

ANGEL CHROME

PRO KIT INSTRUCTIONS



Our Pro Spray Chrome Kit includes the chemicals, base coat, top coat, tools and supplies you need to set up a professional spray chrome operation.

#A1122

ANGEL GILDING

KIT CONTAINS

SPRAY SILVERING GUN SET

- Center Handle Silvering Gun
- Rinse Gun
- Prep Coat Gun
- Tin Activator Gun
- HVLP Gravity Feed Gun, 1.0 mm fluid nozzle
- (5) Quart Bottles for the silvering guns
- (5) Air Hoses, 10 ft
- Manifold, 4 outlet

ANGEL CHROME SILVERING CHEMICAL SET

- Angel Chrome Silver Concentrate, 500 mL
- Prep Coat Concentrate, 500 mL
- Tin Activator Concentrate, 120 mL
- (3) Measuring Cylinders, 50 mL
- Measuring Cylinder, 1000 mL

BASE & TOP COAT

- Angel Chrome Base Coat, 1 gallon
- Chrome-Tinted Top Coat, 1 gallon
- Resin Measuring Cup + Lid, 1 quart

CLEANING SUPPLIES

- Dawn Cleaner for Base Coat
- Silver Remover, 125 mL

SAFETY SUPPLIES

- Waste Treatment Kit, Large
- Gloves, Nitrile, X-Large, 6 pairs
- Respirator Set

YOU SUPPLY

- The objects you want to spray chrome
- An air compressor that can deliver 6 – 8 cfm at 40 to 60 psi
- Several gallons of steam-distilled or de-ionized water
- Lacquer thinner to clean the HVLP gun
- Two 5-gallon buckets to process waste water
- A clock or a timer with a second hand
- A *well-ventilated* work space

NOTE: Our Kit includes 3 white speed shapes so you can practice the spray chrome process – base coat, silvering and top coat – before creating your masterpiece. The white surface under the Base Coat gives you a clear view of the silver as it develops.

PRO SPRAY CHROME INSTRUCTIONS

INTRODUCTION

Spray chrome is silver applied to an opaque surface and protected by a transparent top coat. Our Pro Spray Chrome Kit contains the chemicals and tools you need to establish a professional spray chrome operation. The guns are designed specifically to work with spray silvering and our 2K urethane Base and Top Coats.

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OVERVIEW OF THE STEPS

1. Clean and dry the object to be chromed.
2. Apply the Base Coat.
3. Air dry the Base Coat for at least 12 hours or bake at 140° to 190°F for 10 to 30 minutes.
4. Clean and rinse with distilled or de-ionized water.
5. (Optional) - Flame treat the Base Coat to improve silver adhesion.
6. Apply diluted Prep Coat to the clean, wet surface.
7. Apply Tin Activator on top of the Prep Coat.
8. Wait about 30 seconds for the Tin Activator to attach to the surface.
9. Rinse off the Prep Coat/Tin Activator mix very thoroughly.
10. Silver the surface using light misting strokes.
11. Rinse and dry the silver.
12. Apply Chrome-Tinted Top Coat.
13. Apply additional layers of Clear Top Coat if desired.
14. Allow the Top Coat(s) to cure for 3 days before subjecting the surface to heavy use.

ESTABLISHING A SPRAY CHROME AREA IN YOUR SHOP

THE SILVERING PROCESS WORKS THE SAME WAY WHETHER THE PIECE IS SUPPORTED HORIZONTALLY OR VERTICALLY.

- Silvering is a wet process that involves dissolved heavy metals. You will need a way to collect the mirror run-off and treat it with the Waste Treatment Kit included in this Kit.
- Paint fumes and silvering mist are not good to breathe. Your shop needs an active ventilation system. The 3M Organic Vapors Respirator included in our Kit traps the fumes from our Base Coat, Top Coat and Silver.

COMPRESSED-AIR EQUIPMENT

AIR COMPRESSOR

For spray chrome, you need an air compressor that can deliver 6 - 8 CFM (cubic feet per minute) at 40 - 60 psi (pounds per square inch). The HP (horse power) of the compressor is less important than its delivery rate. The larger the tank (measured in gallons), the less often the compressor will cycle off and on.

REGULATOR

You need a regulator to monitor and control the air pressure from your compressor. Some compressors have a built-in regulator. Some stand-alone regulators include a water trap. We recommend that you install a water trap and empty it often. You need to install the regulator between the air compressor and the manifold. All of our spray chrome equipment is designed to be used at a pressure setting of 40 – 60 psi.

MANIFOLD

The manifold allows the compressor to drive multiple devices at once. Given that the base/top coat application and spray silvering stages occur separately, you can disconnect and reconnect the hoses as needed. The manifold and guns come with quick connects.

HVLP GRAVITY FEED GUN FOR UNI-COAT

Our Base Coat and Top Coats are designed to be sprayed with an HVLP (High Volume Low Pressure) spray gun fitted with a 1.0 mm fluid nozzle. Using a small tip and low pressure ensures the smoothest possible application.

SILVERING GUN

The silvering gun is basically two guns joined together with one handle and one trigger. The gun keeps the silver and the reducer separate until they mix on the surface.

Our silvering gun has a stainless steel body to resist corrosion. Each side has a screw head and feed tube that attaches to a separate 1-quart HDPE bottle – one bottle for the Silver and one for the Reducer.

The jets from the two guns come together about 1 foot in front of the gun. Hold the gun about 1 foot away from the piece so that the chemicals merge before they hit the surface. You will get better results if you repeatedly mist the surface with silver rather than blasting it.

BALANCING THE SILVERING GUN

Before you use the guns, be sure that each side is delivering the same rate of flow. Use distilled water for this test. Do not use tap water or silvering chemicals.

1. Attach the Center Handle Silvering Gun to your compressor.
2. Loosen the set screw on the side of the Rear Cap on each gun using the 5/64 inch Allen wrench included with your gun.
3. Screw the Needle Stop Adjustment Knob down to the gun then unscrew it one turn so the Knobs are the same distance from the gun.
4. Attach each Bottle Tube Fitting firmly to each gun – Silver to the Silver side and Reducer to the Reducer side. It is very important that you do not mix up the silver with the reducer sides.
5. Unscrew the bottle from its Tube Fitting and fill it with 250 mL distilled water.
6. Weigh each bottle on a gram scale and make a note of each weight.
7. Reattach the bottles to their tubes – silver to silver and reducer to reducer.
8. Point the guns into a sink or tub, squeeze the trigger and spray for about 30 seconds.
9. Remove each bottle and weigh it again. Subtract this weight from the previous weight.
10. Adjust the Needle Stop Adjustment Knob and repeat the weigh/spray/weigh process until the bottles are spraying an equal weight of water. The difference should be less than 10%.
11. When you have the Needle Stop Adjustment Knobs in the correct position, use the Allen wrench to tighten the set screws to lock them in place.
12. If you can not get the weights exactly even, it is better to have the silver side spray just a bit more than the reducer side.

PREP COAT AND TIN ACTIVATOR GUNS

The Prep Coat and Tin Activator guns are used to apply the diluted Prep Coat and diluted Tin Activator to the surface before silvering. The Rinse gun is used to rinse the Prep Coat/ Tin Activator off and later to rinse the silver. Use one gun for one chemical only to avoid cross contamination. The angle of the bottle relative to the gun can be adjusted when you attach the Tube Fitting to the gun.

RINSE GUN

The Rinse gun is used to rinse the object with distilled water between each step in the process. You must use distilled, de-ionized or reverse osmosis water for silvering. We have a simple test for water purity at <https://angelgilding.com/knowledge-base/about-water-purity.html>

PREPARING THE SUBSTRATE

Base Coat will not adhere to a dirty surface. By reflecting light at different angles, the silver will make bumps and other imperfections in the surface very noticeable. The surface must be perfectly smooth before you apply the Base Coat. It does not have to be glossy. Base Coat will add the high gloss, glass-like surface needed for a mirror finish.

PLASTIC

Base Coat adheres well to most plastics, including those used for 3-D printing. It does not adhere to HDLP or LDPE (polyethylene). Before applying Base Coat, wipe a plastic surface well with a soft cloth and denatured alcohol or rubbing alcohol to remove any mold release compounds that might remain from the molding process. Do not use paper towels which can scratch the plastic.

METAL

Our Metal Primer is needed to adhere the Base Coat to a metal surface. It also adheres well to Bondo. Sand and then clean the metal. Apply one thin, wet coat of Metal Primer and allow it to dry for one hour before applying the Base Coat.

APPLYING THE BASE COAT

Apply the Base Coat in one wet coat, avoiding a dry, misted appearance. Base Coat builds quickly. One thin wet coat adheres better than a thick coat.

The high gloss surface of the Base Coat will reveal any defects in the substrate. If you want to apply a second layer, allow the first layer to flash off for 3 to 4 minutes. Apply the second layer in less than one hour or allow the first layer to cure for at least 24 hours.

If air-drying, allow the Base Coat to cure for at least 12 hours before silvering it. There is no upper limit on the time. You can let it sit for days or weeks – just be sure to clean it well before silvering.

Base Coat can also be force dried. Allow it to flash off for 15 minutes before baking at 140° to 190° F (60° to 90° C) for 10 to 30 minutes. Dense, heavy parts require a longer bake time. Once cool, Base Coat is fully cured and can be silvered immediately.

FLAME TREATING THE BASE COAT (OPTIONAL)

NOTE: Angel Chrome Prep Coat and Tin Activator combined on the surface allow you to silver most items without flaming. Flaming can increase the adhesion of the silver but we only recommend this for objects that will receive hard use such as car wheels and bumpers.

How and Why to Flame (plasma) Treat the Base Coat:

Plastics such as our Base Coat 2-part polyurethane repel water because, unlike glass, they have a very low level of surface energy. Water molecules on the surface are more attracted to each other than they are to the plastic – they form beads and roll off. Flame treating increases the chemical attraction between the plastic and the water.

When you pass a lean blue flame about 1 inch above a plastic surface, the heat from the flame ionizes the air around it. The ionized oxygen alters the structure of the surface molecules which increases their surface energy. The energized molecules can now bond to the water-based Tin Activator which bonds to the silver. This chemical process is often visible as a thin mist rising in front of the flame.

Do not allow the blue cone of the flame to touch or burn the base coat. You are not trying to heat or melt the base coat – you are using the flame to create an ionized air stream over it. A thin blue oxidizing flame creates a more ionizing atmosphere than a heavy, bushy flame.

1. Light the torch and adjust it to a narrow blue (oxidizing) flame.
2. Hold the torch so that the inner cone of the flame is about 1 inch above the surface.
3. Begin at one end of the piece and pass the torch slowly down to the other end.
4. For large pieces, move in stripes to cover the piece evenly.
5. Keep the torch moving to avoid melting or burning the surface

Turn off the torch. The piece should be cool enough to pick up. Proceed with the chroming process starting with Prep Coat and Tin Activator. The effects of flaming last a few hours so it is best done the same day as the silvering

APPLYING THE PREP COAT

Prep Coat breaks the surface tension of water and allows the Tin Activator to attach evenly to the Base Coat. This will help you to achieve a smooth, even silvered finish.

- Measure out 30 ml of Prep Coat and pour into the 1 liter bottle for the Prep Coat gun. . Add 1 liter of distilled water. Diluted Prep Coat has a shelflife of about 1 month.
- When you are ready to begin silvering, spray the diluted Prep Coat thoroughly all over the surface to be silvered. Do NOT rinse it off before applying the Tin Activator. Prep Coat and Tin Activator should mix on the surface of the piece.

TINNING THE SURFACE

- Our Tin Activator is a highly concentrated solution. Diluted Tin Activator has a shelf life of 6 to 8 hours. Mix up only as much as you can use in one day. One quart (1000 ml) of diluted Tin Activator covers about 28 square feet (2.6 square meters).
- Wash the Tin Activator bottle with distilled water and empty it.
- Using the included syringe, measure 1 ml of Tin Activator and dispense it into the bottle.
- Measure out 250 ml of distilled water and pour it into Tin Activator gun bottle.
- After applying the Prep Coat, wait about ten seconds and spray the object with a very generous amount of diluted Tin Activator.
- Wait 30 to 40 seconds for the Tin Activator to attach to the surface. Waiting longer than 30 seconds does not help or harm the process.
- Rinse, rinse, rinse off the Prep Coat and Activator mix. Rinsing is very important. The Activator you need is now attached so firmly to the surface that *you cannot rinse it off*. Any excess Activator that remains on the surface will weaken the bond between the silver and the surface and stain the silver. Pay special attention to rinsing out holes, crevices and corners.

SILVERING

The best results with silvering are achieved with light passes with a period of waiting approximately 10 to 15 seconds between passes. Be sure to reach all areas of your piece and do not concentrate the spray in one spot. The silver takes time to develop. The first layer will look yellow – brown before it turns silver.

It is always better to spray a few passes and then decide to spray more than it is to spray too aggressively and find that you have gone too far. If the surface is darker or slightly brown

this could be due to inadequate coverage. You should have a brilliant, mirror finish and be unable to see the substrate.

If any milky/white areas appear, the silver is too thick and you have sprayed too much. Spraying on more silver does not fix this problem. You will have to remove the silver with Silver Remover and start the process over again. A few light passes with periods of waiting in between gives the best results. So long as your piece has not dried out, you can always add more silver.

RINSING THE SILVER

After you have silvered the piece, rinse it very well with distilled water paying careful attention to any pockets or crevices where the silver chemicals might have accumulated. Rinsing is an important part of the silvering process.

AIR DRYING

You can use the air directly from the compressor hose to blow off the water, but we recommend using a hair dryer or heated fan. Any trapped residual moisture will harm the finish later. Unless the air in your shop is heavily polluted, the silver will take days to tarnish.

SILVER REMOVER

If you are not happy with the silver coat, you can use Silver Remover to clean it off before re-silvering. It dissolves the silver through a chemical reaction. Heavy abrasion is not needed or recommended. Mix equally quantities of Parts A and B and pour or wipe it over the piece. Silver Remover does not affect the substrate. Be sure you have removed all of the silver and that you have rinsed off all of the Silver Remover before re-silvering.

Silver Remover is safe to use on skin, clothing and other surfaces. Wash well after using.

TOP COAT

When you are sure the silver is perfectly dry all over, you are ready for top coat.

Unlike aluminum or chrome, silver has an optical property that makes it appear pale gold or yellow when coated with any colorless transparent film – even distilled water. We offer two pre-tinted Top Coats – Chrome Tinted and Gold tinted. We also have a Clear Top Coat that you can tint any color with our concentrate Candy Colors.

CLEAR COATING

Once you are satisfied with the appearance, you can add Clear Top Coat to further protect your piece. Thin layers of Top Coat adhere better and look more brilliant than thick layers. Top Coat cures completely in 3 days at room temperature.

GETTING SET-UP

Do this before you begin silvering

1. Set the regulator on your compressor to deliver 40 psi (pounds per square inch).
2. Attach the compressor hose to the manifold.
3. Attach four (4) air hoses to the manifold.
4. Attach the Silvering gun, Rinse gun, Prep Coat gun and Tin Activator gun to the other end of the hoses.
5. Turn on the compressor and let the tank fill with air.
6. Fill all the gun bottles with a small amount of distilled water and spray it through the guns to clean them.
7. Check the balance on the silvering gun – see instructions above.
8. Empty the bottles and blow all remaining water out of the guns.

MEASURING THE COMPONENTS

MEASURE THE BASE COAT

1. Measure out 8 parts of Resin and add 1 part of Hardener. For example, to make 8 fluid ounces of Base Coat, measure out 7 fluid ounces of Resin and add 1 fluid ounce of Hardener using the measuring cup in your kit. Measuring by gram weight is more accurate than measuring by volume. 1 gram = 1 mL; 30 grams = 1 fluid ounce. Our Mixing and Tinting Guide <https://angelgilding.com/knowledge-base/uni-coat-mixing-and-tinting-guide.html> can do the math for you.
2. Mixed Base Coat has a pot life of 4 to 6 hours. Do not mix more than you can use in 1 day.
3. Do not allow Base Coat to sit in your gun. Immediately after spraying, pour the Base Coat into a separate container and spray a small amount of lacquer thinner through your gun to clean it.
4. Allow left over mixed resin/hardener to dry before discarding it in the trash.

MEASURE THE TIN ACTIVATOR

1. Measure out 1 ml of Tin Activator using the syringe included in with the Tin.
2. Dispense it into the Tin Activator bottle.
3. Measure out 250 ml of distilled water.
4. Pour it into the Tin Activator gun bottle.
5. Attach the Tin Activator bottle to the Tin Activator gun.

MEASURE THE SILVER AND REDUCER

1. Measure out 30 ml Angel Chrome Silver Solution.
2. Pour it into the "Silver" bottle.
3. Measure out 970 ml distilled water and pour it into the "Silver" bottle.
4. Attach the "Silver" bottle to the "S" side of the gun.
5. Measure out 30 ml Angel Chrome Reducer.
6. Pour it into the "Reducer" bottle.
7. Measure out 970 ml distilled water and pour it into the "Reducer" bottle.
8. Attach the bottle to the "R" side of the gun.
9. Be sure to keep the silver guns and bottles separate.

ONE PAGE SPRAY CHROME CHECKLIST

APPLY THE BASECOAT

1. Apply an even, wet coat of Base Coat over your perfectly clean, smooth piece.
2. Allow the Base Coat to air-dry for at least 12 hours or force dry it and let it cool.

SILVER THE PIECE

1. Clean the Base Coat with Dawn Ultra dish soap and a clean, gloved hand to remove any accidental fingerprints or dust. Rinse it well with distilled water.
2. Set the piece over a tray to catch the mirroring chemical run-off.
3. Spray it with a generous amount of diluted Prep Coat. **Do not** rinse off the Prep Coat.
4. Spray on a generous quantity of Tin Activator. Pay special attention to any high points where the Activator might run off too soon.
5. Wait about 30 seconds for the Activator to take effect.
6. Spray-rinse the piece thoroughly with distilled water. It is very important to rinse all the Prep Coat and Activator out of any crevices or holes where they might accumulate.
7. Silver the piece with the silver chemicals. Short misting sprays are best. Give the silver plenty of time to develop between sprays.
8. Rinse the silver thoroughly.
9. Dry the piece with warm air and allow it to sit until all the moisture is gone.

APPLY THE TOP COAT

Once the piece is fully dried, apply the Top Coat color of your choice. Use our pre-tinted Chrome Top Coat for a pure chrome appearance. Mixing and application instructions are the same as for our Base Coat.

APPLY A CLEAR PROTECTIVE TOP COAT (OPTIONAL)

Apply untinted Clear Top Coat to your piece as desired to enhance its durability.

ANGEL GILDING

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