

# Using a Pump Spray Silver Kit

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A mirror is made by depositing a thin layer of metal on a clean, sensitized, high gloss surface – either glass or plastic. With our Pump Spray Silver Kit, you can spray silver using muscle power instead of an electrically powered air compressor. The system is light-weight, portable and good for the environment.

Because mirroring is a chemical process, the following procedures are *important*.

- **Cleanliness:** The surface must be absolutely clean, including the edges.
- **Careful measurements:** Too much or too little can make a big difference.
- **Distilled Water:** Always use steam distilled or de-ionized water. The minerals in tap water or other types of bottled water will ruin the mirror.
- **Timing:** Use a clock with a second hand to time the tinning process
- **Concentration:** Arrange your time so you can work without interruption.

## SAFETY:

- **Storage:** Store the chemicals in a cool, dark place away from children and pets.
- **Breathing:** This kit sprays silver mist into the air. Work in a well-ventilated area or use the respirator available on the Safety page of our website.
- **Staining:** Silver creates brown stains. Wear rubber gloves and cover your bench with several layers of newspaper.
- **Disposal:** These chemicals contain heavy metals. Follow the instructions in our Waste Treatment Kit to keep heavy metals out of the public sewer system.

## Mirroring Tray and Glass Supports:

This kit is designed to silver a wide variety of shapes and sizes so it does not include supports to hold the glass or a tray to catch the mirroring run-off. Use a clean tray that is large enough to catch all of the run-off including the rinse water. Use strong, sturdy supports to hold the object you want to mirror at least 1” above the level of the waste chemicals that will accumulate in the tray. You may want to use the Bench Kit available on our website at <http://angelgilding.com/bench-kit.html>

## Mirror Backing Paint:

This kit does not include mirror backing paint or lacquer. You must protect the silver with backing paint or lacquer to keep it from tarnishing. We sell mirror backing paint and clear lacquer on our website. We do not currently sell any material suitable for use as a base coat or top coat for “spray chrome” applications.

## **Cleaning the Surface:**

A clean, wet surface is *essential* to successful mirroring. Water must “sheet off” the surface without beading up even at the edges. Always wear rubber gloves to keep your fingerprints off the clean surface.

- *Glass* – for detailed cleaning instructions see [How To Silver Flat Glass](http://angelgilding.com/media/documents/How_to_Silver_Sheet_Glass.pdf)  
[http://angelgilding.com/media/documents/How\\_to\\_Silver\\_Sheet\\_Glass.pdf](http://angelgilding.com/media/documents/How_to_Silver_Sheet_Glass.pdf)
- *Plastic* – for more information see: [Wetting Agent Instructions](http://angelgilding.com/media/documents/Wetting_Agent_Instructions.pdf)  
[http://angelgilding.com/media/documents/Wetting\\_Agent\\_Instructions.pdf](http://angelgilding.com/media/documents/Wetting_Agent_Instructions.pdf)  
and [Mirroring Plastics](http://angelgilding.com/Mirroring_Plastics.html) [http://angelgilding.com/Mirroring\\_Plastics.html](http://angelgilding.com/Mirroring_Plastics.html)

## **Connecting the Bottles:**

*Always* connect the Silver bottle to the top and hose labeled “S” and the Reducer bottle to the top and hose labeled “R”. If you mix up the bottles, silver will form inside the hoses and clog the wands. You can clean them out with Silver Remover if you need to. Flush the bottles, hoses and wands with distilled water after cleaning.

## **Pumping the Bottles:**

To get a good silver layer, you must spray on equal amounts of Silver and Reducer. To get an equal spray, the bottles *must be fully pressurized*. Pump each bottle until you feel firm resistance – until you can not push the plunger more than half-way down the rod without forcing it. Do NOT force the pump.

Re-pump both bottles before you begin each new piece. Keeping the bottles fully pumped up is the key to getting a good silver deposit. Each bottle holds 1 liter (1,000 ml). The maximum *liquid* capacity for each bottle is 500ml. You must leave at least half of the space in the bottle for the pressurized air.

## **Releasing the Pressure:**

Release the pressure in both bottles at the end of every day to preserve the air and water seals. To release the pressure, hold the blue top firmly in one hand and unscrew the white bottle with the other hand until all the compressed air has escaped.

## **Shelf Life of Mixed Chemicals:**

Mix only as much Sensitizer as you can use in one day. Diluted Silver and Reducer have a pot life of about 5 days. Diluted Wetting Agent lasts indefinitely. Fresh chemicals work best.

## **Measuring Cylinders:**

This kit includes three (3) 25 ml measuring cylinders. Use 1 cylinder per chemical to avoid cross contamination. Label each cylinder with a felt tip pen – “S” for Silver Solution, “R” for Silver Reducer and “W” for Wetting Agent.

## Step by Step Instructions

### Step 1: Set-Up Your Spraying Area



1. Set up a silvering area that is suitable to the size of the object you want to silver.
2. Support the object in a way that keeps it above the level of any waste chemicals that accumulate.
3. Make sure that you can easily reach the object from all sides.
4. Be aware of overspray. Mirroring is a very wet process.

### Step 2: Measure and Mix the Silver



1. To open the bottle, hold the blue top and turn the white bottle to avoid twisting the hoses.
2. Measure out **15 ml** of 2-Part Silver Solution and pour it into the Silver Solution bottle.
3. Measure out **485 ml** of Distilled Water and pour it into the Silver Solution bottle.
4. Close the bottle tight and rock it gently to mix the chemicals.

### Step 3: Measure the Silver Reducer



1. Open the Silver Reducer bottle.
2. Measure out **15 ml** of Silver Reducer and pour it into the Silver Reducer bottle.
3. Measure out **485 ml** of Distilled Water and pour it into the Silver Reducer bottle.
4. Close the bottle tight and rock it gently to mix the chemicals.

### Step 4: Measure the Sensitizer for 2-Part Silver



1. Measure out **250 ml** of distilled water and pour it into the Sensitizer trigger spray bottle.
2. Use the syringe included with the Sensitizer to measure out **0.5 ml** of concentrated Sensitizer.
3. Add the Sensitizer to the Distilled Water and rock gently to mix.

*Mix up fresh Sensitizer every day.*



### Step 5: Measure the Wetting Agent

Measure and mix **20 ml** of Wetting Agent with **200 ml** of distilled water in your Wetting Agent trigger spray bottle.

Diluted Wetting Agent has an indefinite shelf life.



### Step 6: Pump Up the Silver and Reducer Bottles

Grasp the bottle firmly and pump the plunger until you cannot press the plunger more than half-way down. *Be sure to pump up both bottles equally. Do not over pump.*



### Step 7A: Cleaning Glass

1. Clean the glass well with a little concentrated glass cleaner and **hot** tap water.
2. Polish the glass with cerium oxide, **hot** tap water and our wool felt polisher.
3. Remove the cerium oxide by rubbing the glass with tap water and a clean sponge reserved for this use.



### Step 7B: Cleaning Plastic

1. Wash the surface with Concentrated Liquid Glass Cleaner, hot tap water and a soft, clean cloth. Do not use paper towel which can scratch plastic.
2. Rinse thoroughly with distilled water.



### Step 8: Wetting Agent (for plastic)

1. Spray the surface all over with diluted Wetting Agent.
2. Do NOT rinse off the Wetting Agent before you apply the Sensitizer.
3. Wetting Agent is not necessary if you are silvering glass.



### Step 9: Sensitize the Surface

1. Spray the surface thoroughly with diluted Sensitizer.
2. Wait about 30 seconds for it to attach to the surface.
3. Rinse off **all** of the Sensitizer and Wetting Agent thoroughly with distilled water. You will not be able to rinse off the sensitizing layer.



### Step 10: Silver the Object

1. Hold the wand about 1 foot away from the surface.
2. Spray on a single, light, even layer of silver.
3. Wait 10 seconds for the silver to develop and then spray again.
4. Continue spraying and waiting until the silver is fully developed.



### Step 11: Rinse the Silver

Rinse the silver very thoroughly with distilled water. You should be able to touch the silvered surface carefully with your gloved hands without harming the silver.



### Step 12: Dry the Silver

1. Set the object aside to dry completely.
2. Do not allow any water to dry in puddles.
3. Use a heated fan, a hair dryer or allow the silver to air dry in a dust-free location.

### Step 13: Protect the Silver

When the silver is completely dry, paint it with mirror backing paint or lacquer to protect it. Unprotected silver will soften, get scratched, rub off and tarnish over time. We do *not* currently sell a tinted top coat for spray chrome or front surface mirrors.



### Step 14: Empty the Tray

Empty the waste chemicals into your waste bucket and treat the waste according to the instructions in the Waste Treatment Kit. It is irresponsible and potentially illegal to pour heavy metal waste into the public sewer system.



### Step 15: Pump Up or Release the Air Pressure

If you are going to silver a new piece, be sure to pump up your bottles before starting.

If you are done for the day, unscrew the bottles to release the air pressure and thereby preserve the pumping mechanism.



### Step 16: Admire Your Handiwork

That's it! You have created a perfectly reflective silver surface without using any electricity.

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## Troubleshooting

**How to fix the problem:** Clean off all of the silver with Silver Remover and start over by re-cleaning and re-tinning the piece. Our Silver Remover will not harm your base coat, paint, plastic or glass. Be sure to rinse off *all* of the Silver Remover with distilled water.

Appearance	Cause	Solution
Gray and speckled	The surface did not “wet” evenly and so the Tin did not deposit evenly.	1. Be sure that the surface is ‘chemically’ clean. 2. Apply a generous amount on diluted Wetting Agent and apply the Sensitizer directly over the Wetting Agent. Wait 30 seconds and then rinse the surface completely with distilled water.
Dull and dusty	Too much silver applied at close range.	Hold the wands at least 1 foot away from the surface and spray on the silver in light, even layers. Rinse very well after silvering.
Matte white areas	Too much silver.	Waft the wand over the surface and stop silvering as soon as you have an even coat.
Yellow or brown stains	Too much Tin	Rinse off the Sensitizer very thoroughly. You will not be able to rinse off the sensitizing layer that attaches to the surface.
Blue areas	The wands did not spray equal amounts of chemicals.	Pump up both bottles fully and equally. Be sure you have mixed the chemicals properly.
Thin and gray	Too little Tin, old Tin or bad water	If the Sensitizer looks yellow, it is too old and you need to buy fresh. See the Water Purity page in the FAQ section of our website for a simple way to test the purity of your water
Matte gray all over	Non-glossy substrate	Be sure that your surface is ultra-high gloss – as shiny as glass. No amount of silver will make a matte surface look shiny.
Pale gold color after top coating	You used a non-tinted top coat.	This is a known problem with all clear lacquers. To counteract this effect, you need to tint your clear top coat with a transparent blue or violet dye.