

The Sticky Business of Paint

By Susanne Michi Gargiulo

The fabricator is working late. He's finishing up the painting he needs to install for a customer tomorrow. He's not too worried about it. It'll be ready because he's using a fast-drying paint. He searches the shelf for his solvent, wipes down the railing, and then mixes the solvent with the paint until it becomes a good consistency. He loads the paint and starts his spray gun. After 30 minutes it's dry and ready for a re-coat. But the next morning his paint job has a number of surface imperfections. What went wrong?

Well, paint experts and troubleshooters would look at the imperfections and likely say that almost everything could be wrong in this scenario. They might say the paint was incompatible with the solvent. Or the primer was incompatible with the topcoat. Maybe they'd say he didn't prepare and clean his surface properly. Maybe he put too much solvent in the paint. Or, perhaps his equipment was dirty. Maybe his air was dirty. Maybe it was just that he didn't hit the critical re-coat time, or maybe it was something entirely different.

As for the fabricator, he has been painting metalwork for years and is inclined to think something was wrong with the paint.

In truth, he would probably be wrong. But, it would take a more detailed problem solving session to get to the bottom of why the paint didn't perform. And unfortunately, fabricators don't really have the time to "get to the bottom of it." In addition, the area of coatings is incredibly complicated. Understanding the complexities and interactions of every single variety of paint, primer, solvent, and what could possibly go wrong, would take at least a full year of study.

So, let's just cover the basics of paints and the most common problems – and then determine how you can set up a worry-free, solid paint system that works for your shop.

We begin with a look at paint. It is comprised of three basic ingredients:

- ❖ **Pigments** – These are insoluble solids that provide opacity and color. They can also provide improved surface adhesion, weather resistance, and corrosion resistance. And, they control the level of gloss.
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- ❖ **Solvents or Volatile Material** – These dissolve and carry the resins and pigments, and aid in paint flow and drying. Solvents totally evaporate in the drying process, leaving only the resin and pigments. The faster evaporating the solvent, the faster drying the paint. Solvents are included in the manufacturer's formula and are also regularly added prior to application by the user.

- ❖ Typically, there is also a number four, titled **Miscellaneous Additives**. This is a grouping of all other minor ingredients, such as antioxidants, dryers, flow agents, and so on.

Within each of these groupings is a variety of choices, as well as an endless variety of combinations depending on the manufacturer. Often, the chemical composition of paints differ considerably from one manufacturer and paint to the next, and the many differences means that mixing them, or using them incorrectly, can lead to adverse results and other problems.

Let's use our scenario to take a look at some of the most common problems that can cause cracking, bubbles, wrinkles, or other interesting phenomena on our surfaces.

First of all, pulling any solvent off the shelf and mixing it with any old paint is not a good idea. They may or may not resist each other immediately, but as time goes by that seemingly successful bonding is likely to start cracking — along with the smile on the customer's face. Again, the chemical composition of each paint, primer, and solvent is so particular and highly interactive that not using exactly the correct combination is detrimental to a paint job.

According to experts, the incompatibility of solvents to paints and topcoats to primers are the more common mistakes made. Jim Gillenwaters, paint troubleshooting expert with PPG Industries, says that there are a few specifics to go by; you can put urethane over enamel, and water on oil, but you can't put anything on either water or oil. Aside from the basics, everything else depends on the quality and manufacturer. Therefore, the key is to follow the manufacturer specifications. "Make sure you always ask for a manufacturer's information sheet with recommendations," he says. "Otherwise, you're asking for problems." This will also specify what solvents, primer, or topcoat will work with that particular product for maximum corrosion protection and durability.

The information sheet is equally important when talking about critical re-coating times, another common problem. When can you apply the second coat? Gillenwater says, "If you have a 6-hour window and you put it on prior to that, or later than that, the paint may crack or explode on you." And depending on the manufacturer, different kinds of paint have different re-coat sensitivities.

Another common problem is a soft coating that's easy to scratch. While it may or may not be noticed immediately, it is frequently the result when a fast-evaporating solvent is mixed into paint. Most fabricators prefer the fast-evaporating solvent because it speeds up drying time — the faster the evaporating of the solvent, the faster the drying of the paint. Xylene is one of the most popular solvents on the market today, and it is a fast-evaporating solvent. But, what most lay painters don't know is that if the solvent evaporates too fast, it will flash over the surface and trap un-evaporated solvent underneath. Consequently, the paint never truly hardens. Dennis Johnson, paint expert with Paint Professionals says, "Nine times out of 10 it would stay soft. The solvent really needs to be slowed down."

Other quite common but less obvious mistakes Gillenwater sees as problems for paint

jobs are: dirty air compressors, darkened work areas, a Mecca of dirty equipment, and dirty air. Yes, dirty air can affect your paint job. To check for dirty air in the shop, Gillenwater advises conducting an inexpensive test. He says, "A cheap way to test your air is to open your air chuck and put in an air line. Then put a cotton rag over it for 10 minutes, take that rag off, and if you can see the ring of the air line you've got dirty air."

Whatever is causing your problems with coating, the bottom line is that paint, primers, and solvents are highly chemical and interactive entities that should be treated as such. If you are concerned about the quality, looks, and long-lasting corrosion protection of your paint job, primers and solvents should be applied according to manufacturer guidelines, and they should be viewed as a system (see related article starting on page 56).

Of course, we cannot discuss paint without talking surface preparation, one of the other common problems noted by experts. It has nothing to do with the choice of paint, but as you probably know, surface preparation is one of the single most important parts of a coating system. The NOMMA Technical Committee notes in their brochure Corrosion Protection Of Ferrous Metals: "It has been said that an average coating applied to a well-prepared surface is far superior than an excellent coating applied to an improperly prepared surface." This brochure, available from NOMMA, also lists The Society for Protective Coating's (SSPC) standard surface preparations. Contact NOMMA for a copy.

Choosing a Paint System for Your Shop

So, having said all this, how do you go about picking and setting up a paint system that works with your shop, size, available cost, and needs?

According to Bob Mangum, Industrial Marketing Manager with Omega Coatings Corp., fabricators prefer working with alkyds. Most likely because alkyds typically dry faster, are inexpensive, and have a tremendous open time – meaning time to work with it to get a smooth surface. In addition, says Mangum, "Alkyds tend to wet out the metal and absorb rust and so on."

Sounds like the perfect choice, especially for a fabricator of ornamental metal. "Painting is a small percentage of a fabricator's job. And they like to keep it simple," says Chet Dinkins with Sumter Coatings. "They like to use a particular paint and stick with it. They know how it dries and prefer not to jump around."

But, there are a number of other factors that should be taken into account when choosing paint. For example, is the job to be installed indoors or outdoors? A fabricator may use an alkyd on the railing indoors, but for the outdoor fence, it may not be the best option. Dennis Johnson of Paint Professionals notes that while alkyd paints and primers may be fine for inside, their durability factor is horrendous when it comes to the outdoors. And as Johnson notes, after putting so much time and effort into crafting a beautiful piece, doesn't it deserve a good coating? Besides, you still don't want that customer's smile cracking.

When selecting a paint system, here are some factors to consider, courtesy of Sherwin-

Williams: Is it a short or long-life article? What kind of metal are you coating? What kind of soil – rust, dirt, grease, or drawing compounds? What level of durability is required of the finish? Will the article be exposed to high humidity, salt atmospheres, etc.? And what about costs?

It all sounds awfully complicated and it is no wonder fabricators shy away from getting into the details. But once you know your parameters you can choose and apply paint more wisely and effectively.

Another way to make painting more reliable is to set up a paint system for your shop. First of all, a good distributor is everything. You need to find a distributor who knows his product and equipment, and someone you can call on for technical support. Once you find him, he will work with you to set up paint systems that are within your desired price, quality, and drying time requirements. Besides, why waste time keeping up with constantly changing coating technology when your distributor lives and breathes it daily? Save time, and pick his brain instead.

According to Gillenwaters, you can find a good distributor even if your shop uses only five gallons a month. When you look for a distributor make sure the company has a field technician who can come to your shop and troubleshoot. Ask about their other customers. Ask how they intend to help you solve problems, and check if they have good references. Dennis Johnson with Paint Professionals says, "There are a bunch of people out there that are knowledgeable. They [fabricators] just need to take their time and find them." Also, read up on some basics regarding solvents and paints. You may not have time to learn everything, but you can cover the basics.

In addition, Dennis notes that there are three basic rules to follow when setting up a solid and worry-free coating plan for your shop. (Dennis is creating a basic class on this for the industry):

- ❖ **Standardization of finishes for interior and exterior.** This is the most important point. Get involved with someone who can help set up a system for each of your needs. This is where a good distributor comes in. Whether the job is inside, outside, oceanfront, aluminum, steel, or iron, you should set standards according to desired level of quality and price. For example, on an inside job in this particular metal you will always use System #1, comprised of primer A, plus two coats of topcoat B – or simply two coats of DTM (direct to metal) paint C. For an outside job in iron you know to use System #2, comprised of primer D plus topcoat E. If the jobs coming through your shop only require you to use a small amount of paint, have the distributor work with you on a "few good paints" that can be repeated within each system
- ❖ **Qualify jobs to the customer.** It may be that you are keeping the price of your paint systems low to satisfy the customer – and to keep up with competition. But that may ultimately sacrifice the quality of your job. Instead, make samples to show to customers. Take pictures. Show them what an alkyd sample will look like in 2-3 years versus an urethane sample. Don't tell them the alkyd is "bad," just

that the urethane is better. It will be more costly, but let them choose what they are looking for and what they are willing to pay for in terms of quality.

- ❖ **Education.** Fabricators and customers need to be more educated. Learn the basics of paints, and convey the differences to your customer. But again, save some time and let the distributor keep you updated. He has already done the legwork. Reprinted from the November-December 2000 edition of Ornamental & Miscellaneous Metal Fabricator.