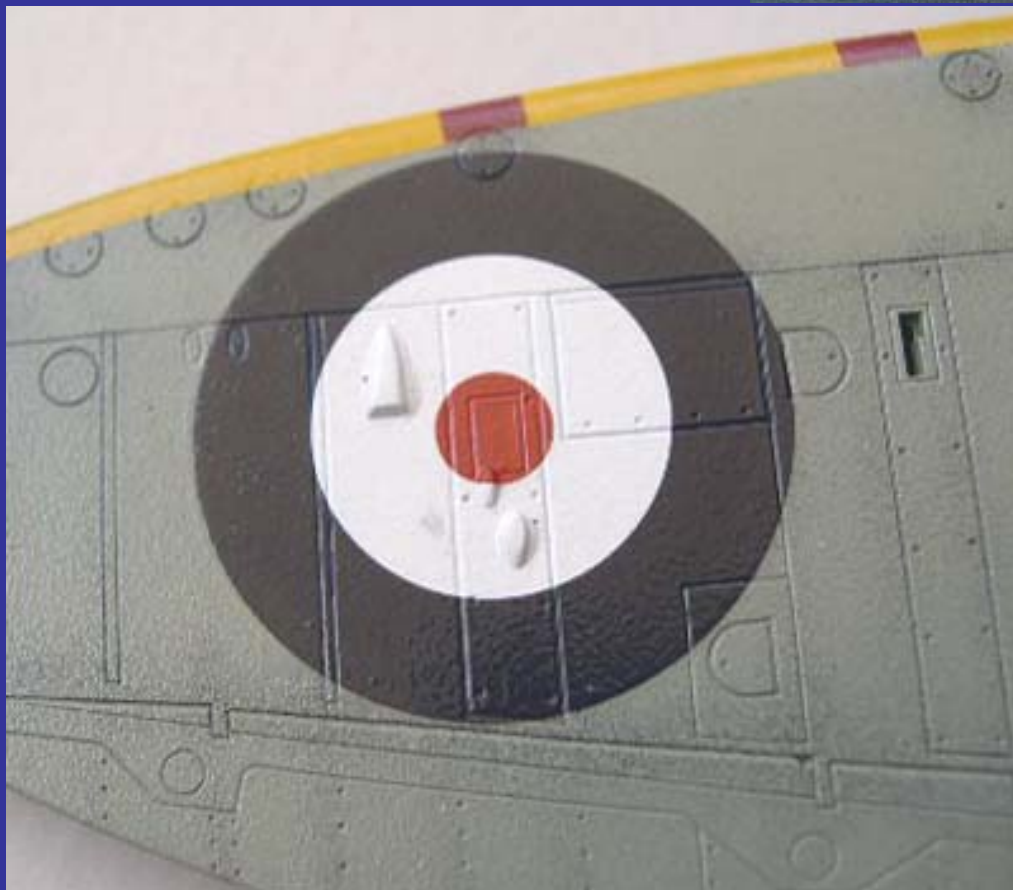


# Model Airplane

## Decals & Markings



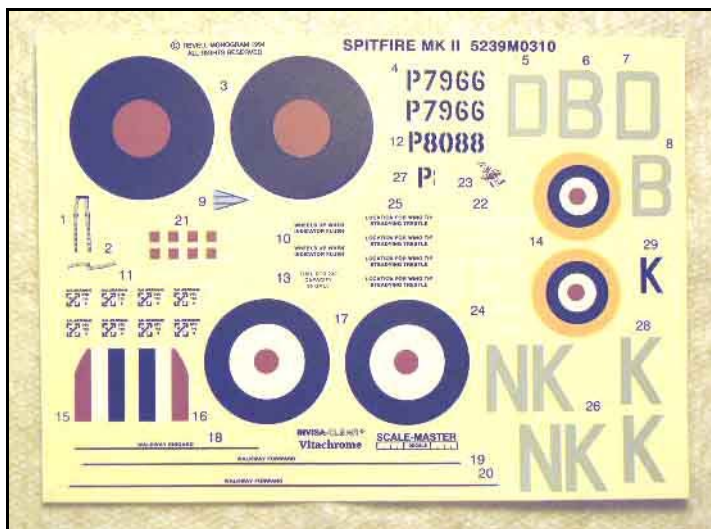
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# Introduction

Applying decals and markings can be one of the most fun parts of building a plastic scale model. Since many airplanes of the WW2 era had unique, colorful and personalized markings, the decals give the model its character. Most kits include a decal sheet with options to produce 2 or 3 different models, so your first task is to choose which one to model. Actually this really *is* your first task, before doing anything else: the different models may use slightly different kit parts, or have somewhat different paint schemes.



*Above:* Typical decal sheet, containing national insignia, squadron code letters, aircraft serial numbers, and various other markings.

Now if you're not happy with what's in the kit, or you have a favorite specific airplane that you want to model, you can purchase other decal sets, known as **aftermarket** decals. The quality of these aftermarket decals is sometimes better than that supplied with the kit. A couple of reputable companies making aftermarket decals are Aeromaster and EagleStrike, although there are many others. You can search the Squadron catalog at [www.squadron.com](http://www.squadron.com) for exactly what you need.

## Basic Procedure

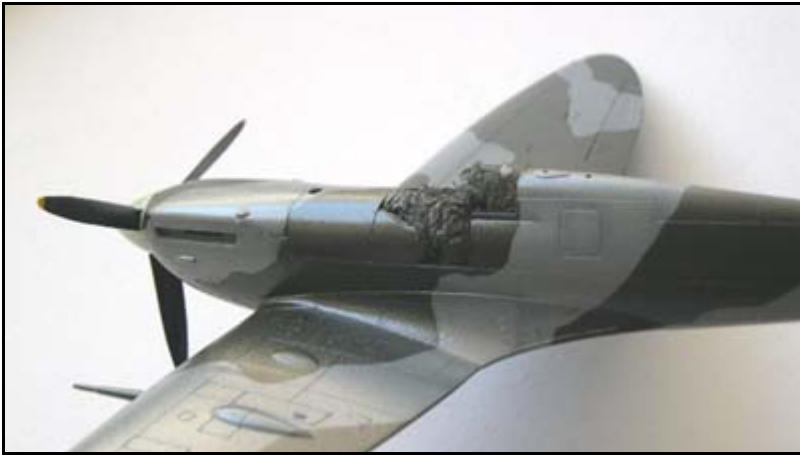
Decals consist of paint layers on a plastic carrier film, with a paper backing. The decal has a glue that is activated by water. The **basic application** of the decal is covered in the kit's instructions:

- Cut out the decal from the sheet.
- Place in room temperature water using tweezers for 10 sec or so.
- Then remove and place on a paper towel for 30 sec or so. The water will penetrate the glue and cause it to come loose from the paper.
- Slide the decal into position on the model, and gently rub down to remove excess water or bubbles from underneath it.

You may have noticed that on some models, the decal looks as if it is painted on; on others it looks like a shiny sticker just stuck on the surface. To get that painted-on look, you'll need to move a bit beyond the basic instructions.

## Advanced Procedure

1) Decals work much better when applied onto a **glossy surface**. To prevent silvering (see Silvering section), apply a gloss coat to the model, let it dry 48 hours, then apply decals. A very popular clear gloss coat is Future acrylic floor wax. This can be applied straight from the bottle using a wide, soft brush. It can also be airbrushed straight, or thinned 4:1 with Windex window cleaner. Clear gloss coats from hobby paint lines (e.g. PollyScale, Model Master, Tamiya) can be used as well.



*Above:* Model gloss-coated with Future.

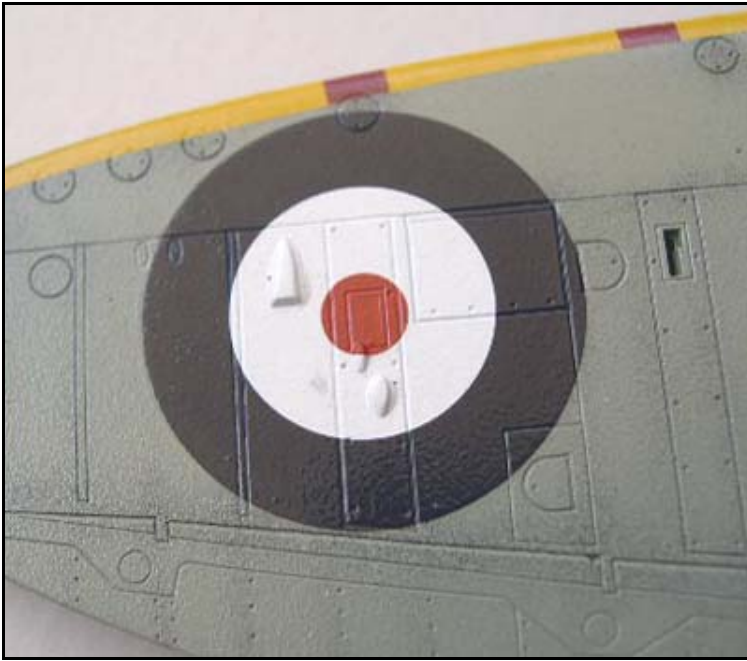
2) **Remove excess carrier film** from around the decal. E.g. if the marking is a letter "D", cut the clear film inside the "D" using a sharp (new) hobby knife blade. The excess film can be removed after applying the water. Removing this film also helps reduce silvering.

3) There are special products designed to help the decals go onto the surface better. Two popular ones are made by Microscale: these are **Microset** and **Microsol**. Microset is applied to the surface of the model with a brush, in the area where you are about to place the decal. Do this right after taking the decal out of the water. The Microset will help you to position the decal with less effort. After it is dry, apply Microsol. This has "plasticizers" which soften the decal film; the film initially wrinkles (but don't touch it!), then on its own settles down over every detail of the surface. See photo of the red, white and blue British marking below; that's not paint, it's a decal after 2 or 3 Microsol applications. It's remarkable to see it happen.



*Above:* Micro Set and Micro Sol are a great help for decal application.

4) After all the decals are applied, let the model dry overnight. Then wash off the excess setting solutions by gently using soap and water on the model. We like to blow-dry it to prevent watermarks.



*Above:* Decal after application of Micro Sol. The decal has been sucked down into all the recessed panel lines and screw holes on the surface, giving it a painted-on look.

5) Now apply another gloss coat. This seals the decals, and helps reduce silvering even further.

6) Now apply any panel-line washes. These go best on a glossy surface, as it's easier to clean up the excess wash. Other weathering can also be applied at this time, although some (e.g. pastel stains) might work better on a flat surface.

7) Not all airplanes are glossy. In fact, very few airplanes in military service are. So the final step will be a coat of flat clear paint. This can be mixed with glossy paint to give a semi-sheen finish if appropriate.

Some common flat coats:

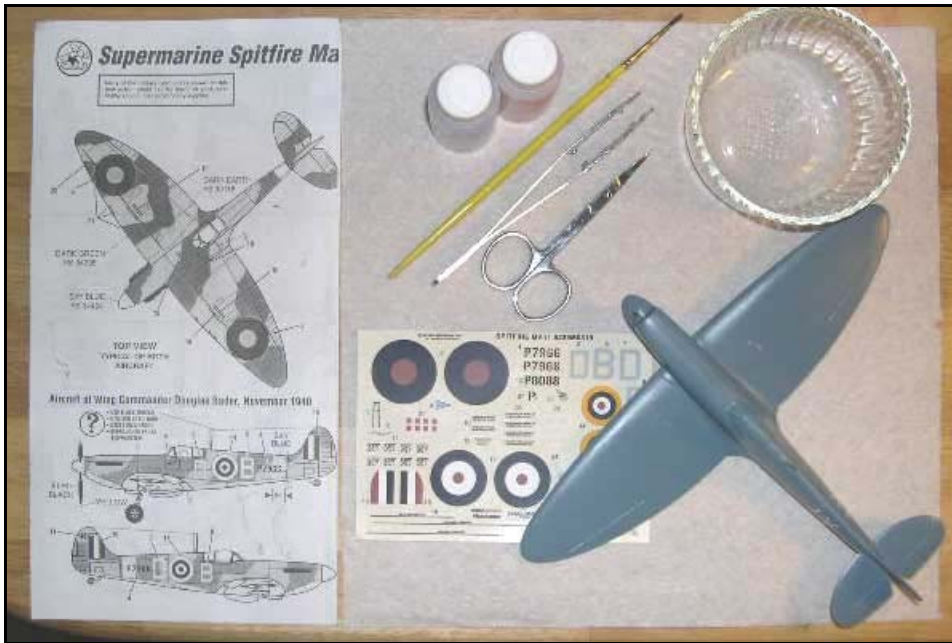
- PollyScale Clear Flat acrylic
- Future + Tamiya Flat Base (4:1). **Warning:** do not use Flat Base by itself! It is *not* a clear coat, and will turn your model cloudy.
- Testors Dullcote (spray can). **Warning:** apply light mist coats only. This lacquer can damage decals or paint if applied heavily.

If in doubt, test the flat coat on scrap with the same paint layers as your model.



## Decal Application Photo Sequence

The following photo sequence demonstrates the decal process from start to finish.



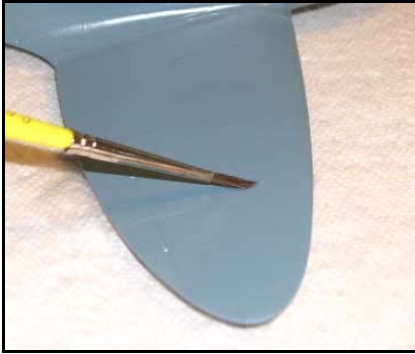
Above: Everything needed. Clockwise from left – decal instruction sheet, MicroSol and MicroSet, brush, tweezers, scissors, water, gloss-coated model, and decals.

Below Left: Decal cut from main sheet, dipped into the water for 10 sec. Below Right: Wet decal placed on paper towel unit adhesive activates (i.e. decal can slide on the backing paper).





Below Left: Target surface is prepared by brushing with MicroSet. Below Right: The decal is held in place while the backing sheet is removed with tweezers.



Below Left: The decal has been moved into its exact position (consulting the instruction sheet). The wet surface allows this positioning. If the surface gets too dry to allow movement, apply some more MicroSet. After positioning, gently use a corner of a paper towel to absorb most of the excess liquid. Below Center: Gently press down on the decal, from center outwards, to remove any air bubbles. Be careful to not move the decal. Below Right: Decal in position and drying.



Below Left: After the decal is dry, MicroSol is applied to help it conform to surface details. This will first cause the decal to wrinkle as shown. Don't panic! Let it dry, the wrinkling will go away. You may need repeated application of MicroSol for thicker / larger decals.

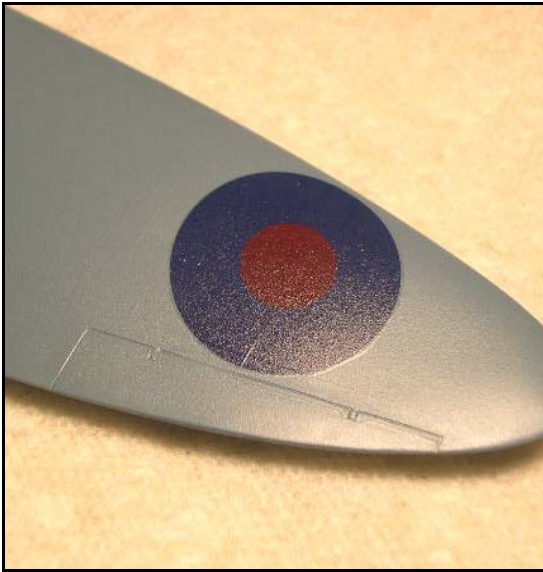
Below Right: This decal turned out to be one of the stubborn ones. No problem, we employed the next tool in our toolbox...



This is Solvaset, made by Walther's. You can find it in the hobby shop, possibly in the model train section. It's a very strong decal setting solution, and is used when MicroSol is not enough. Like MicroSol, apply it sparingly with a brush.



Unfortunately, this decal refused to un-wrinkle even with repeated applications of Solvaset. This will happen occasionally, and you need to know what to do. We first used the Decal Removal technique in the next section. Since we had no spare decals for replacement, we then made new decals following the Make your Own Decals section. Finally, we ended up with a nice, smooth decal:

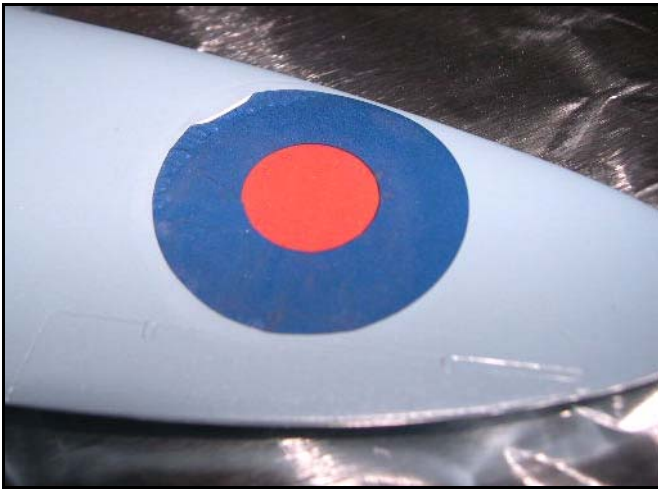


## Decal Removal

Decal removal is necessary from time-to-time. The decals may be misplaced, off-color, wrinkled, not opaque enough, etc. The first thing to do is take a deep breath; do not throw the model against the wall, as you will probably regret that. If approached methodically, the decal removal process can be smooth and easy.

To remove the decal, we again use the MicroSet product. Prop up the model so that the surface with the decal is relatively flat. Then brush generous amounts of MicroSet on top of the decal, and leave it to soak for 15 minutes. This will cause the decal to start wrinkling and lifting off the surface. You may need more applications of MicroSet for a large decal.

If the decal is already sealed with one or more clear coats, the MicroSet will not be effective. In this case, use denatured alcohol to remove the clear coats. If your color coats are acrylic, be careful as alcohol can remove these. If you have a barrier gloss coat (e.g. Future) between the color coats and the decals, this will help (although Future is soluble in alcohol).



Above: Decal after soaking for 15 minutes in MicroSet. Note that the left edge is beginning to peel off the surface.

Blot the excess liquid off the decal with a paper towel. Then apply masking tape over the decal, and rub it down gently. Next, hold the end of the tape in one hand, and hold the model firmly in the other hand. Now rip the tape off the surface with a

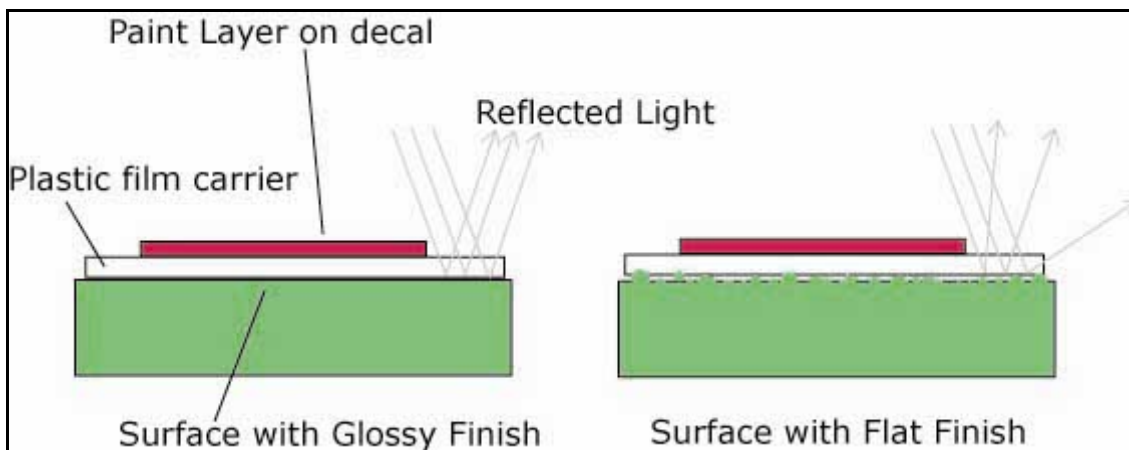
sudden and vigorous arm movement. This will remove all or most of the decal; you may need to repeat the process with fresh tape. If done correctly, this part is really quite satisfying.

When all of the decal has been removed, if the surface is still smooth, you can proceed to re-apply decals if appropriate. We prefer to lightly smooth the surface with 2000 grit wet or dry sandpaper. Depending on the surface condition, you may need or want to re-paint the gloss coat in the affected area, or even touch-up the base-color. For our demo model, we did both before applying the new decal:



## Silvering

The decals are layers of paint on a plastic backing film. If applied over a flat-finished surface, reflected light gets randomly scattered through the clear plastic film, making it highly visible. The effect is called “silvering”. However, a clear gloss coat sprayed on the model before the decals are applied reduces the scattering of light, making the plastic backing film less visible. Another coat of clear gloss after decal application helps seal them. If the real airplane being modeled has a flat finish, a flat clear coat is applied as the last step.



*Above:* Decal on glossy versus flat surface finish.

*Below:* Example of silvering. Arrow shows clear decal film easily seen on flat paint surface.



## Make your Own Decals

You may occasionally need to make your own decals. The markings for a specific airplane you want to make may not be available, either in the kit or from aftermarket decal manufacturers. Painting your own is sometimes an option for simpler markings (see next section), but you can make your own decals if you like.

First you'll need **decal paper**. Testors makes a "sampler" decal system to get you started, you can buy extra decal sheets as necessary.



Above Left: Testors Decal System. Above Right: Contents of the Testors system: one sheet of clear and one sheet of white inkjet paper, mini-cd with some pre-made markings, and can of clear sealing spray.

Another option is the Experts-Choice™ Decal Film Sheets. These come in 8 1/2 by 11 inch sheets, but you could cut them in two to save money. If you get these, you will need to separately purchase a sealer, such as Microscale Liquid Decal Film.

The Testors paper is for inkjet printers, but the Experts-Choice is available for either **Laser or Inkjet**, so make sure you get the right paper type for your printer type.



Another choice that you will have to make is **White versus Clear** decal paper. Kit or Aftermarket decals come printed on clear paper, which allows you to cut the decal with a slight margin around the colored marking. The printers used by decal manufacturers are expensive models that are capable of printing white. On our common inkjet or laser printers, white is actually an absence of ink on white paper.

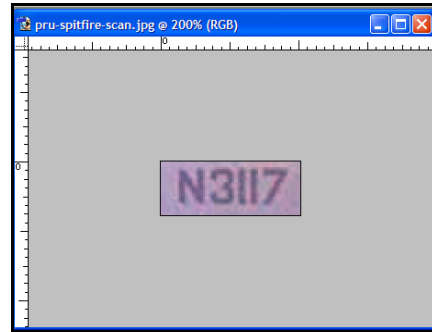
To make decals containing white portions with the inkjet or laser printer, you will need to print on white decal paper. The challenge then will be to cut out the decal so that you do not leave any excess white border around the decal. Another option is to print the decal that should contain white onto clear paper, and then paint the white portions in by brush or airbrush. This will generally require masking off the non-white portions.

### **Software**

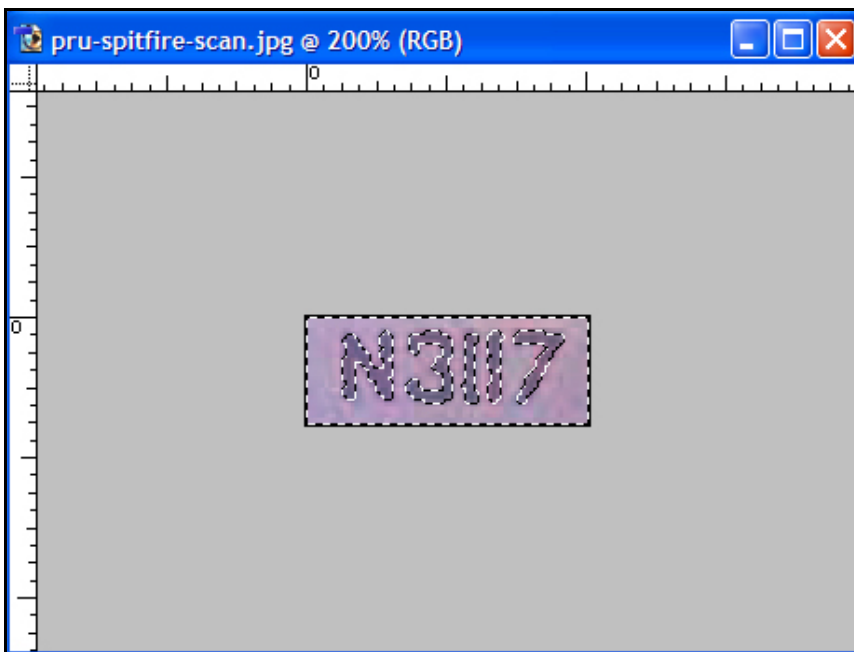
Creating your own decals will also involve software. You may draw your own decal with a **drawing program** such as Adobe Illustrator. Another option is to start with a photograph of the airplane and its markings, then edit them in **photo-editing** software such as Adobe Photoshop. If you already have a digital picture, you can start editing. If your picture is in a hardcopy book, you will first need to **scan** the picture, then edit it.

The sequence below illustrates making our decals starting with a paper illustration of the airplane. This was first scanned with a flat-bed scanner, and imported into Adobe Photoshop. The **image size** was then adjusted to match the scale of the model. For example, if the size of the round marking that was scanned was only 1 cm but needs to be 2 cm on your actual model, use the image size function to double the width of the image (the height will also double automatically). Most editing software will have a similar function.

The area of interest, in this case the aircraft serial number 'N3117' was then **cropped** closely, so that the image contained a fairly even background color and intensity. This makes the next steps easier.

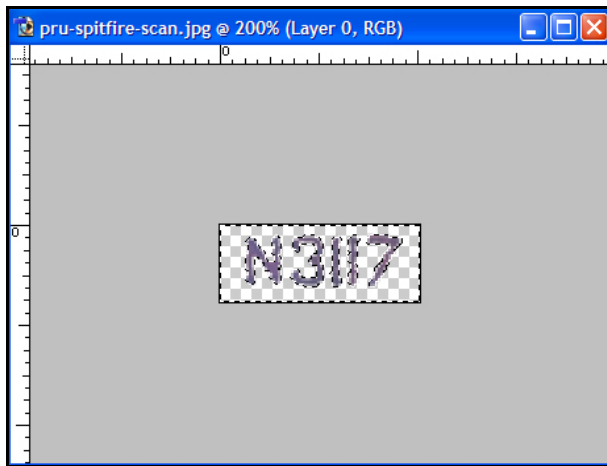


Then select the 'Magic Wand' tool. Different programs might have slightly different names for this tool; its function is to select an entire region of similar color and intensity. You select the tool, then click somewhere in the background. As you can see in the picture below, this results in the entire background being selected. If only part of the background gets selected, it's because there is lots of variation in the background. In that case, you would look for the 'Magic Wand Plus' tool, and click on the background again with that tool, until all of the background is selected.

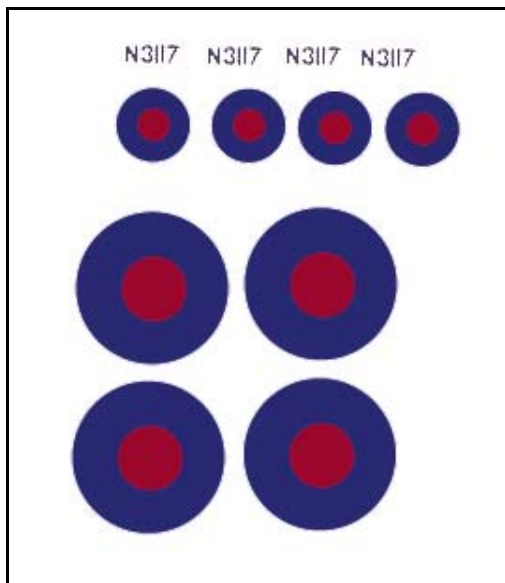


Now that the entire background is selected, the next step is to remove it. Do this by selecting the 'Magic Eraser' tool. Set the tolerance of the tool to 100%, then click on

the selected background area(s). This should erase all of the background. If there are remaining areas that need erasing, you can touch them up manually with the regular Eraser tool. The picture below shows the new image with all of the background erased.

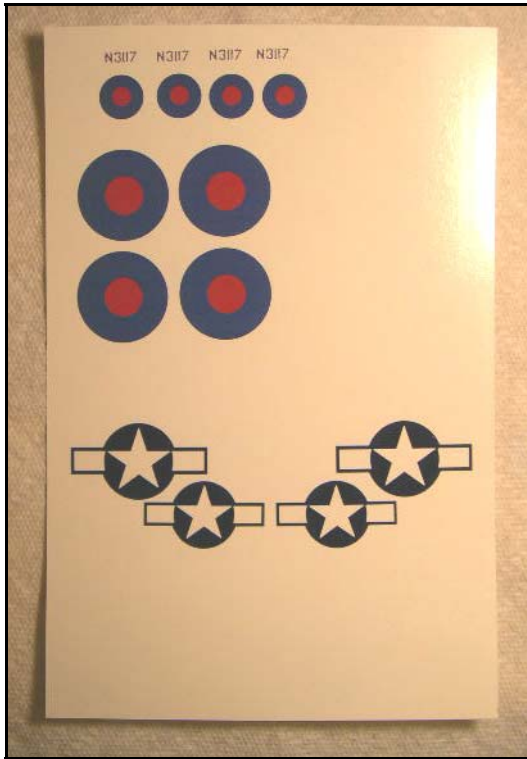


You can now put the image into a file with other decals. Simply select the whole image (we used the selecting box), and cut and paste. We pasted into an Adobe Illustrator file (because we had drawn roundel markings using that SW), but you could paste into other files/formats.



If possible, add other decals to your layout, to conserve space and not waste the decal paper. The decals above contain no white areas and so are best printed onto

clear decal paper. We added some stars-and-bars decals from the Testors mini-CD as a test. (Since the white areas of these decals would print clear, to actually use them would require some asking and painting of white.) Here is what our final decal sheet looked like after printing:



This paper is 8.5 by 5.5 inches (half the size of standard US printing paper). So you will need to test your layout to make sure that the decals print completely within the bounds of the paper. You will need to move your decals to one corner of the screen layout.

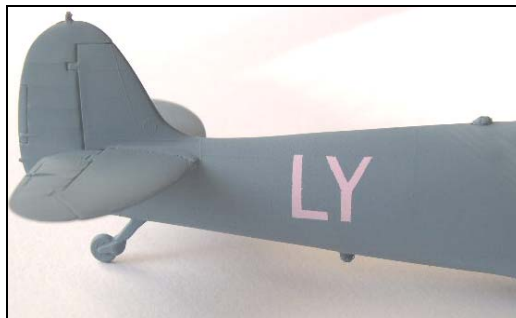
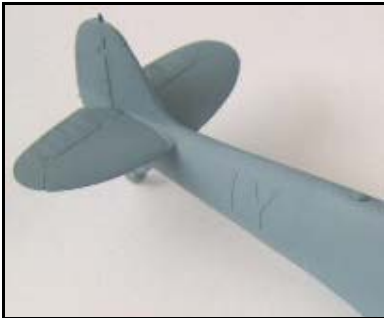
Your best bet will be to cut a piece of regular paper to the same size, and manually feed it into the printer (remove other sheets of paper). This tip is especially relevant since the Testors sample kit only comes with one sheet of white and one sheet of clear paper...

After the paper was dry, the sheet was coated with two light coats of the included sealing spray. This was sufficient to prevent ink-bleeding out of the paper when we applied the decals with the usual wet technique.

## Painted Markings

Sometimes decals (homemade or otherwise) are not available or practical. It is possible to paint your own markings. Some designs such as nose-art can be free-hand painted, others can be applied using masking.

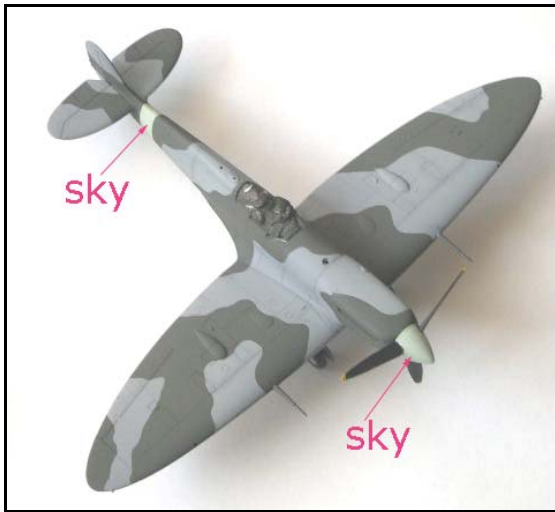
Typical uses of masking would be stripes, checkerboard patterns, or squadron letters. Paint the area the lighter color first, then cut the masks out of masking tape, frisket, or other material. Apply to the surface, paint the darker color, then remove after drying.



*Above:* Squadron letters applied by masking. Rear fuselage area first sprayed with PRU pink. Squadron letters "LY" cut from blue house-painter's masking tape were applied (top). Then airplane sprayed with PRU blue (bottom left), and masks removed (bottom right).

*Below:* Rear fuselage band in Sky color was supplied as decal option. However, spinner would have to be painted with Sky as well, and that color did not exactly

match the decal sheet. Solution: spray Sky on the rear fuselage, then mask to create the fuselage band. Then spray base color, camouflage, etc.



Cutting out the masks requires some care. It is best done on a hard, smooth surface such as a sheet of glass (e.g. from a picture frame). Place the tape on the glass, in overlapping strips if necessary. Then use double-sided tape to attach a copy of the required pattern over the masking tape. Then use a steel ruler and a sharp hobby knife to cut through the pattern and the tape at the same time.

When ready to apply the tape to the model, remove it from the glass surface using the tip of the knife. It helps to wet the surface of the model with water from a cup containing a small drop of dishwashing detergent. This gives you extra time to position the tape on the model before it sticks. When the mask is in position, remove excess water with a q-tip or paper towel. Then burnish down the mask with a toothpick.

**END**