

How To Silver Non-Flat, Non-Glass Objects

with a Mini Silver Plating Kit from AngelGilding.com

A mirror is made by depositing a thin layer of metal, usually silver, on clean, sensitized, transparent substrate, usually glass. However, you can deposit an electrically conductive layer of silver on any non-metallic surface. You can not use this kit to silver a metal object.

Silver conducts electricity. Any silver-coated surface, whether it is plastic, ceramic or glass, is electrically active. Once the surface is silvered, you can powder coat it or tank electroplate it. The silver layer is too thin for brush plating,

Conductive paints often change the gloss and texture of the surface. Our silver does not does not change the original texture of the surface in any way. It does not make a rough surface smooth or a dull surface look glossy.

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

- Cleanliness: The object 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 bottled water will ruin the mirror.
- Timing: Use a clock with a second hand to time the tinning process (step 5)
- 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.
- Staining: The silver creates brown stains. Wear rubber gloves and cover your bench with several layers of newspaper.
- Disposal: These chemicals contain heavy metals. At AngelGilding.com, we have Waste Treatment Kits to remove the heavy metals from mirror waster water and prevent them from going into the public sewer system we all share.

For details on chemical storage, water quality and other issues, see the Appendix at the end of these instructions.

This Kit contains enough silver to cover about 8 square feet. You will need to provide:

- 1) The objects to be silvered
- 2) Three new plastic tubs to immerse the objects in the chemicals
- 3) A new trigger spray bottle for rinsing
- 4) A few gallons of steam distilled water
- 5) A supply of small paper cups – 3 to 5 fluid ounce capacity
- 6) Two clear plastic quart bottles for Waste Treatment
- 7) A clock with a second hand to time steps in the process

How To Silver a Non-Flat, Non-Glass Object

Step 1: Clean your equipment and containers.

Use hot tap water and the glass cleaner included in your kit to remove any impurities from your mirroring tubs and spray rinsing bottle. Wear rubber gloves to keep your fingerprints off the objects to be mirrored.

Rinse everything with distilled water after cleaning. Tap water contains impurities which will interfere with the silvering process.



Step 2: Mix the Tin for Silver

Use the 10 ml cylinder to measure out **2 ml** of concentrated Tin for Silver. Pour it into the 8 ounce measuring cup. Add **2 fluid ounces** of steam distilled water. (ratio = 30:1)
Use fresh tin for each object you mirror. Diluted tinning solution has a shelf life of 6 to 8 hours. **Mix fresh daily.**



Step 3: Measure the Silver

Measure out **10 ml each** of ready-to-use Silver Solution, Silver Activator and Silver Reducer. Use a separate plastic dosage cup for each solution. Do *not* mix the three solutions together.



Step 4: Clean the Object to be Silvered

Scrub the object with hot tap water and glass cleaner using a dedicated sponge. Rinse the object under a running tap. Rinse it again thoroughly with distilled water to remove the tap water.



Step 5: Tin the Object

Place the object in the Tin tub. Pour on the Tin and note the time. Rock the tub gently so that the object is completely covered with tinning solution for **30 seconds**. Lift it out – wearing your rubber gloves.



Step 6: Rinse the Object

Hold the object over your Rinse tub and spray it with distilled water. Rinse thoroughly – you can not rinse it too much. Tip off the rinse water. Place it in the Silver tub.



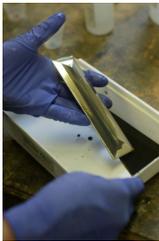
Step 7: Mix the Silver

Get two new paper cups. Pour the three measured silver solutions into one cup. Pour this mix into the other cup and box them back and forth two to three times to mix them. The solutions should be clear. Pour the mix over the object. Note the time.



Step 8: Silver the Object

Rock the tub gently so that the silver flows continuously over the object. As the silver deposits, the object will turn brown and then gray and then silver. The silver solution also turns brown – this is normal. Continue to rock the object in the silver for **5 minutes**.



Step 9: Rinse the Object

After 5 minutes, the object should be covered in silver. The surface will look like a mirror only if the surface was glossy to begin with.

Lift the object carefully out of the tub. Spray it thoroughly with distilled water. If the object was properly cleaned, the silver will not come off as you rinse it.



Step 10: Dry the Object

Set the object on edge to dry. A heated fan or hair drier speeds up the process.

Step 11: Protect the Silver

The layer of silver is very thin – between 50 and 100 nanometers. It is easily scratched and it will tarnish over time. You can proceed to electroplate over it as soon as it is dry or you can leave it as a front surface mirror, but you must protect it by electroplating over it or coating it with clear lacquer.

Troubleshooting:

If your silver did not come out as evenly as you would like the first time, you can remove it with our Silver Remover included in the Kit. To re-silver the object, be sure that you have removed all of the old silver, rinse the object very thoroughly with distilled water, clean it and start over. You can re-silver it as many times as you like.

If the silver layer is not as thick as you would like, you can add a second layer of silver over the first. You do not need to repeat the tinning process (Step 5).

Appendix:

Chemical Safety

Store your chemicals in a cool, dry, dark place out of the reach of children, pets and other curious visitors. These chemicals are no more toxic than most household cleaners but, like all chemical solutions, they must be stored and handled safely. They can stain your skin and your bench; wear rubber gloves and cover your bench with newspaper.

Chemical Storage

All chemicals in this kit have a shelf life of one year or more if the bottle is capped and stored in a cool, dry place. The Tin for Silver has a shelf life of 4 to 6 months. You can prolong the shelf life of Tin for Silver by freezing it, using it and re-freezing it. Allow it to come to room temperature naturally (no microwave) and be sure that the bottle is thawed completely before using it. Do not shake the bottle and do not leave it uncapped.

Water Purity

Mirroring is a water-based operation. The quality of the water is important. Use steam distilled or de-ionized water. The minerals in tap water and other types of bottled water will contaminate the mirroring chemicals. You can wash and rinse with tap water but you must remove the tap water by rinsing again with distilled water. Many grocery stores sell steam distilled water.

A Simple Water Test: To test the purity of your distilled water, pour 8 fl oz into a clear, disposable plastic cup. Add a few drops of Silver Solution. If the water turns white and cloudy, it is not pure enough.

Waste Treatment

At AngelGilding.com, we sell a simple waste treatment kit that removes the heavy metal from your mirroring runoff. It is *irresponsible and potentially illegal* to pour untreated heavy metal waste into the public sewer system. Our Small Waste Treatment Kit contains enough material to process 8 gallons of mirror run-off.

The Metric and American Standard systems of measurement

With one important exception (mixing the Tin), mirror making is described in terms of ml. That way you don't have to think about adding and multiplying fractions.

1 ml (milliliter) = 1 cc (cubic centimeter)

30 ml = 30 cc = 1 fl oz (fluid ounce)

240 ml = 8 fl oz = 1 cup

32 fl oz = 1 quart = 946 ml

1000 ml = 1 liter

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