

## Fine Lines

The Holy Grail of airbrushing seems to be the ability to do fine lines. How fine? Well, pencil width is a common goal. But, of course, that depends on how sharp the pencil is. People will spend a lot of money on airbrushes that promise to achieve this. However, an old airbrush artist with about 40 years experience once wrote on one of the airbrush forums, "You can't buy fine lines". But, no doubt, some airbrushes make it easier than others. I've seen artwork done on cigarette lighters and even ballpoint pens that is unbelievable, and you know these weren't done with a large nozzle.

If you want to see what your airbrush is capable of, take a newspaper page with lots of black areas on it. Then fill your airbrush with plain lacquer thinner and try it on the black areas. The lacquer thinner will leave a white line on the paper. You may be surprised at how fine a line you can make. Airbrushes work best with very thin liquids. This is why I use ink in my reviews. It makes up for my lack of skill.

So, why doesn't paint work the same way? Well, physics works against you. Since the spray pattern is a cone, you have to get very close to the surface. Then, you pull back on the trigger a little and nothing happens. So, you pull back a little more and suddenly you get too much and the paint goes splat. It can be very frustrating. Why does it do that?

**Let's look at the drawing of the airbrush head again.**

The air escaping from the front of the airbrush creates a vacuum at the end of the tip. This vacuum is a force that tries to pull the paint out of the nozzle. As you can see on the [It Sucks](#) page, this force is very small when the needle is barely pulled back. Resisting this force are a couple of things; paint viscosity and surface tension. In addition, there may be a small dam of dried paint on the needle blocking the vacuum. And, if that's not enough, it turns out that the viscosity of paint is not constant. It's a [shear-thinning fluid](#) and the viscosity is actually higher when at rest and lower when it's in motion.

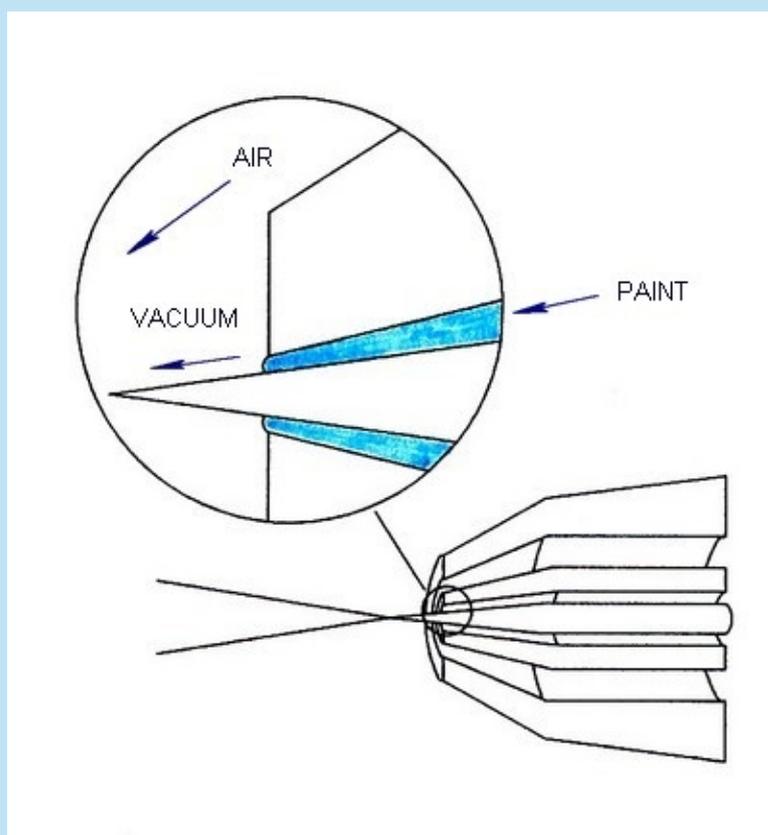
So, as you pull back on the trigger, more paint is exposed to the vacuum and its effect increases until it reaches a point where it overcomes the resistance to flow. Ideally, this would be a smooth transition. Unfortunately, it's not. The best we can do is to try to reduce the effects mentioned above.

Thinner paint will have less surface tension and viscosity, and slower drying thinners will clog less.

**Here are some things to consider:**

Since the pattern is a cone that starts at the point of the needle, most airbrushes can produce a fine line if they are held close enough to the surface. But, at a given distance, a narrower pattern will produce a finer line.

The spray pattern of an airbrush pretty much reflects the shape of the needle. A more acute needle taper produces a narrower pattern.



A more acute needle will also result in a smaller change in paint volume at a given distance, for a given movement of the trigger. In other words, the trigger is less sensitive.

Most airbrushes have a total needle travel of about one tenth of an inch. In this distance, the nozzle opening will usually go from fully closed to fully open. Check it out on yours and see if this is true.

Since the needle travel is fairly constant at .1 inches, and the nozzle opening goes from fully closed to fully open in this distance, a more acute needle taper means a smaller nozzle diameter. Airbrushes designed for fine work may have nozzles of .2mm or even less.

But, paint must be really thin to pass through such a small opening. These fine tips were really meant for ink and water thin liquids. And, thin paint is more likely to splat and run when you spray it, especially on a hard surface like plastic.

Increasing the air pressure will increase the vacuum force and pull paint out sooner. But, it will also increase the velocity of the air and therefore of the paint spray. And, this means those droplets are going to bounce around more and go where you don't want them.

### How do you get there?

It ain't easy. I've gone through many empty plastic bottles and lots of paint trying to get the knack. I'm getting better. Sometimes I get things just right and it works. But, I'm still not consistent. Thinning seems to be the key, that and balancing viscosity against air pressure. And, even when it works, there is a very narrow zone between no paint and too much. Rather than move your finger, you sort of have to just think about moving it. I've found that a slow drying thinner helps, so I've switched from lacquer thinner to mineral spirits for enamel paint. If you use acrylics, a retarder is supposed to help. Either of these should reduce the build up of that little dam on the needle, also known as tip dry. It also helps to brush the tip with a little thinner now and then to keep it clean. Airbrush artists sometimes use their fingers to pick dried paint off the needle. Also, if your paint isn't lump free, forget it. I've got some older bottles of paint that will produce general coverage just fine, but won't allow fine control no matter how I thin them.

So, there you have it. It's still going to take some practice, but at least you know what you're up against. And, you might want to ask yourself if this is something that you really need. You can accomplish a lot with a little masking.

If you want to do some really fine lines, here is another option.



Actually, I've found that if you thin the paint to airbrushing consistency, it works pretty well. Here are some doodles done with it on the lid of a small metal box using Floquil flat black thinned about 1 part paint to 2 parts lacquer thinner.



### Postscript

I've discovered that the slightest burr on the needle point makes a big difference in spray pattern. I was playing with my Omni 4000 and it just wasn't doing nearly as fine as it used to. I examined the needle with a 6X magnifier and didn't see anything. But, by pulling my fingernail over the tip, I could feel something. I looked at it under a 25X microscope and sure enough there was a tiny burr. So, I pulled the needle toward me while rotating it against my cutting pad until the burr was gone. When I tried the brush again it was back to its old self. It's something to check if you are having fine line problems.

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