

WATER-BASED FINISHES AND HVLP SPRAYERS MAKE IT EASY

Picture this if you will. You just completed a project that required hundreds of dollars worth of wood, using thousands of dollars of woodworking machinery. Now, are you going to apply the finish with a \$5 brush? We hope not. If you've always admired the smooth, rich looks that come with a spray finish, but avoided the process because of all the complications, take heart. Help has arrived.



You can achieve professional results in a home shop

Woodworking pros know the value of a sprayed-on finish. But conventional spray guns and solvent-based finishes demand expensive equipment and shop setups that most of us home woodworkers cannot afford. Now there's a better, safer way--combining HVLP spray equipment with water-based finishes.

HVLP stands for high-volume, low-pressure. In contrast to conventional spray guns, which blast out air at up to 40 pounds per square inch, HVLP units need only 4 to 10 psi to get the job done. The result: Up to 85 percent of the finish lands on the workpiece compared with 35 percent for conventional sprayers.

You waste less finish, and you don't coat

everything in your shop with overspray.

The second ingredient to this winning recipe is a water-based finish. Unlike oil-based finishes, water-based finishes don't give off toxic, flammable fumes. With them, you don't need an explosion-proof ventilation system, and you can safely spray water-based finishes in the basement or a shop attached to your house.

Taking advantage of the opportunities offered by HVLP systems and water-based finishes does require some education, though. So here's our five-step program to get you started on the kind of woodworking finish you've always wanted.

Choose your equipment wisely



Here are samples of three different types of HVLP sprayers. The three-stage turbine-based Accuspray 23i, left, the Binks Mach I CAS gun in the middle, and the single-stage Wagner Professional FineCoat.

Manufacturers offer two different types of HVLP setups: turbine-based machines that pump their own air and conversion-air systems (CAS) that hook up to an air compressor. Below, we compare the two systems, but for the techniques in this seminar, we'll concentrate on the turbine-based systems because they usually are better suited to the home woodworker.

Turbine-based systems. The beauty of turbine-based systems is that they send out a warm stream of air and finish. This helps water-based finishes dry faster and flow out smoother, particularly during periods of high humidity. Portability also ranks high on the list of advantages. You can carry these compact units by hand or roll them around in the shop.

Turbine-based spray systems have one or more blowers that force air through a 1"-diameter hose and into a spray gun. They are rated as one, two, or three stage, corresponding to the number of blowers. Extra blowers increase the pressure of the air coming out the gun, which helps spray thick-bodied finishes and speeds up work on larger projects. The one-stage machines do a fine job of spraying water-based polyurethanes, as well as paints and oil-based products that are thinned according to manufacturers instructions. A two-stage machine will handle unthinned finishes and larger projects better, and three-stage machines are used primarily by production shops. Prices for one-stage systems range from \$180 to \$350, two-stage turbines sell for about \$300 to \$800, and three-stage units cost around \$900 to \$1,200.

Conversion-air systems (CAS). CAS sprayers rely on air coming from an air compressor. Changing this high-pressure air to low-pressure, high-volume air requires a specialized CAS spray gun, or a pressure-conversion regulator that attaches to the air inlet port on an HVLP gun.

This might seem like a way to get into the HVLP game without spending a lot of money because all you buy is the gun. But CAS guns generally cost \$250 to \$350. They also require a compressor with a minimum of 3 to 5 hp and an air-delivery rate of at least 10-20 cfm at 60-80 psi. With a large compressor, however, CAS systems do a nice job of atomizing thick finishes.

A potential source of problems with CAS sprayers is the oil or water that occasionally

gets into the hose of an air compressor. To eliminate these contaminants, you must attach a filter to the air outlet on the compressor.

Get to know water-based finishes

The techniques you may have used in applying oil-based finishes won't always work with water-based products. Knowing the do and don'ts of water-based finishes will prevent problems and improve your results.

How to control grain raising.

All water-based finishes, sprayed or not, will raise the grain of your wood. The solution? Put on a light first coat, and let it dry. Then, lightly sand the surface with 220-grit sandpaper. Be careful not to sand through the finish and into the bare wood. Subsequent coats will not raise the grain.

Whatever you do, never smooth a water-based finish with steel wool. Small fragments of steel will become embedded in the finish and create rust stains.

The importance of gun cleanup.

When spraying water-based finishes with an HVLP system, the finish can dry out inside the nozzle of the gun within minutes after you stop spraying. Once these finishes dry, no solvent will remove them. You'll have to scrape them out, and this can take hours. To prevent this problem, be sure to clean your gun and its parts immediately after you finish spraying.

Set up your shop for spraying

Finishing wood is 90 percent preparation and 10 percent application, and that holds true with HVLP systems and water-based finishes. Here are the things you need to do to your shop before turning on the spray gun.

Light to see the work.

With your work light in the correct position, you'll be able to see the thickness of the finish you're applying and any flaws, such as sags or runs. The secret lies in positioning yourself and your light so that you can see the light's reflection in the finish on the workpiece. Set up your light as shown in the photo *below*, and spray a few test pieces to make sure you can see the results clearly.

Guard against overspray.

Even though HVLP systems greatly reduce overspray, you should still plan to control it. Cover your tools and workbenches with drop cloths, or hang an old shower curtain or other barrier around your work to avoid spraying the walls.



Position yourself and the work light so you can see the reflection of the light in the sprayed surface.

Nix the dust for top results.

Fast-drying sprayed finishes don't collect dust like brushed-on finishes, but you should minimize airborne dust anyway. Clean and vacuum the area thoroughly. Turn off all fans, including the heating or air conditioning. You also may want to mop the floor with water to keep down static electricity, which attracts dust. Turbine-based HVLP units draw in a lot of air, and this may stir up dust.

Wear a respirator and goggles.

Water-based finishes impart very little odor, but avoid inhaling the mist from the spray gun. When spraying, wear a snug-fitting respirator with a replaceable organic-vapor cartridge. Replace the filter when you can smell odors through the respirator. Cotton dust masks won't suffice because they don't neutralize organic vapors.

Prepare the gun and finish

Successful spray-finishing requires a lot of small, but simple adjustments at this step. You may need to thin the finish and tweak the settings on the gun until you get a perfectly even flow.

Thin and strain the finish.

Although most manufacturers of water-based finishes don't recommend thinning products more than 5 percent, you may want to thin other finishes, such as polyurethanes or paints. You'll find directions for thinning on the labels of most finishes.

You must, however, strain any finish you spray to get rid of lumps or contaminants, as shown *below*. Most hardware stores sell disposable paper strainers you can use for this purpose.

Select a pattern. The air horns on the front nozzle of a spray gun enable you to adjust the shape of your spray pattern. Turn the horns horizontal for a vertical pattern, or vertical for a horizontal pattern. Set the horns at 45 degrees for a circular pattern. Test your spray pattern on a piece of scrapwood until you get the desired shape. Use a vertical pattern for spraying panels, a horizontal pattern for narrow vertical

workpieces, and a round pattern for round or circular objects. For most HVLP spray guns, keep the nozzle about 6-10" from the workpiece to obtain the best results.



Strain the finish through a disposable filter available at hardware stores.

Adjust the fluid-to-air ratio.

The next step is to adjust your finish flow to get the proper amount of finish on the work surface. You increase or decrease the amount of finish by turning a knurled knob located at the rear of the gun just above the handle.

Start with the fluid control set at the minimum and increase the amount of fluid until the finish on your test piece starts to run or sag. Then, reduce the amount of fluid until the runs stop. If you get a surface that has a texture similar to that of an orange-peel, you need more finish.



Turning the air horns on the front of the spray gun enables you to change the shape of your spray pattern.

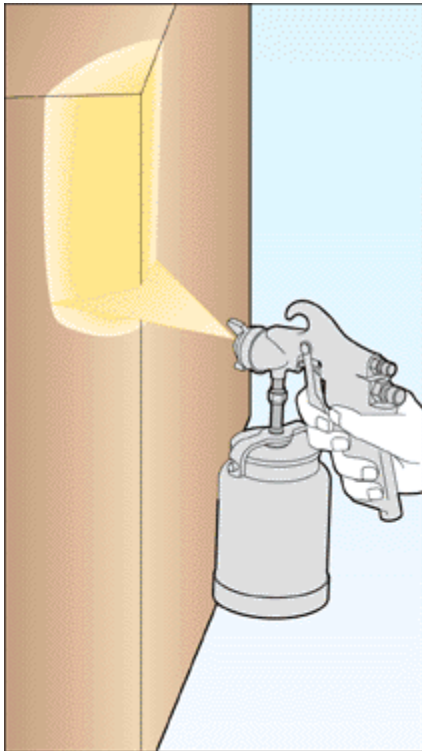


Adjust the fluid control knob at the rear of the gun until you get the proper amount of finish on a test panel.

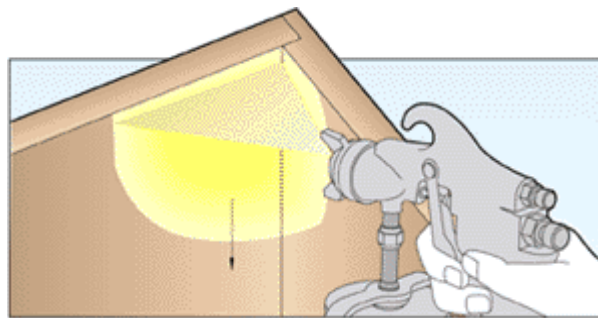
Start your spray guns

Having tuned up the equipment and prepared the finish, all you have to do now is spray the parts of a project in the correct order and maneuver the gun properly. Start spraying on the edges and corners, saving the large areas and panels for last. On enclosed structures, such as boxes and drawers, spray the inside first.

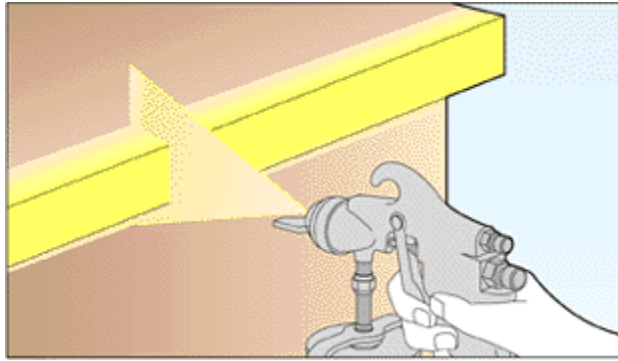
To avoid the natural tendency to pivot the gun from the wrist or elbow, move your arm from the shoulder. And be sure to maintain a constant speed with the gun.



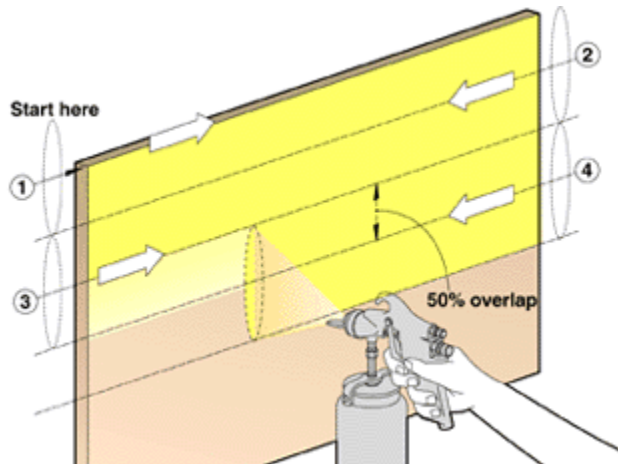
OUTSIDE CORNERS. Aim the spray gun so the corner splits the spray pattern down the middle.



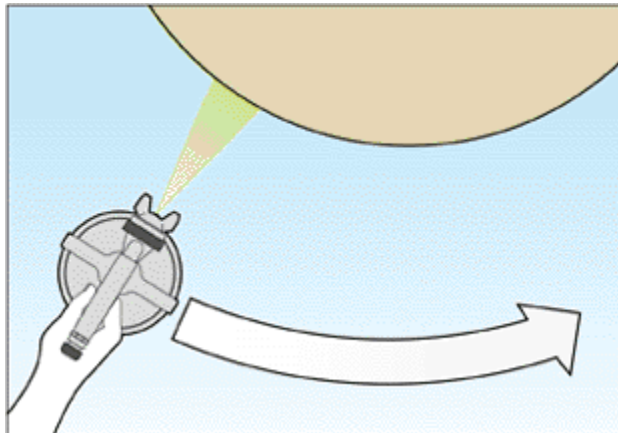
INSIDE CORNERS. Spray down each side with a small overlap in the corner.



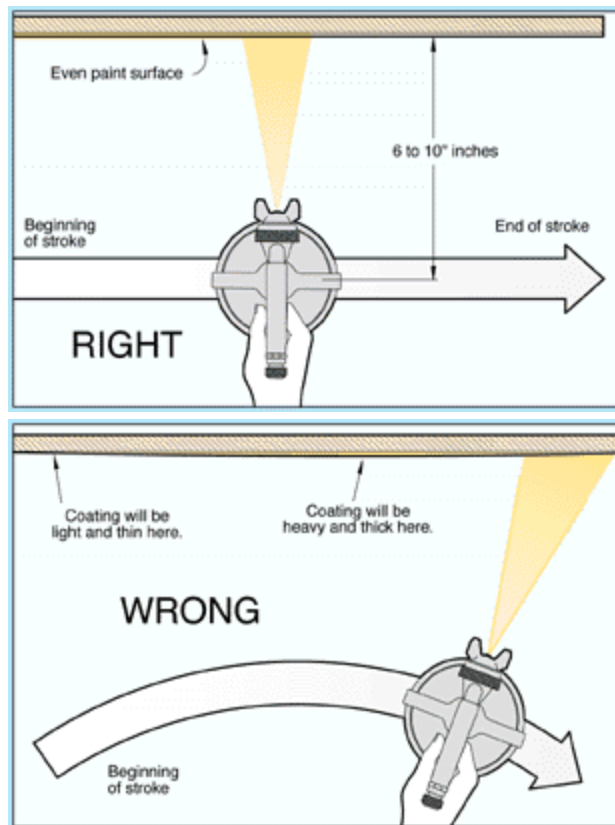
EDGES. Aim so the center of the spray pattern hits the center of the edge.



PANELS. Start by triggering the gun before the spray pattern hits the workpiece. Do not let go of the trigger until the spray pattern has completely left the workpiece. Overlap each spray pattern 50 percent, and work in a back-and-forth motion.



GUN TRAVEL, ROUND OBJECTS. Keep the gun equidistant from the project during the entire spraying motion. If you cannot maneuver around your project easily, mount it on a lazy Susan. That way, you can rotate the project 360 degrees.



GUN TRAVEL, FLAT OBJECTS. The nozzle of the spray gun should travel along a straight path that's parallel to the object being sprayed. If you spray in an arc, you'll apply too little of the finish on the ends, which causes orange peel. Too much in the middle causes runs or sags).

Tips on spraying other products with HVLP

HVLP systems work for more than just water-based finishes. Here are the other options available.

Paint.

You can spray oil- or latex-based paint with most HVLP systems, but you may have to thin the paint anywhere from 10 to 30 percent to achieve smooth results. Follow manufacturers recommendations on thinning, and spray a few test panels before applying paint to a project. If thinning doesn't work, you can buy accessory air nozzles for spraying thick finishes.

Oil-based polyurethanes.

Oil-based polyurethanes usually require thinning. But unless you have an extensive ventilation system with an explosion-proof fan, you must spray these oil- or solvent-based products outside in a spark-free environment.

Lacquer.

Because of its quick-drying nature, lacquer usually does poorly in an HVLP spray system. The warm, turbine-driven air causes the lacquer to dry prematurely, leading to an orange-peel texture. With their cooler air delivery, however, CAS systems do a good job with lacquers. Like oil-based products, lacquer requires extensive ventilation precautions due to its toxic and flammable fumes.