JEWELRY PLATING

PD3-ECO

READY TO USE PALLADIUM FLASH AMMONIA FREE 3G/L PURE PALLADIUM COLOR

DESCRIPTION

PD3-ECO is the most advanced formulation of palladium plating. This new generation palladium is totally absent of free ammonia granting extremely simple production management and an eco-friendly production approach. In addition to reducing environmental impact, PD3-ECO makes the operator's work healthier and easier as frequent pH management or regular additions of concentrated ammonia is not required. Moreover, since the pH of the bath is near neutral, hydrogenation of the deposit is limited compared to the traditional ammonia baths; this provides a white deposit almost like that of rhodium and is less porous than the traditional palladium baths.

- New generation palladium formula
- Totally absent of free ammonia
- pH stability = easy to use
- Thickness to 1 micron

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	3 g Pd/l
Product pH	Neutral
Format	Ready to use liquid
Color of the product	Pale yellow
Storage time	2 years
Volume	1 L

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PRODUCT USAGE	RANGE	OPTIMAL
Voltage [V]	1.0 - 1.8	1.5
Current density [A/dm²]	0.5 -1.5	1.0
Working temperature [°C]	35 - 50	40
Treatment time [min]	1 - 8	4
Cathodic efficiency [mg/Amin]	20 - 30	30
pH	6.0 - 7.5	6.5
Anode/cathode ratio	> 1:1	
Anode type	Ti/Pt	
Stirring	Moderate	

METAL CONCENTRATION (g/l)

METAL	RANGE	OPTIMAL
Pd	2.0 - 3.0	3.0

COLOR COORDINATES

L *	84.4
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
PDXWR.5U	Pure palladium replenisher (5UN=1L)
PDXWBR1.1L	Brightener 1 for pure palladium - 1L
PDXWBR12.1L	Brightener 2 for pure palladium - 1L
PDSTARK-SC.5KG	Conducting salts for palladium - 5 kg
PDSTARK-SS.5KG	Stabilizer salts for palladium - 5 kg

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

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USER GUIDE

READY TO USE SOLUTION PREPARATION

PD3-ECO is a ready-to-use galvanic bath at the concentration of 3 g/l of palladium. No preparation is required.

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 enoughto 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 volume plating solutions (up to 5 liters) use them until exhaustion, without adding any replenisher unit of PDXWR solution. For bigger plating solutions additions shall be performed using the appropriate replenishing unit as reported here below. For optimum performance of the palladium electrolytic solution, it is better to work with a Pd concentration that is not less than 80% with respect to the initial concentration: for example, with a plating solution working at 3 g/l as nominal value, additions must be done after a maximum consumption of 0,6 g/l of Palladium. In order to perform the additions, always consider that a 3 g/l electrolytic solution deposits about 30 mg of Palladium per Ampereminute average. As Palladium is a precious metal, and in order to control at the best its consumption, periodic analytic controls are advised.

ABOUT THE PALLADIUM CONSUMPTION: with all those premises, in order to run a good maintenance of the electrolytic system, we can consider that EVERY 600 Amiutes 20 g of fine Pd are consumed and must be restored as PD 100RW. Following to this operation, add then 40 ml replenisher of PDXWR. Nevertheless, we repeat that a frequent analytical control of the real Pd concentration is suggested to perform the maintenance operation in a good way. ABOUT PD3-ECO BRIGHTNESS SYSTEM: if the Pd deposit loses brightness despite good concentration for the metal (and it might be the case after carbon active filtration also) the brightness can be restored by a separate addition of its brightener compounds. In doing so, add 4 ml/l of PDXWBR1 + 2 ml/l of PDXWBR2 once at a time and, in case, repeat this operation for not more than 2 total consecutive times for a total of 8 ml/l of PDXWBR1 and 4 ml/l of PDXWBR2.

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ABOUT SOLUTION DENSITY

Keep constant the density at optimum values between 11 .0-15.0 °Bé. If the density is too much lower than those range values, restore it by adding the related conducting salts. In this sense remind that to higher of +1 °Bé the density of the PD3-ECO it will be necessary to add 20 g/l of PDSTARK-SC (conducting salts) + 10 g/l of PDXWSS (stabilizers salts).

PRETREATMENTS

The plating solution PD3-ECO 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 platingtreatment.

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 using our high-grade purity WATER.

ABOUT pH

Keep pH within its nominal values. Normally it tends to decrease with respect to the optimal range 6.0 -7.5 during time and if it is necessary to raise it, the correction can be done by the slow addition of diluted ammonia solution until reaching again an optimal value; on the contrary, if it is necessary to lower it, add slowly a diluted sulfuric or acetic acid solution. In order to do this type of operation it is strongly suggested to keep constantly monitored the pH by the use of a p H meter probe and if possible, run this operation at room temperature.

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 be 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 beforeentering 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.

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SAFETY INFORMATION

Although PD3-ECO can be considered a product of low-toxicity and neutral in its pH, irritation to the skin, eyes and mucous membrane cannot be excluded on a "priori" base. 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 relative safety sheet.

DISCLAIMER

All recommendations and suggestions in this bulletin concerning the use of our products are based upon tests and data believed to be reliable. Since the actual use by others is beyond our control, no guarantee expressed or implied, is made by Legor Group, its subsidiaries of distributors, as to the effects of such use or results to be obtained, nor is any information to be construed as a recommendation to infringe any patent.

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