



PD2

PALLADIUM SOLUTION FOR FLASH BATH PLATING 2 G/L READY-TO-USE WHITE COLOR

GENERAL INFORMATION

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.

Product form

Metal concentration	2 g/l (Pd)
Product's pH	Neutral/Alkaline
Solution form	Liquid
Solution form	Ready-to-use
Plating solution color	Yellow/Green
Storage time	2 years
Volume	1 liter

Deposit data

Solution appearance	Shiny
Purity (%)	99.9
Density [g/cm ³]	12.0
Plating solution color	White
Thickness range [μm]	0,02 - 0.20



Operating data	RANGE	OPTIMAL
pH	7.8 - 8.5	8.0
Voltage [V]	1.5 - 2.5	2.0
Current density [A/dm ²]	0.3 - 1.0	0.5
Working temperature [°C]	20 - 35	30
Exposure time (sec)	45 - 120	90.0
Cathode efficiency [mg/Amin]	2	
Anode type	Platonized titanium	
Agitation	Moderate	

Metal concentration	METAL	RANGE (g/l)	OPTIMAL (g/l)
	Palladium	1-4	2.0

Color coordinates

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

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PREPARATION

PD2 is a ready-to-use galvanic bath at the concentration of 2 g/l of palladium. No preparation is required.

EQUIPMENT

- Working vessel material: Pyrex glass / PVC / polypropylene
- Power supply: DC current rectifier with low residual AC (<5%).
- Heating element
- Anode type: Platinized titanium (1.5-2.5 µm)

For larger bath volumes:

- Magnetic driven filter pumps with 5-15 µm cartridge
- Amp/min counter

PRE TREATMENT

PD2 can be deposited directly onto silver, gold, copper, nickel and other alloys. An intermediate deposit or precious metal plating strike is necessary before depositing onto tin, lead, zinc, cadmium, aluminum and iron or alloys which contain any substantial amount of the elements listed.

POST TREATMENT

The electrolyte should be removed from the surface as quick as possible. Wash off the bath residual in a recovery rinse (still rinse). Rinse the parts in circulating deionized water and dry.

WATER PURITY

To prevent contamination of the bath both during its preparation and any subsequent replenishing operations, use demineralized water with a conductivity of less than 3 µS/cm (containing no traces of organic compounds, Chlorine, Silicon, or Boron).

**BATH MAINTENANCE**

For small volume PD2 bath (up to 5-6 liters) use the bath until exhaustion, without making any addition of the PD20R / PD100R replenisher units. For larger volumes, additions can be made using the appropriate replenisher shown in the table below. For optimal operation of the galvanic bath, it is advisable not to deplete more than 20% of the initial palladium concentration; for example, with a bath operating at a concentration of 2 g / l the additions must be made after a maximum consumption of 0.4 g / l of Palladium.

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 galvanic process are available in palladium packs of 20 g (PD20R) and 100 g (PD100R).

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 brighteners.

If instead you buy PD100R as Palladium salts, then you will also have to buy PD100RB or the brighteners separately.

It is important to point out that the palladium contained in PD20RA or PD100R is in saline form, and 2 grams of salts correspond to about 1 gram of palladium metal. Therefore, having the PD2 process a cathodic efficiency of about 20 mg per Ampere / minute, the PD2 bath has a consumption of about 20 g of Palladium metal every 1000 Ampere / minutes. To restore 20 g of Palladium metal, 40 g of PD20RA or PD100R must be added together with 20 ml of PD20RB or PD100RB. During the addition of palladium salt a good stirring of the solution is required.

LACKS OF BRIGHTNESS AND BRILLIANCE: If, despite the concentration of Palladium is at optimal levels in the bath, 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 of brightener PD-B1 at a time THE BATH OF PD2 DOES NOT TOLERATE ITS EXCESS. PD-B1 serves 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 contaminating metal species other than palladium, avoiding their co-deposition. An excess of PD-B2-1LT is well tolerated by the palladium electrolytic system.

If you need to increase the wettability of the plating solution add wetting agent PD-WA according with the suggestions provided by our Technical Assistance Service.

ABOUT THE DENSITY: if it is necessary to increase the conductivity or the density of the PD2 plating solution add PD2SC or PD2SC-5 conducting salts in the amount of 15-20 g/l to increase of +1 °Bé the density of the solution.

ABOUT THE pH: normally the pH tends to decrease spontaneously due to the ammonia evaporation during time. In case add a solution of 50% ammonia to restore it. On the contrary, in case you are in the situation to decrease it add a solution of diluted 10% sulfuric acid.

SUPPLEMENTARY INFORMATION

The items to be treated are prepared according to the usual process. In general it is recommended to start by degrease the pieces in an ultrasonic solution followed by rinsing and a subsequent alkaline electrolytic degreasing step at 5-6 volts for 1-2 minutes. Neutralization is done by immersion in a 5% sulfuric acid solution or similar solutions, followed by a rinse in demineralized water and the palladium plating step with moderate agitation of the pieces. **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.

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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 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 or 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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RELATED PRODUCTS LIST**Prodotto Complementari**

PD-B1	BRIGHTENER SOLUTION 1 FOR PD2 AND PD10 PALLADIUM PLATING BATH 1L
PD-B2-1LT	BRIGHTENER SOLUTION 2 FOR PD2 AND PD10 PALLADIUM PLATING BATH 1L
PD-WA	WETTING AGENT FOR PD2 AND PD10 PALLADIUM PLATING BATHS 1L
PD100R	YELLOW SALT OF PALLADIUM DICHLOROTETRAMINE (41-42%) = 100 G PD
PD20R	KIT PALLADIUM SALTS REPLENISHER (PD2,PD4,PD10) 20G PD
PD2SC	CONDUCTING SALTS FOR PD2 AND PD10 PALLADIUM PLATING BATHS 1KG
PD2SC-5	CONDUCTING SALTS FOR PD2 AND PD10 PALLADIUM PLATING BATHS 5KG
PD4	PALLADIUM READY TO USE FLASH PLATING BATH 4G/L PURE PALLADIUM COLOR