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SILVER SPRAYING INSTRUCTIONS FOR FIRST SURFACE REFLECTIONS AND DECORATIVE USE

Depending upon size and shape, a number of articles can be sprayed at one time. This is possible by attaching them firmly to a rack or spindle in such a manner as to have all surfaces to be silver sprayed accessible to the spray. The basic shop requirements include the following:

1. Clean, filtered, dry compressed air supplying approximately 5 cubic feet of air per minute at 60-70 pounds per square inch. This is used for the spraying of the silvering chemicals, protective coatings and for force drying between steps. The air must be clean to prevent contaminants from tarnishing the silver you have sprayed.
2. A spray area with adequate ventilation and a powerful exhaust fan are required to draw fumes away from the operator.
3. De-ionized, demineralized, or distilled water is essential in the production of a long-lasting blemish-free mirror like finish. The minimum acceptable limit of dissolved solids is 10ppm. Dissolved solids adversely affect the deposition of the silver, especially chlorides and sulfates. A brown silver deposit as a bright, metallic color is due to impurities in the water. A simple purity check of your water is to add one drop of concentrated silver solution to 15 ml (1/2 fluid ounce) of water and heat for twenty minutes. A cloudy or white precipitate indicates water impurities.

PREPARATION OF SOLUTIONS

Peacock Laboratories offers a variety of proprietary silver and reducer formulations for various substrates. The description below details the use of the S-400 silver solution, and the N-28 reducer solution. This recommendation is based on the proven ability of this formulation to form a bright, continuous, and adherent silver surface. We note that in some cases, the HE-300 silver formulation has also been used to successfully “Chrome” the objects. The mixing instructions using this formulation can be found under “HE-300 Spray Instructions for Chroming and Decorative applications” on our website.

Degreasing Solution: Measure 6 fluid ounces (180 ml) of concentrated #77 Solution into one gallon of distilled or de-ionized water and mix.

Wetting Solution: Measure 6 fluid ounces (180 ml) of concentrated #C-22 Solution into one gallon of distilled or de-ionized water and mix.

Silver Solution -Measure four fluid ounces (125 ml) of concentrated S-400 Silver Solution into one gallon of distilled or de-ionized water and mix. Varied concentrations of 3 to 5 ounces can be attempted in order to determine the most suitable. It is not advisable to use concentrations over 5 ounces as the silver film has a tendency to build up too fast and pass the point of desired brilliancy. Ready to spray silver solution which has been left over after a day's operation can be used the following day.

Reducer Solution Measure four fluid ounces of concentrated MD-40 Moderator into a separate container and add ½ gallon of distilled water. To this, add 1 ounce of N-28 reducer solution and dilute with water to one gallon using deionized/distilled water. This concentration should not be varied. Ready-to-spray reducer solution left over after day's operation cannot be kept for use the next day. This should be discarded and fresh solution made up for each day's operation.

Sensitizer Solution. Measure 4 fluid ounces of #93 sensitizer solution into a container and dilute to one gallon. This solution must be prepared fresh daily.



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We recommend that only a sufficient quantity of ready-to-spray solution be prepared for a day's work. Solution containers and fluid tubing should be rinsed with distilled water at the end of each day. Solutions can be used at ambient temperatures or heated to increase the speed of silver deposition. The recommended range of temperatures for optimal silver deposition is 85-100 F (a 30-38 C). If solutions are fed to the spray gun, a four to six foot head is required.

Step 1. - Apply and Cure a silverable Base-Coat

Articles molded, cast, or otherwise formed of plastic, wood, plaster, metal, or materials other than glass require a silverable coating to attain a smooth high gloss base surface for good results. Some of the items like wood and plaster are porous, and require a pigmented filler or ground coat before the smooth and glossy silverable coating is applied. Either of these coatings can be applied by spray or dip, whichever is most suitable. Proper curing of the base coating is essential. Improper curing of the base or silverable coating can sometimes be detected after silvering by a frosted or crackled appearance. This is more liable to happen at edges or in crevices where the coating is heavier than on flat or central areas. Uniform coatings are very desirable on areas to be spray silvered.

Peacock Receiving Coat #733 is a two part silverable coating that can be used on plastic and wood as a sealer and as a receiving coat for silver spray. Mix 4 parts of #733 with 1 part hardener #833, and 1 part #81 special thinner. This mixture has a pot life of about 12 hours and must be sprayed on by then. A glossy surface is obtained. The base coat must not only completely cover the area to be silvered, it also must be cured (hardened) before the process can be continued. At room temperature (25 C/75F), the base coat requires 12-16 hours for curing. Curing can be accelerated by baking in an oven at higher temperatures. Before it goes into the oven, the base coat must be air dried for about 15 minutes. Cure for 30 minutes at 190 F oven, 45-60 minutes at 140 F.

Step 2. - Degreasing

Spray the dilute #77 cleaning solution on the sealed and base coated surface. This step is required to remove any organics, oils, and fingerprints left on your piece due to handling. You can use a Windex or squirt bottle to apply this solution. Rinse well with the de-ionized water using the water rinse gun.

Step 3. - Wetting

Spray the dilute #C-22 wetting solution on the degreased surface. You can use a Windex or squirt bottle to apply this solution. Rinse well with the de-ionized water using the water rinse gun.

Step 4. - Sensitizing

Spray the #93 Sensitizing solution using the special sensitizing gun that is furnished for this purpose. It is important that the entire area to be silvered is covered well with this solution.

Rinse the object thoroughly with de-ionized water using the water rinse gun.

Silvering the object should be initiated immediately following sensitizing. The surface must not be allowed to dry.

Step 5. - Silvering

Begin application of silvering solutions immediately following the rinse. A special silver spray gun is required for this step. The two solutions, prepared in step 1 and 2 are fed to the two nozzles of the gun using appropriate fluid



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dispensers, or tubing and fittings. The stainless steel parts of the gun and the fluid dispensers resist reacting with the corrosive solutions that come in contact with it. Additionally, the solutions do not mix inside the gun but do so after coming out of the nozzles at a distance of about 6 inches from the gun. Compressed air at 40-60 PSI atomizes the solutions thus enhancing the mixing of the two fluid streams.

The suggested spray pattern is to begin at the bottom of the object and to move in a horizontal manner ascending to the top and then returning to the bottom. The initial silver film will appear as a dark blue color and then quickly develop the bright silver color. Repeat this process until you have the desired reflection and brightness. If spraying a vertical object, you will have to spray a few extra seconds at the top due to the fact that the solution will drain downward leaving the upper portion with a lighter silver layer.

Following the silver solution application, the silver film should be thoroughly rinsed with de-ionized water.

Step 6. - Drying the Silver Film

It is necessary to remove the excess rinse waters remaining on the items. This can be accomplished by spin drying or forced air drying using the air nozzle provided with the spray gun kit. To achieve adhesion of the silver film, the items must be heated in an oven or using a hot air gun for 30 minutes at temperature of approximately 150^o F.

You can test the adhesion of the silver by the "tape pull test" in which a piece of tape is first stuck and then pulled off the surface in one fast and continuous action. If no silver sticks to the tape and if the silver coat on the surface is undamaged, then it has "passed" the test. Tests in our labs and field tests by our customers prove that our process will pass the "tape pull" test.

Step 7. - Apply a Clear Top or Protective Coating

This is necessary to prevent the silver from losing its brilliant reflective qualities because of atmospheric conditions or handling. Depending on the part, top coating can be applied by electroplating Copper, Nickel, or any other metal, or by applying paint by spray or dip, whichever is most suitable.

Peacock has developed a durable clear top coat which in our lab tests has been shown to remain clear and not yellow silver. Mix 1 parts of top coat 1K#56 with 1 part #256 Thinner. and dry at 150 F for 30 minutes. Where a color is desired, a dye is either incorporated into the paint coating before spraying or applied after the coating is applied and dried properly. For example, for gold finish, 2 parts black toner, 2 parts yellow and 6 parts orange can be added to the clear 1K#56 before spraying and curing. Brass can be obtained by adding 1 part black, 2 parts yellow, and 6 parts orange. Under certain circumstances, "chrome" finish will require an addition of 3 parts black, 1 part blue, and 1 part violet-blue.

NOTES FOR ALUMINUM and STEEL SURFACES

You may experience adhesion problems with the base coat on certain Aluminum and Steel surfaces. To improve adhesion, use any commercially available adhesion promoter/primer for aluminum and steel surfaces and then proceed as before- that is., base coat, silvering and top coat as outlined in the instructions above.

These instructions are the result of our development of the process for first surface reflections and decorative purposes specifically. Variations from these instructions will probably be desirable at each installation to fit individual conditions.



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