PD2

PALLADIUM READY TO USE FLASH PLATING BATH 2G/L PURE PALLADIUM COLOR

DESCRIPTION

PD2 is a traditional palladium plating electrolyte for bath plating. The chemical make-up of this ammonia based product deposits a consistent layer of 99.9% pure palladium to the metal substrate which it is applied. PD2 is primarily used for flash plating as the maximum thickness achievable is 0.2 micron. The palladium deposit can be used as a barrier to prevent copper migration which is common to metal substrates containing significant amounts of this element.

- Traditional palladium plating solution
- Excellent substitute for nickel plating
- Good barrier to prevent external copper migration

DEPOSIT DATA	
Purity (%)	99.9
Hardness [HV 0.01]	400
Density [g/cm³]	12.0
Thickness from-to [µm]	0.02 - 0.20
Aspect	Shiny
Color	white

PRODUCT FORM	
Metal concentration	2 g Pd/l
Product pH	Neutral - slightly alkaline
Format	Ready to use liquid
Color of the product	Yellow - green
Storage time	2 years
Volume	1 L

PRODUCT USAGE	RANGE	OPTIMAL
Voltage [V]	1.5 - 2.5	2.0
Current density [A/dm²]	0.3 -1.0	0.5
Working temperature [°C]	20 - 35	30
Treatment time [sec]	45 - 120	90
Cathodic efficiency [mg/Amin]	20 - 30	20
pH	7.8 - 8.5	8
Anode/cathode ratio	> 1:1	
Anode type	Ti/Pt	
Stirring	Moderate	

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METAL CONCENTRATION

METAL g/l	RANGE	OPTIMAL
Pd	1.0 - 2.0	2.0

COLOR COORDINATES

L *	83.8
a*	0.4
b*	4.3
c*	4.3

Note: Color coordinates here reported have been measured on a white underlayer and they are to be intended as PURELYINDICATIVE being strongly dependent on underlayer color, on thickness of the deposit and on specific design(shape)of the surface.

RELATED PRODUCTS - MAINTAINING

PD100R.1PC*	Yellow salt of Palladium dichlorotetramine (41-42%) = 100G Pd
PD100RL.1L*	Palladium dicloride tetramine solution 100G Pd/l - 1 L
PD100RB.100ML	Brightener for palladium (PD2, PD4) replenisher - 100 ml
PD20R.1PC	Kit palladium salts replenisher (PD2, PD4) 20G Pd
PD2SC.1KG	Conducting salts for palladium plating solutions - 1 kg
PD-B1.1L	Brightener solution 1 for PD2 and PD4 palladium plating solutions - 1 L
PD-B2.1L	Brightener solution 2 for PD2 and PD4 palladium plating solutions - 1 L
PD-WA.1L	Wetting agent for PD2 and PD4 palladium plating solutions - 1 L

* Product which is subject to the international regulations concerning transportation of dangerous goods

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USER GUIDE

READY TO USE SOLUTION PREPARATION

PD2 is a ready-to-use plating solution at the concentration of 2 g/l of palladium. No preparation is required. Pour it directly into working tank, heat it up to the preset temperature and once reached start to plate.

ANODES

Use Titanium Platinized anodes with a layer in platinum not lower than 1.5 µm.

WORKING TANK MATERIALS

For small volume amount solutions - in beaker scale - use Pyrex glass; vice versa use PP /PVC/HDPE tanks for larger volumes and equipped with an efficient exhaust fume/suction or aspiration system.

DC POWER - RECTIFIER

Use a current DC rectifier having an alternate current residue –ripple– less than 5% and having an output amperage enough to obtain a proper electroplating process. The rectifier should be equipped with:

- Amperemeter
- Voltmeter
- Ampere/minutes counter (for bigger installations only).

HEATING SYSTEM

The admitted materials for heaters are: Pyrex, quartz or PTFE.

FILTRATION AND MOVEMENT

For bigger plating installations (> 5 liters) it is advisable to keep the plating solution continuously filtered and in movement through a magnetic driven filter pump with 5-15 µm cartridges in PP that must have been previously conditioned by boiling them for at least 3 hours and then washed with DI water in order to prevent any possible organic contamination.

PLATING SOLUTION MAINTENANCE

For small volumes of PD2 (up to 5 liters) use the bath until exhaustion, without making any addition of the PD20R or PD100R replenisher units. For larger volumes, additions can be made using the appropriate replenisher system. For optimal performance of this palladium plating solution, it is advisable to not consume more than 20% of the initial palladium concentration without adding any replenisher: for example, with a bath operating at a concentration of 2 g/l, the additions must be done after a maximum consumption of 0.4 g/l of the metal. To carry out the additions it should be remembered that, under optimal operating conditions, a bath operating at 2 g/l normally deposits about 20 mg of palladium for each Ampere minute. Since Palladium is a precious metal, and for the purpose of accurately assessing consumption, it is advisable to carry out periodic analytical checks. The replenisher units for the PD2 plating solution are available in packaging containing respectively 20 g (PD20R) and 100 g (PD100R) of fine Pd respectively. The replenisher PD20R is composed of two subcomponents "A" and "B" to form a kit: PD20RA is the part of the replenisher unit containing palladium salts, while the PD20RB is the part containing the all the brighteners system. Vice versa, if instead of PD20R kit, you have got PD100R as Palladium salts, then you will also need PD100RB or each brightener to be added separately.

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It is important to point out that whatever is the palladium replenisher system you want to use (PD20RA or PD100R), 2 grams of salts correspond to about 1 gram of fine palladium. Therefore, having the PD2 process a cathodic efficiency of about 20 mg per Ampere minute, the PD2 bath will have a consumption of about 20 g of Palladium metal every 1000 Ampere minutes. For all this reasons to restore 20 g of Pd an addition of about 40 g of PD20RA or PD100R must be done together with 20 ml of PD20RB or PD100RB solution. During the addition of palladium salt a good stirring of the solution is required.

IN CASE OF LACKS BRIGHTNESS AND BRILLIANCE: If, despite the concentration of Palladium is at optimal levels in the plating solution the resulting deposit is still off and not very bright or shiny, it is possible that the same bath lacks brighteners. The additions of brighteners 1 and 2 in the PD2 are therefore to be carried out together and in the following manner: Add 2.5 – 5 ml/l at a time of brightener PD-B1: THE PLATING SOLUTION OF PD2 WILL NOT TOLERATE ITS

EXCESS. PD-B1 acts to restore brightness and brilliance to the deposit of the plating solution. Then add 10-50 ml l of PD-B2-1LT at a time: this complex helps in trap any possible interfering-pollutant metal different than palladium, avoiding their co-deposition. An excess of PD-B2-1LT is well tolerated by this plating solution. If you need to increase the wettability of PD2, add wetting agent PD-WA according with the suggestions provided by our Technical Assistance Service.

PRETREATMENTS

The plating solution PD2 can be directly deposited on Gold, Silver, Platinum, and copper alloys. For copper alloys a flash of Pd will act in prevent copper migration to the external surface for the treated items.

As pre-treatment it is suggested to run a preliminary degreasing through a cycle of ultrasonic degreasing treatment -solution followed by a wash step into running water. Then proceed with the electrolytic degreasing step by using the alkaline degreasing solution SGR1. Once the items has been washed again in demineralized water, then proceed in activate and neutralize the surface of the same by dipping them into the slightly acidic solution NEUT1 for 3 – 4 times subsequently at room temperature, in order to be sure that no any alkaline residues coming from the degreasing previous steps are dragged into the rhodium solution together with the same items to be treated (which would lead to a reduction of its life). After the neutralization, wash in demineralized running water and immerse the pieces in the Pd plating solution for the plating treatment.

POST TREATMENTS

The electrolyte should be removed from the surface as quick as possible. Wash off the plating solution residues in a recovery rinse (static rinse). Rinse the parts in circulating deionized water and dry. A possible last rinse in hot static water before dry can help in gain more brightness and luminosity.

WATER PURITY

To prevent contamination of the plating solution during any replenishing operations, use demineralized water with a conductivity of less than 3 µS/cm (containing no traces of organic compounds, Chlorine, Silicon, or Boron). To achieve maximum deposit quality we suggest to use our high- grade purity WATER.

ABOUT pH

pH tends to decrease spontaneously due to the ammonia evaporation during time. Add a solution of concentrate ammonia to restore it. Vice versa, in the situation of too much high pH, add a solution of diluted 10% sulfuric acid to decrease it.

ABOUT SOLUTION DENSITY

If it is necessary to increase the conductivity or the density of this plating solution add PD 2SC conducting salts. The addition of 15-20 g/l of this salts will raise of +1 °Bé the density of the solution.

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SUPPLEMENTARY INFORMATION

Palladium plating process comes generally with 100% of efficiency so gaseous hydrogen development is not happening at all at while plating at optimum voltages and current densities range. For the same reason it will not necessary to provide with strong agitations for both items and plating solution. The movement provided with the filter pump (see related paragraph) and eventually with moderate movement for the cathodic bar is condition more than sufficient to get palladium plated surfaces of a good quality. As Palladium is extremely sensible to hydrogen contact, making it darker and dull, avoid the application of too much high voltages as they can cause localized burns of the surface close to the high current density areas which will be visible after successive plating treatments even. If the palladium plating treatment is applied as an intermediate layer on white gold items which are then rhodium plated, it is important to do both plating steps in rapid sequence. After the palladium plating treatment, the pieces are rinsed with demineralized water and neutralized before entering in the final rhodium plating solution. Never perform complete electrolytic degreasing treatment on the palladium plated pieces as it will cause blackening of the pieces due to the absorption of the gaseous hydrogen in the palladium layer and generated by the water reduction close to the cathode. If you have accidentally done this, an anodic treatment (inverted polarity) or heating of the pieces for a few minutes at 80°C should restore the original features of the plating.

SAFETY INFORMATION

Although PD2 can be considered a product of low-toxicity, irritation to the skin, eyes and mucous membrane cannot be excluded. Caution should be exercised when using the product, avoiding contact with the eyes and skin. Use gloves and safety goggles. For further information please refer to the related MSDS.

DISCLAIMER

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