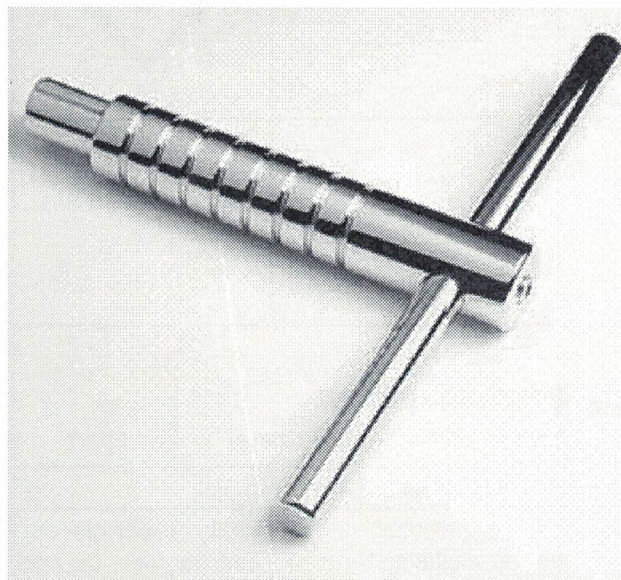


Caswell Inc Product Instructions

The following sections are instructions for each of our plating kits. Refer to the metals chart to see which plating types are required, then refer to each specific section at a time. For example, to Triple Chrome Plate a steel part, according to the metals chart, you would need to Flash Copper, Nickel and then Chrome Plate it. So you would refer to the Flash Copper Instructions, Nickel Instructions and Decorative Chrome Instructions in the following section.

Nickel Electroplating Kit



A nickel plate has to be one of the most attractive and decorative types of electroplating. It gives a bright, chrome like color plating, with a slight, warm yellow hue.

Tank Setup For 1.5 Gal Kit

For 3 Gal Kit, multiply by 2

For 4.5 Gal Kit, multiply by 3

For 15 Gal Kit, multiply by 10

READ MSDS AND WEAR ALL PROTECTIVE GEAR

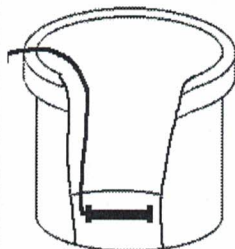

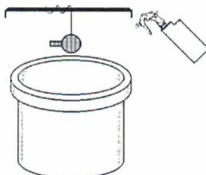


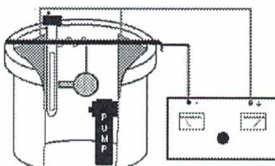

Degreasing Tank

1. In one of your plastic tanks, add 1.5 gallons of distilled water.
2. Add 12oz of SP Degreaser Powder
Heat and mix well. Degreaser works best at hot temps

Plating Tank

1. In the other plastic tank, add 1.5 gallons of distilled water
2. Install the heater and heat the water to approx 170
3. Add one bag of Nickel Crystals. Stir until most of the crystals are dissolved
4. Add bottle of brightener
5. Mark liquid level with permanent marker
6. Remove heater and let solution sit overnight to age
7. Cut strip up anodes (see page 24)
8. Wrap bandages around anodes and secure with elastic band.
9. Install anodes in tank
10. Install Tank Bar (see page 9)
11. Install heater and pump. Heat to approx 110F

Refer to the chart on the following page for plating steps.

PROCEDURE	SETUP	OPERATING PARAMETERS	EQUIPMENT	SAFETY												
1. SURFACE PREPARATION	Buff & Polish for a mirror finish. Bead Blast for a 'flat or Butler Nickel' finish. Nylon Abrasive wheel buff for a 'scratched brush' look. DO NOT ATTEMPT TO PLATE POT METAL DIRECTLY WITH THIS KIT (Prime first with FLASH COPPER)															
2. DEGREASING		140- 200F No agitation 5 mins immersion 12 oz. SP Degreaser 1.5 gal Distilled water	1 x Plastic tank 1 x tank lid 1 x heater 1 x 2lb SP Degreaser													
3. RINSE IN DISTILLED WATER SPRAY																
4. WATER BREAK TEST	 Oil/dirt film makes water bead up		 No oil/dirt film allows water to cover part													
5. CALCULATE TOTAL SURFACE AREA AND AMPERAGE REQUIRED (0.07 AMPS PER SQUARE INCH)																
6. TANK MAKEUP		<ul style="list-style-type: none">• 110°F• Agitation (pump)• 1 pack Crystals per 1.5 gals of DISTILLED WATER• Add 8 fl oz brightener per 1.5 gal• 1 amp per 16 sq" for nickel• pH = 3.5 – 4.5	<ul style="list-style-type: none">• 1 x Heater• 1 x plastic tank• 1 x tank lid• 2 Nickel Anodes• 2 Anode Bandages• 1 x Pump• Crystals & Brightener• Distilled water	Wear rubber gloves and goggles. Do not ingest. 												
PLATING CYCLE MUST NOT BE INTERRUPTED OR DELAMINATION OF SUBSEQUENT PLATING MAY OCCUR																
7. PLATING TIMES	Immersion time depends on plating thickness <table><thead><tr><th>Time</th><th>Application</th><th>Plate Thickness</th></tr></thead><tbody><tr><td>15 / 30 mins</td><td>Indoor items, decorative etc.</td><td>0.00025"</td></tr><tr><td>30 / 60 mins</td><td>Hand tools, guns, nuts & bolts, brackets etc</td><td>0.0005"</td></tr><tr><td>60 / 90 mins</td><td>Marine, motorcycle, car or outdoor fittings</td><td>0.001"</td></tr></tbody></table>				Time	Application	Plate Thickness	15 / 30 mins	Indoor items, decorative etc.	0.00025"	30 / 60 mins	Hand tools, guns, nuts & bolts, brackets etc	0.0005"	60 / 90 mins	Marine, motorcycle, car or outdoor fittings	0.001"
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60 / 90 mins	Marine, motorcycle, car or outdoor fittings	0.001"														
8. ADD LOST WATER	After plating, top up the tank with DISTILLED water to the original waterline.															
9. BUFF & POLISH	Buff and polish to enhance the finish, using white buffing compound or Blue Begone Polish															
10. WAX	If the nickel is your finished product, apply a coat of Collinite Metal Wax															
11. CHROME PLATE	If you are to chrome plate the nickel: a. buff to a high shine b. degrease in SP Degreaser c. Water Break Test d. Proceed to Chrome Tank immediately															

Nickel Plating Troubleshooting

Problem	Cause	Remedy
No deposit	No current (or gassing from part)	Check all electrics
Plate peels off or blisters	1. Poor preparation 2. Inadequate cleaning	Check part with 'waterbreak' test. Acid etch part. Check SP Degreaser is OK. Chrome in nickel, if so, dump solution. On porous metal (Pot Metal) sand blast, Flash Copper, then Bright Copper & or nickel plate.
Pitted Plate and Orange Peel effect	1. Impurities in solution 2. Hydrogen bubbles formed on part	1. Strain through coffee filter with 1/2 of 'activated charcoal' in bottom. Add more Nickel Brightener. Add 1-3 teaspoon of HYDROGEN PEROXIDE per 2 gals of nickel solution to reduce pitting. 2. Alter agitation, or use manual agitation of the part.
Rough Plate	1. Amps too high 2. suspended particles in solution 3. pH too high or low	1. Reduce current 0.07 amps/sq in 2. Filter solution (no charcoal). Clean filter 3. Adjust Ph to within 3.5- 4.5
Black streaks or dark deposits (esp. on low spots)	Zinc, lead or copper in solution (Especially zinc plate)	Plate out onto a dummy corrugated cathode. Zinc contaminants may show as alternating dark & lights areas. Air agitation must be on. Do not blast or abrade old zinc plating off metal. Use an acid pickle. Blasting causes zinc to penetrate into the metal.
'Burnt' Plate	Too much current	Lower the amperage Raise the bath temperature
Haze on the plate	Excess Hydrogen Peroxide	Heat solution to 190 deg F, then filter using charcoal bag in the filter pump. Replace brightener
Bright plate on high areas only	Insufficient Brightener	Add Nickel/Copy Chrome Brightener
Bright plate except very low spots	Too much Brightener	Remove by filtering through charcoal, then replace
Dull Nickel Plate	1. Insufficient Brightener 2. Part not polished properly	1. Add Brightener 2. Strip the plate off and re-polish, or plate with copper, polish the copper and then re-plate.

Additional Nickel Plating Tips

DO NOT REMOVE THE PART ONCE PLATING HAS STARTED. You will interrupt the process causing the succeeding layer of plate to delaminate. If any interruption occurs, activate the surface by swabbing the surface with NICKEL ACTIVATOR on a cotton swab. Rinse the part in fresh water, then return to the plating tank to finish the application.

Nickel plating is prone to forming little pin pricks in the surface caused by Hydrogen bubbles sticking to the plated surface. The plating then forms around the bubble, making a small crater on the surface. These are very unsightly and difficult to remove. Agitation from the filter pump removes the bubbles and supplies fresh solution to the plating surface. It will also make a smoother plate. This can also be achieved by blowing air into the solution.

For a high quality finish on brass, copper & bronze, apply a copper plate first, buff, then nickel plate. However, nickel will plate successfully directly to these metals.

For a flat finish on steel, sand blast with fine abrasive, then plate, do not polish before plating, only after to remove dull gray. The BRIGHT NICKEL finish can be made to look like Cadmium or a "Butler Nickel" used on Model A Fords.

To make nickel look like a cadmium plate sand blast the part to a dull flat finish, then nickel plate. Finish by scrubbing with wetted scouring powder such as VIM or Comet. You will get better results from our COPY CAD kit.

To make nickel look like the Butler Nickel finish, plate with the amperage turned up slightly and the temperature down. Clean up with scouring powder (COMET).

Use nickel plate as a 'strike' coat onto steel, prior to plating with copper. Acid copper systems such as ours, will NOT plate directly to steel or zinc, so they need to be covered with an 'inert' layer prior to plating. Either type of nickel system will act as this protective layer, preventing the acid from damaging the steel or zinc. Our preference is to use the FLASH COPPER system as this primer.

DO NOT PLACE POT METAL, OR ANY TYPE OF ZINC/PLATED SURFACE IN BRIGHT NICKEL SOLUTION. The zinc from the pot metal will react with this more acidic solution, which will become contaminated and ruin any further work. Steel is not effected by this product and can be directly plated with it, however use caution when plating steel that has previously been zinc plated. Be sure to remove the zinc plating in an acid pickle. Blasting the zinc off sometimes causes zinc particles to penetrate into the steel, resulting in black streaks in the plating.

As soon as you have completed nickel plating, proceed immediately to chrome plating, if required. After plating with nickel buff the part to a high shine using a spiral sewn wheel and white compound, then soak in hot SP Degreaser to remove buffing greases etc.

The shiny appearance of BRIGHT NICKEL or Copy Chrome plate can be enhanced by several factors.

1. Buffing and polishing PRIOR to plating, is by far the most important factor.
2. The addition of brighteners to the solution. NICKEL BRIGHTENER ADDITIVE should be added at the rate of 1 fl oz per gallon of solution when the system begins to lose brightness. These brighteners are in the initial mix of nickel solution. If the system is 'cleaned' by filtering through a charcoal filter (see troubleshooting), then additional brightener MUST be added to bring back the original plating conditions.
3. Buffing and polishing AFTER plating,
4. Protecting the surface by applying Glare Professional Polish.