



Plug N' Plate®

Brush Plating System



I am a watchmaker in Scottsdale, Arizona and I specialize in restorations of fine antique watches and clocks. I was recently commissioned to restore a one-of-a-kind French clock, Circa. 1860 which was ornamented with hand-made, gilded accents. The original gold was long gone due to improper handling. Because the clock is irreplaceable as are the hand-made accent pieces, I did not feel comfortable in sending them to another state for plating because of the possibility of loss or damage. I bought one of your Plug N' Plate® kits to see if I could achieve a good finish at my own bench.

Your product totally exceeded my expectations! It is easy to use, put down a uniform layer of beautiful 24k gold (after proper cleaning of the pieces of course) and the clock is simply stunning. Your products have opened-up the door to yet another service I can offer my clients. Thank you very much for making such a fine, fun and easy to use product which yields excellent results!

John Crabtree Watchmaker, Member AWI

Visit www.caswellplating.com.au or call 03 9741 7103 for kits, supplies and technical support

Brush Plating With Plug N' Plate®

The following solutions are available for use with Plug N' Plate adapters:

Solution	Plates Onto	Solution Size	Wand	Wand Color	Voltage
Nickel	Steel, Copper, Bronze, Brass, Tin	8oz	Stainless	Silver	4.5-6
Flash Copper	Zinc, Pot Metal, Steel, Stainless Steel, Copper, Bronze, Brass, Tin, Pewter	8oz	Copper	Copper	4.5-6
Acid Copper	Copper, Brass, Bronze, Tin, Aluminum, Plastics	8oz	Copper	Copper	4.5-6
Copy Chrome	Steel, Copper, Nickel, Bronze, Brass, Tin	8oz	Stainless	Silver	4.5-6
Brass	Steel, Copper, Bronze, Brass, Tin	4oz	Brass	Gold	4.5-6
Gold	Nickel, Silver, Copper	4oz	Stainless	Silver	4.5-6
Silver	Nickel, Copper, Brass, Bronze, Tin	4oz	Stainless	Silver	1.5-3
Tin	Steel, Nickel, Copper, Brass	8oz	Tin	Stainless with Tin Insert	4.5-6
Bronze	Steel, Nickel, Copper, Brass	8oz	Stainless	Silver	4.5-6
Zinc	Steel, Iron, Pot Metal, Zinc, Tin, Nickel, Copper, Brass	8oz	Zinc	Silver with Zinc Insert	1.5-3
Black Nickel	Steel, Nickel, Copper, Brass, Bronze, Tin	8oz	Stainless	Silver	4.5-6

Setting Up Your Kit

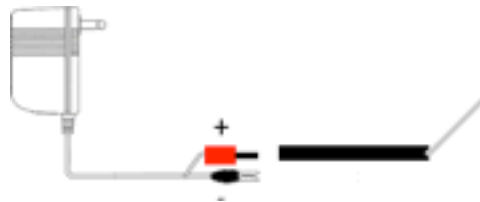
The Plug N' Plate® power supply for Brush Plating has two terminals. The red plug or the alligator clip fits into the open end of the plating wand. Sometimes the red plug may be a little loose, but this can easily be tightened by placing the plug into the wand, then gently squeezing the wand case with a pair of pliers, until the fit is tighter.

The black alligator clip is attached to the work-piece. The blade of the wand is wrapped with the bandage in such a way that no metal is showing, as if the bandage was being applied to a cut in the tip of a finger. The end of the bandage should be secured by a rubber band of a small piece of sticky tape. Don't wrap the bandage too tightly, or the solution will not be able to penetrate it down to the wand.

Plug the Plug N'Plate® power supply into a 110-volt power outlet. Make sure the two terminals are not touching, as this will short out the unit, causing irreparable damage.



Occasionally, oxides will build up on the plating wand blade. These should be removed with a wire brush, steel wool or emery paper.



Additional Plating Wands

The Plug N' Plate® workshop has some detailing wands. These have small marker pen nibs; chisel, fine point, and bullet. To use these nibs, connect the wand to the power pack in the normal manner, then dip the nib into the solution until it is well soaked, then use in the normal manner. These nibs do NOT require a bandage.

Surface Preparation

All surfaces must be highly polished and thoroughly cleaned, with no corrosion. The use of a mild abrasive cleaner/polish such as Soft Scrub or Dawn will greatly assist in cleaning. Do not touch the cleaned part with your fingers after cleaning. Insufficient cleaning before plating will cause the plating job to fail....every time.

After cleaning, run the part under water to remove the cleaner. Note how the water comes off the part. If it sheets off evenly, it is clean. If it beads up anywhere on the part (like a waxed car), it is not clean and you should repeat the cleaning step until it doesn't bead.

Plating Procedure

Pour a small quantity of plating solution into an eggcup sized plastic container. (The actual lid of the plating solution will do). Firstly, dip the clean wand into the entire bottle. Hold onto the bottle, otherwise it WILL tip over. Let the solution thoroughly soak into the bandage. This should take about 30 seconds.

Proceed to brush plate the area to be treated, using soft strokes, (somewhat like stroking a cat). Do not stop in any one place, otherwise 'burning' will occur. You should plate at about 1 sq. inch per minute. After a few seconds, you will find that the plating is no longer proceeding as quickly. This is because all of the metal has been used up from the solution contained on the wand. Dip the wand in the smaller amount of solution (in the lid), and NOT in the main bottle. Harmful oxides build up during brush plating, and repeated dipping of the contaminated wand will spoil many of the solutions. You may repeatedly dip your wand into the smaller amount of solution.



If the plating has black streaks, speed up the wand action and press down harder. A few more passes over the blackened area will clean it up. This is especially prevalent with silver plating. The black streaks will come off with a liquid hand polish after plating.

You may review the video at <https://www.youtube.com/watch?v=VoOULQYb58E>

Specific Usage Tips

Plating With Copy Chrome & Nickel

These solutions contain hard alloys and generally plate slower than copper, gold, silver. To ensure good coverage, completely plate the part twice, using brush strokes in different directions. Brush plating doesn't plate as evenly as tank plating, so make sure the part is well covered. If in doubt, do it again.

Plating With Copper

We sell two types of copper solution (Acid and Flash). Use Acid copper to plate over nickel, copper, brass, bronze, aluminum and plastic/non-conductive parts. Use Flash Copper to plate ferric and porous metals such as steel, iron, pot metal and zinc. Using Acid copper on these materials will corrode the metal, not plate it. Acid copper plates more quickly than Flash copper and allows a thicker layer to be plated. If you wish, you can plate Flash first to form a protective layer, then Acid copper to build thickness

Specific Usage Tips

Plating Over Stainless Steel

To plate over Stainless steel, with anything other than Gold, plate first with our Stainless Steel Activator using a stainless wand and 4.5-6V. Then plate with your other metal.

To plate Gold over Stainless, activate the metal first by swabbing with our “Stainless Steel Activator For Gold” using a stainless wand and 4.5-6V, then plate directly with gold.

Plating Over Aluminum

You can use the Plug N Plate system to plate over aluminum, but it can be challenging. The polished and cleaned part is immersed in an activator that we supply called Zincate, then rinsed in water and should then be plated with our Acid Copper kit.

As soon as bare aluminum contacts air, it begins to form an oxide layer that prevents corrosion...and plating. The zincate forms a protective layer that prevents the aluminum contacting air. The challenging aspect is that if the solution is allowed to drip onto the zincated layer, it will be dissolved and plating won't occur in that area.

For that reason, you should try to coat the zincated layer very quickly, be careful to prevent drips, and only plate small parts.

Plating Over Plastic and Other Non-Conductive Parts

Plastic parts can be plated with our Acid Copper kit. In order to be electroplated, the parts must be electrically conductive first. To make them conductive, you can use our Copper Conductive Paint, Silvaspray, or cover them with copper, silver or gold leaf.

Apply your conductive layer and, in the case of a paint, allow 24 hours to completely dry. Ensure you have complete coverage.

Proceed to plate with Acid Copper. Be careful where you attach the alligator clip - it can mar the painted surface easily. It is permissible to simply touch the clip to the part while plating.

If the copper layer is having difficulty plating, we have found that lightly plating the painted surface with silver, until it turns a greyish color, substantially increases the ease of plating with copper.

Once you have a complete copper layer, you can lightly polish, degrease and proceed to plate with other metals.

Plating Car Emblems and Other Chrome Plated Parts

If you are plating car emblems, or other chrome plated parts such as trim, it isn't necessary to paint with a conductive paint first, because the manufacturer has already done that.

Simply strip off the chrome plate, then proceed to plate over the nickel layer with is always under the chrome.

To strip the chrome, purchase a bottle of Anodize & Chrome Stripper from us. Reverse the polarity on your plating setup by attaching the plating wand to the alligator clip. Use a stainless wand and 4.5-6V.

Plating Car Emblems and Other Chrome Plated Parts (continued)

Dip the wand into the stripper. Hold the banana plug against the part and wipe the wand over the chrome surface.

The bandage will become covered in a yellow stain. After a few wipes over the entire part, change the bandage for a new one and repeat.

Continue stripping until the bandage no longer turns yellow. This indicates all the chrome is off, and the nickel layer is exposed and ready to be plated.

Rinse, and proceed to gold plate, or plate with any other metal.

Dip Plating With Plug N' Plate

Our Plug N' Plate kits were designed for simple, inexpensive and fast brush plating of small objects. At first glance, it would seem tempting to use the system to dip plate small objects as well, however, the kits are not designed for this, nor do they usually work very well.

Firstly, when brush plating, the voltage of the power supply is the important factor. However, when dip plating, amperage is key. Amperage needs to be calculated and adjusted for the items being plated. Our Plug N Plate kits use a fixed 300ma output, so 9 times out of 10, the amperage is either too much, or too little for the part being plated.

Secondly, when dip plating, anode to part surface area is important. The anode should be at least as large as the part being plated. Because our wands (the anode) are relatively small, they usually don't meet this requirement.

This being said, it is possible to get decent results if the two points above are carefully considered.



Procedure

Pour all of the plating liquid into a small wide necked container, such as a glass. Place the plating wand into the solution and clip it to the side of the glass with a non-metallic clip. Attach the work-piece to the negative alligator clip and suspend the part into the solution.

The degree of plating will depend on several factors:

1. The amount of anode (plating wand) immersed in ratio to the size of the part. The larger the part, the more surface area of the wand should be immersed. (Too much wand will make the plating appear smutty or dark). Strive for a 1:1 ratio.

2. The distance of the anode from the work-piece. Being too close will cause similar problems to #1.
3. The size of the parts. Ideally, amperage needs to vary based on the size of the part being plated. The Plug N' Plate® power supply gives a fixed output. You may need to add resistor parts into the bath to compensate for excess power.
4. The temperature of the solution. Generally, the warmer they are, the better they plate, and the less current you need.
5. The duration of plating time. This will depend on which plating kit you are using. Gold should only be plated until the color is right. Copper should be plated until the thickness is adequate, especially if you are using it to build up an area. Nickel and Copy Chrome should be plated for at least 5 minutes. Silver, being a soft metal, should be treated somewhat like gold, but make sure you have enough plating on the part to enable it to withstand polishing etc.

With silver and gold Plug N' Plate® systems, you may substitute the wand for a small piece of silver or gold. This will enhance the life of the solution. (Do NOT use plated items as the anode, they MUST be made of solid silver or gold. (The anode must be held so that the wire connection is out of the liquid, otherwise the wire will dissolve and contaminate the solution))

Additional tips for Brush Plating

1. Always check that the bandages are in good condition. Worn areas may allow the wand to touch the work piece, causing a short circuit and burning the work piece.
2. The gold wand bandage will become soiled with a green substance after plating. The degree of this will depend on plating action and time.
3. Dark spots or streaks that occur during the gold plating may be from brushing too slowly.
4. To give a richer gold color, simply continue plating the item to build a thicker gold layer, or consider using our FastGold solution with the Plug N' Plate® Kit. FastGold is a much more concentrated solution, and plates with a deeper, richer gold color and much more quickly.
5. Remove and wash all bandages after use. Dispose of cotton ball.
6. Plate only articles that are in good condition. Plating will NOT cover imperfections, such as scratches and pits.

Technical Tips

1. Place the solutions (in a glass container) in a microwave, and heat on high for approx 30 seconds before plating, to attain approx 140F. At the same time, place the part to be plated into hot water. When warm, proceed with plating. The additional heat will dramatically improve plating speed.
2. Plating larger objects can be more difficult than small ones. Practice your technique on the smaller objects first.
3. Some objects may actually be covered with a type of chrome paint or lacquer. Test the piece first by checking that it is conductive, using a multi-meter.
4. Trying to match existing gold supplied by another company is difficult as shades vary.
5. An application of a lacquer, or polyurethane, over a plated item will increase its wear resistance, reduce water spotting and enhance the gold's color.



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