

CASWELL

Plug N' Plate® *Brush Plating System*



A Gold Plated Clock using Plug N' Plate®

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*

Notes & Plating Record

(Keeping a record will help you to reproduce the same performance at later plating sessions or point to areas in resolving problems)

BRUSH PLATING with Plug N'Plate®

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

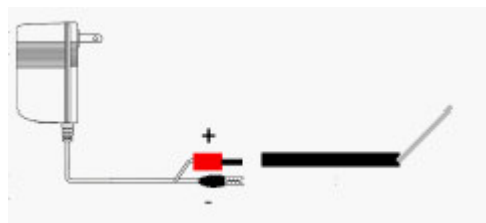
Solution	Plates onto:	Soln. Size	Wand	Wand Color	Adapter output in volts
Nickel	Steel, copper, bronze, brass, tin	8oz	Stainless	silver	4.5 – 6
Acid Copper	Copper, bronze, brass,	8oz	Copper	brown	4.5 - 6
Flash Copper	Pot metal, steel, copper, bronze, brass, tin, pewter	8oz	Copper	brown	4.5 – 6
Copy Chrome™	Steel, copper, bronze, brass, tin	8oz	Stainless	silver	4.5 – 6
Brass	Steel, copper, bronze, brass, tin	4oz	Brass	gold	4.5 – 12
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	Silver + inserted tin strip	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 + inserted zinc strip	1.5 - 3
Black Krome™	Steel, nickel, pot metal, copper, brass, tin	8oz	Stainless	silver	4.5 - 6

General Setup

The Plug N' Plate® Regulated Power Pack for Brush Plating is 1.5v to 12v DC variable @ 500ma and has two terminals. The red plug or the red 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 or 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 metal of the wand.

Plug the Plug N'Plate® variable power supply into a 240-volt power outlet. Make sure the two terminals are not touching, as this will short out the unit, causing possible 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.



Surface preparation

All surfaces must be highly polished and thoroughly cleaned, with no corrosion. The use of a cold de-greaser, SDKLENE-OX and a mild abrasive cleaner/polish such as Caswell Inc. Blue Begone Prod # BLUBG or Soft Scrub will greatly assist in cleaning. Do not touch the cleaned part with your fingers after cleaning.

Brush 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.

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.



BRUSH PLATING WITH COPY CHROME™

Copy Chrome™ is a nickel alloy, harder than nickel and with a daylight tint like chrome. It should be plated directly to the metal, and does not need an underlying layer of nickel plate like a normal chrome plate. Because of its extra hardness, it is important to ensure the part is highly polished prior to plating, as this finish is harder to buff than nickel.

BRUSH PLATING WITH SILVER

Silver requires a lower voltage than any other plating process. The plate will tarnish very easily, even during the plating process. Do not be unduly concerned about the smutting, as it is more important that you concentrate on getting sufficient material plated onto the surface. Once this is achieved, the smut problem can be addressed. To remove brush-plating smut, simply polish lightly with a cloth. If this doesn't remove it all, try buffing lightly with a Canton Flannel Wheel and BLUE compound. To improve the finish of a brush plated repair to a silver plate, we recommend a final clean/ polish of the entire surface of the part with "The Silver Solution by Sheffco" or "The Silver Maintenance Solution by Sheffco"

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BRUSH PLATING WITH NICKEL & COPY CHROME

To ensure a good corrosion resistant surface on steel, go over the entire part twice, using brush strokes in different directions. Brush plating does not plate as evenly as tank plating, so make sure the part is well covered. If in doubt – do it again!

GOLD EMBLEM PLATING USING PLUG N' PLATE®

The system must be applied to a nickel or buffed copper plate surface.

To plate emblems requires a two step process:-

1. Stripping. Removing the existing chrome.

- Attach a stainless steel plating wand to the NEGATIVE/BLACK terminal of your power pack. You can clip the black alligator clip inside the end of the wand, ensuring electrical contact with the metal. Press the positive red terminal plug to the work piece.
- Pour a small quantity of ANODIZE & CHROME STRIPPER solution into a plastic cup. Use only this liquid, and the original solution will stay fresh.
- Saturate the bandage with the stripping solution.
- Stroke the wand slowly & gently over the work piece. The bandage will turn yellow as the chrome comes off.
- The work piece will change color slightly as the chrome is removed.
- To ensure all the chrome is off, apply fresh bandage or rinse out the old, then dip in fresh solution and lightly repeat the process. If no yellow appears on the wand, then the part is successfully stripped.
- Rinse the part in fresh water.
- To remove chrome faster, you may use the 12 volt position on the Plug N' Plate® adapter.

2. Plating. Applying the gold plate.

- Attach a Stainless plating wand to the red plug on the Plug N' Plate® adapter.
- Pour a small quantity of Gold solution into a plastic cup. Use only this liquid, and the original solution will stay fresh.
- Saturate the wand with Gold solution. Stroke the wand slowly & gently over the work piece.
- Initially you may increase the wand speed slightly, then, as the gold color forms, slow the speed down to build up a thicker layer of gold.
- The gold will become visible after 30 -60 seconds for 1-2 square inches of treated area.
- Repeat the gold application to increase the gold's durability.
- Finally, wash with detergent, and rinse with water.
- You may polish the metal with a proprietary metal polish. We recommend Collinite Metal Wax, as this has a very mild abrasive in it, which cleans off brush plating smut marks and at the same time waxes and protects the plate. Use sparingly on silver and gold plate.

Plating Over Stainless Steel

To plate over Stainless Steel, first plate with our Stainless Steel Activator, using a Stainless Steel wand and 4.5Volt position on the adapter. A thin plate is all that is required. Rinse, then plate with nickel, copper, tin etc. When gold plating over stainless, brush plate using our Stainless Steel Activator for Gold product first with a Stainless Steel wand and 4.5Volt position on the adapter. You may then apply the gold directly onto the stainless part.

Plating Over Aluminum

It is not recommended to use Plug N' Plate® kits to plate over aluminum. Use our Flash Copper Plating Kit, with Zincate pretreatment to immersion copper plate first. You may then use the Plug N' Plate® kits to brush plate onto the copper.

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

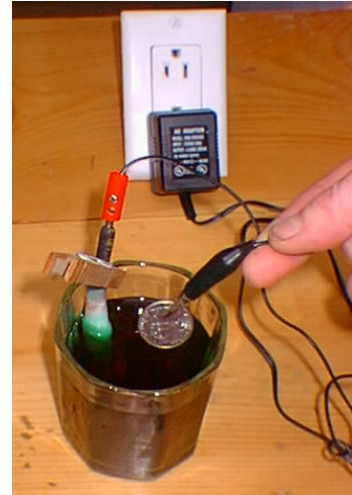
1. Place the solutions (in a glass container) in a microwave, and heat on high for approx 30 seconds before plating, to attain approx 140F. At the same time, place the part to be plated into hot water. When warm, proceed with plating. The additional heat will dramatically improve plating speed.
2. Plating 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.

DIP PLATING with Plug N' Plate®

Sometimes it is much easier to simply dip the part into the solution to plate it, especially if it is small with lots of detail. The Plug N' Plate® power supply and plating wand can easily be used for this 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 clothes peg. 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 robber 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.
6. **Silver will often plate a dark smutty color.** This will polish off, but you can reduce this by plating with a very small amount of the wand immersed, or by using the 1.5V position on the variable power supply. A final treatment using a sparing amount of Collinite Metal wax will also clean the smut and leave a wax protective film, which will reduce tarnishing. Swishing the part through the solution as it plates will also dramatically reduce the smutting problem.
7. **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).



Note the clothes peg holding the plating wand to the side of the glass

BRUSH PLATING with Plug N'Plate® The following solutions are available for use with Plug N'Plate® adapters			
Replenishment Supplies			
Part No.	Description	Quantity	
PNPPS15	Variable Plug N' Plate® Regulated Power Supply - 500ma, 1.5v , 3.0v, 4.5v, 6.0v, 7.5v, 9.0v and 12v DC	240 volt	
PNPNS9	Bright Nickel Solution	250ml	
PNPNS16	Bright Nickel Solution	500ml	
PNPTN9	Tin Solution	250ml	
PNPTN16	Tin Solution	500ml	
PNPCS9	Acid Copper Solution	250ml	
PNPCS9	Acid Copper Solution	500ml	
PNPFCUK40	Flash Copper	8oz	
BLKR8	Black Krome™ Solution	8 oz	
PNPCC9	Copy Chrome™ Solution	250ml	
PNPCC16	Copy Chrome™ Solution	500ml	
PNPBS12	Brass Solution	4 oz	
PNPS12	Cyanide free Silver Solution	4 oz	
PNPS16	Cyanide free Silver Solution	16 oz	
PNPG12	Cyanide free Gold Solution (FastGold formula)	4 oz	
PNPG16	Cyanide free Gold Solution (FastGold formula)	16oz	
PNPBZ8	Bronze Solution	8 oz	
PNPZNS	Zinc Solution	250ml	
PNPZNS16	Zinc Solution	500ml	
PNPSSACT	Stainless Steel Activator	250ml	
PNPSSECTH	Stainless Steel Etch (used with SSACT)	250ml	
SSAG8	Stainless Activator For Gold Plating	8 oz	
STRP5	Chrome Stripper (requires Stainless Wand)	250ml	
WANDS4	Stainless Steel Wand		
WANDC4	Copper Wand		
WANDB4	Brass Wand		
WANDT4	Tin Wand		
WANDZ4	Zinc Wand		
BPBAND	Brush Plating Wand Bandage		
PWAND1	Detailing Wand (fine point)		
PWAND2	Detailing Wand (chisel point)		
PWAND3	Detailing Wand (Bullet point)		
PWANDSET	Detailing Wand Set		

See www.caswelleurope.co.uk for current prices

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