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HARD CHROME PLATING CONSULTANTS LTD.

Where the impossible usually doesn't take any longer to do.

P. O. Box 44082
Cleveland, Ohio 44144
216 351 8297

POROUS POT OPERATING INSTRUCTIONS

The Porous Pot Rack will remove impurities dissolved in chrome solutions of all types. Its used in Anodizing, Bright Dips, and other solutions that may have Trivalent Chrome and other contaminate problems besides Hard & Bright Chrome plating solutions. It will remove Copper, Iron, Nickel, Aluminum and all other metals except Hexavalent chrome.

The Pot we use is a true ceramic with 1/2 to 1 micron pores and is 40% porous. How long will it last? I don't know but barring breakage it should last years. I have had reports of other manufacturers pots failing after one year of use but they are not using the same type of pot or material.

The Pot does act like a filter in a limited sense. More importantly, it takes electricity to drive the impurities through the pores and separates even dissolved impurities from the chrome solution. A filter will only trap solids too big to go through the filter holes or pores - usually the solids are 10 microns or larger. Among other things you may find the pot has separated dissolved oil from the solution. When operated in plating position impurities collect inside the pot. If operated in reverse relatively clean water will collect in the Pot. This water is clean enough to use for rinsing but can't be discharged in a sewer. For this reason the same Porous Pot Rack can either separate impurities in the Chrome Tank or separate Chrome from the rinse water. There are other units on the market that will do one or the other but not both. These units use pumps, plumbing, separate tanks and rectifiers which take up valuable floor space, are prone to leaks, costly installation, difficult and time consuming to maintain.

Our Porous Pot Rack fits in most tanks as the large one is only 6" thick by 18" wide x 28" long. Some automatic bright chrome tanks may not have enough room and simple, easy installation instructions will appear later on. The rack is made to fit in a tank using the Reversible Rack 2 Bus Bar System of Hard Chrome plating. In other tanks you might have to jerry rig a little and use jumper cables. For those of you that do not Hard Chrome plate the Reversible Rack way - you jerry rig all day long so it should not be a problem to use 2 of your many jumper cables to hook it up. (Reversible Rack shops don't own any jumper cables and their many problems!!!!!) The Porous Pot rack is simple, easy to use, low cost - costing hundreds of dollars, not thousands of dollars. Don't let the low cost fool you as users tell me it's the best thing on the market by a tremendous margin. Our pots have been on the market over 2 years. No one has asked for their money back. Indeed, large shops have tried one and ordered 1 or 2 more later. No one so far has needed more than 3 Porous Pot Racks. So much for the sales pitch - now for the instructions.

Normally the lead Grid outside the pot is the anode while the one inside is the cathode. At the top of the rack you will find 2 insulator blocks that divide the anode from the cathode. Start tracing the outside anode up the Lead to the copper clamping bar to the anode or + hook. Tracing down from the other hook which is normally -, this circuit goes past the insulator, across the cathode clamping bar into the cathode grid.

When connected this way to the proper + and - bus bars, in the chrome tank, solution purifying will take place. In the rinse tank the rack can be hooked up either way depending on whether you want clean water or chrome to collect in the pot.

We will discuss operation in the chrome tank first. The rack must be positioned in the tank so that one to three inches of the pot is above solution. The solution in the pot will rise higher than the solution outside. It must not flow over the top as if it does you will be putting the impurities back in the tank. How high it gets will depend on the voltage you use.

Normal operating voltage is between 4.2 and 6 volts. The large pot will draw about 230 amps at the start. As impurities collect in the pot current drawn will fall off to 0 if left in too long. It is best to clean the pot when amps fall under 90. We can't give you absolute numbers as they will be determined by solution concentration, type, amount of impurities in the solution, etc. Of course you may have to clean out the pot every 2 days at first but as contaminant levels fall this could stretch out to a week. By that time you should notice better plating quality, faster plating speeds at lower voltages. What happens in the pot also happens in the chrome tank. As you build up impurities, plating rates slow to a walk even using higher voltages besides all the other nasty things that happen.

Removal of Trivalent Chrome is rapid but metal removal is slow. Depending on how much solution you have to treat and how bad it is it could take several months to reach equilibrium. When you do you can either put the rack in another tank or if you only have one run it a couple of weeks every few months.

The pot will get sludge on the bottom and on the cathode. It is easy to remove the cathode and dump the contaminated solution out to be disposed of properly. Brush the cathode off and scrape out the sludge on the bottom. Do not let any sludge dry out or removal will be difficult. The contents will have to be saved in a plastic barrel and disposed of. It will be much cheaper to have this small amount hauled away than to dump a whole chrome tank of solution.

These Pots are being used in a variety of solutions and if it does appear that the pores have become clogged just reverse it for 5 or 10 minutes which will unclog it. Chances are it has a too highly contaminated solution inside and it's not clogged.

To start an empty Pot pour in about a quart of chrome in it and add fresh water to about 3 inches from the top. if you put the Pot in empty it will take 5 or 6 hours to fill. Even filling it in this manner you won't reach full amperage for a while.

The smaller and cheaper PPS2 is recommended if you have 700 or less gallons to treat. If you don't have enough room in the tank for the Porous Pot Rack use the following method. The racks will fit nicely in a 55 gallon plastic drum. You can buy one for about $8.00 from used drum dealers. Ask for one that has a damaged bung hole as you will cut the top out anyway. They might even give it to you free.

The hooks fit the rim nicely so measure down to where you want the solution level to be. Cut a hole to fit 1 or 1 1/4 inch plastic pipe. You can bolt on or plastic weld a pipe fitting. If you use bolts make sure they are Titanium. This would be the over flow so the exit should be about a foot higher than the tank. Use a small pump to pump solution into the barrel. Be sure to position the pump over the chrome tank and run plastic pipe to the barrel. If the pump breaks down and leaks you won't have chrome on the floor. Keep pipe runs short and joint free as possible.

To separate chrome from the rinse water it will be necessary to use 24 to 27 DC volts maximum. You can collect either chrome or clean water in the pot depending on which way the rack is hooked up to the rectifier. It

is generally best to collect chrome in the Pot and pump it back into the tank.

The solution can be either hot or cold. It never is a good idea to use bottom air agitation in a chrome tank. If you do, it becomes necessary to filter the solution constantly. The combination of filtering and a lot of air is very costly - there is a better way. On page 224 in my book "CHROME PLATING SIMPLIFIED REVERSIBLE RACK 2 BUS BAR SYSTEM" is a air pumping tube that uses a tiny amount of air to pump large volumes of solution. It will keep the solution temperature even from top to bottom at all times without stirring up the inevitable sludge.

As you well know, fluoride baths are very corrosive and some types are more so than others. If anode life is short re-order tin/lead anodes. If you have a mold to cast lead mats or buy lead mats from us you can make a larger anode at replacement time. Burn the mats together in the other direction and make a U. There are 2 plastic support tabs already in place on the sides. The larger anode will last longer and speed up reaction. For longer rack life lacquer all exposed rack surfaces. Do not damage the Plastisol coating.

In Bright Chrome tanks that cycle the voltage off and on it is best if you power the rack from an electro cleaner rectifier. You could also use a separate rectifier so just do whatever is cheaper or more convenient. Keep the rack running and don't allow the solution in the pot drain back in the tank.

If total impurities in your tank are over .5 oz. per gallon including Trivalent chrome it could give you problems. The old 100 to 1 solution is more tolerant of impurities than Fluoride baths. It is only good sense and economics to keep impurities to a minimum. The Porous Pot Rack makes it possible to operate Hard Chrome tanks as a completely closed loop. There should never be a reason to dump a Chrome solution.

If you have a Fume Scrubber for your chrome tanks then you have a problem with the scrubber water. Too much water to treat or even if you can get it all back in the tank it is pretty dirty. All the dust and dirt in the shop air gets in the scrubber water. The Porous Pot can solve this problem for you by doing the following.

Install a one or two hundred gallon tank for the scrubber water. Suspend a PPS1 Porous Pot in the tank and connect it to a 24V power supply. The Chrome should collect in the pot so you will need a small self priming pump to pump the Chrome back in the tank. The inlet tube should be only long enough to reach about 3 inches into the pot. Don't pump the pot dry or it won't work properly. Take the scrubber pump off and move it over the scrubber tank. In case you get a pump leak, they will leak eventually, the solution will not be on the floor.

The pores in the pot are only 1/2 to 1 micron so you won't be putting anything larger than that back in the chrome tank. Some of what goes through will settle in the pot so eventually you will have to clean the pot and the Scrubber Water tank as well. You will have to watch the Scrubber tank solution level as it is bound to drop. A considerable amount of water will evaporate in the scrubber.

Scrubbers are not 100% efficient. How efficient is a function of how clean the water is that's sprayed at the packing. Following the packing is a mist eliminator section which at best is only 98% efficient. To use tap water and treat it wastes chrome and is definitely very expensive.

HARD CHROME ECONOMICS

Its a hard fact that high prices contract your market leading to higher prices which further limits the market, ad infinitum. Think of the hard chrome market as a pyramid. Some parts are so big and expensive they would be plated irregardless of the cost. These are at the top of the pyramid. At the base are parts that would be plated if the price was right. As you raise prices more and more of this work drops out of your market. Pretty soon your competing with the other shops for a very limited amount of work. The truth is some of you are dying from lack of work with all kinds of work, in your territory, not being done. Most of the hard chrome industry is operating in the top 30 % of the pyramid!

You would be making a sad mistake if you think the other 70 % isn't worth going after. Reversible Rack Shops make more than 80 % of their money doing this type of work which consists of tools, dies, molds, machine parts, etc. They can charge 1/3 of what you would and still make a decent living. How can this be? Its easy when a Reversible Rack plater can set up and run more than twice the volume of work your best plater can. They need $\frac{1}{4}$ the equipment and overhead that you do to produce the same volume of work. They get 2 or 3 times more work from each customer than you do. The usual mix of work requires 1 tank for large work and 4 tanks for the smaller jobs in most large reversible rack shops. (tanks are 12 feet long) Its better to have a hundred customerz sending in small amounts of work than to have a few big customers. Even if the year end billing totals were the same, the loss of one or two customers will not put you out of business. Some of the shops that only wanted large work are now out looking for the small jobs. With the huge overhead they have managed to aquire, I don't see them making it plating the hard way! If Your not using the Reversible Rack System you are plating the hard way! There is all kinds of work now crisscrossing this country looking for hard chrome platers that can do it, do it right, in a reasonable time period and at a reasonable price.

The papers and TV are full of the woes that come to industries that waited too long to modernize. Most of the hard chrome industry is 40 years behind times. The chrome shops in Cleveland, Ohio have been plating at a .003 to .006 per hour rate on a OD. since brfore 1940! Some even use .012 per hour rates. Make no mistake, it takes these plating rates and the reversible rack system to really do quality hard chrome plating at a rock bottom price.

What some of you don't seem to realize is that I have seen this industry from both sides of the tracks. I really feel sorry for you poor stiffs trying to hard chrome plate in a bright chrome or modified bright chrome tank. A good part of the 70 % your not doing is impossible to plate using your primitive methods. The rest gives you so much trouble you just don't want to do it. This is all so unnecessary! I am not talking about a few minor improvements but a whole new ball game. The shops that have converted to the Reversible Rack System are extremely happy and fondly hope you never do! This is short sighted because if everybody plated the Reversible Rack way customers that were and are getting burnt, by bad plating, would not be lost to the industry. There would be plenty of work for all. Only a few customers will tell you that you did a bad job and others will look for a new plater. The saddest part are the ones that swear off hard chrome plating forever.

High minimum charges will shut out a lot of lucrative jobs. They can also keep you from getting your foot in the door with new customers. Most minimum charge jobs only take a few minutes to do. I would spend the first 1 or 2 hours, at the start of the shift, plating minimum charge orders. As most of them were flash or quick setup I could run out 4 or more orders an hour. This would pay my wages and tank overhead so the rest of the shift was pure gravy. This gravy consisted of the balance of 8 to 10 orders a shift. Each order had up to 3 different jobs and one or more pieces per job. Remember I am talking about setting up, plating, pulling and checking out tool, die, mold and machine parts work. Because of the high plating rates I did have to pull much of my own work. Compare this with your platers output.