

RU5DG-C

CONCENTRATED RUTHENIUM PLATING BATH 5G/200ML DARK GRAY COLOR

DESCRIPTION

RU5DG-C is a ruthenium plating electrolyte in concentrated form. Simply add the 200 ml bottle to 800 ml of pure deionized water to prepare the ready to use solution. The electrolyte deposits an abrasion resistant layer of ruthenium metal in a dark gray color. The dark gray color produced is developed with extremely stable organic additives making this electrolyte easy to use and maintain. This acidic based compound is primarily used in decorative plating applications for a diverse dark color option in the case where corrosion resistance is also a requirement. The plating deposit is durable and can reach a maximum thickness of 0.2 micron. Due to the fact ruthenium has a lower conductivity than other precious metals, the electrolyte requires a greater metal concentration to function optimally.

- Dark grey color
- Very stable and easy to use process
- 5 grams per liter
- Economical precious metal deposit
- Corrosion resistant

DEPOSIT DATA

Purity (%)	99.0
Hardness [HV 0.01]	700 - 800
Density [g/cm ³]	10.5
Thickness from-to [µm]	0.02 - 0.20
Aspect	Shiny
Color	Dark grey

PRODUCT FORM

Metal concentration	5 g Ru/200 ml
Product pH	Acidic
Format	Concentrated liquid
Color of the product	Dark red
Storage time	2 years
Volume	200 ml

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PRODUCT USAGE	RANGE	OPTIMAL
Voltage [V]	1.8 - 2.2	2.0
Current density [A/dm ²]	0.5 - 2.0	1.0
Working temperature [°C]	50 - 70	60
Treatment time [min]	1 - 6	4
Cathodic efficiency [mg/Amin]	1 - 5	3
pH	0.8 - 1.5	1.0
Anode/cathode ratio	1:1 - 4:1	2:1
Anode type	Ti/Pt	
Stirring	Strong	

METAL CONCENTRATION		
METAL	RANGE	OPTIMAL
Ru	3.0 - 5.0	5 g Ru/l

COLOR COORDINATES	
L *	62.0
a*	0.5
b*	2.4
C*	2.4

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 - INSTALLATION

RU5DG-C.200ML* Concentrated ruthenium plating bath 5 g/200 ml dark gray color - 200 ml

RELATED PRODUCTS - MAINTAINING

RU5R.100ML* Ruthenium sulfamate 5 g Ru/100ml - 100 ml

RU5S.1KG* Conducting salts for ruthenium plating solution - 1 kg

RU5RB Blackening additive for RU5BLACK - 1 L

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

USER GUIDE**READY TO USE SOLUTION PREPARATION**

RU5DG-C is a ruthenium electrolytic make-up at a concentration of 5 g/200 ml suitable for the preparation of 1 liter ready-to-use solution by following the steps described here below:

- Fill half tank with DI water
- Add ALL the make-up RU5DG-C into the tank
- Wash the bottle of rhodium with DI water and pour it into the tank
- Add further DI water until reach the final liter ready-to-use solution
- Stir all the solution for few seconds

Once the ready-to-use solution has been prepared, heat it to the optimum working temperature and 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.

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PLATING SOLUTION MAINTENANCE

For small-size ruthenium baths (up to 5 liters) we advise to use until the ruthenium solution is completely exhausted and dispose without adding any replenisher solution. For larger -sized plating solutions add RU5R which is a pre calibrated replenisher containing ruthenium in concentrate form 5 g/100 ml to restore the optimal ruthenium concentration. For perfect plating solution performance it is advisable to maintain the ruthenium concentration at a minimum of 80% of the initial concentration: for example, with a plating solution operating at a concentration of 5 g/l in Ru, additions should be made after a maximum consumption of 1 g/l of ruthenium. When introducing additional metal, keep in mind that in optimum working conditions a bath working at 5 g/l normally deposits about 3 mg of ruthenium per Ampere/minute.

The dark-grey color of the deposit, on the other side, should be maintained thanks to the small and frequent additions of the blackening solution: RU5RB. Basically, its restoring will be a function of both the plating solution workload and the type of dark shade desired by the operator. It is just an experienced operation: when the L* parameter starts to raise too much with respect to its tolerance, proceed with small portions addition of the related blackening agent solution. However, it is up to the operator's sensibility to understand how to properly dose the blackening agent solution into the plating solution, according to their own experience and working methodology. In general, better to not do additions higher than 0.5 ml/l at a time that often take to deposit problems.

PRETREATMENTS

The plating solution RU5BLACK can be directly deposited on Gold, Palladium, Nickel and its alloys. For Silver, Copper and 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. For optimum results follow this step: A) wash off the plating solution residues in a recovery rinse (static rinse); B) wash the treated items in hot deionized water (80°C): this will help in gain more brightness and luminosity; C) rinse the parts in circulating deionized water; D) dry. In the case a problem is observed, replace step B) with a rinse in concentrated ammonium hydroxide (ammonia) solution for 5 minutes. This action should be performed under an exhaust - hood.

WATER PURITY

To prevent contamination of the plating solution during any replenishing operations, use demineralized water with a conductivity of less than 3 μ S/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 is a very important parameter. The pH value must be frequently controlled and held under optimal values reported on the operating data Table. In the case corrections are needed, use Ammonium hydroxide to raise the pH, and RU 5S conductive salts to lower it.

ABOUT SOLUTION DENSITY

Solution density is not a critical parameter. In the case of heavy productions, it is advised to check the density periodically. As the density lowers in value, restore to its optimum working range by using RU 5S conductive salts. Adding 10 g/l of RU5S will raise the solution density of about + 1°Bé.

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SAFETY INFORMATION

Being an acidic solution, the electrolyte is corrosive therefore is an irritant to the skin, eyes and mucous membranes. Caution should be exercised when using the product, avoiding contact with the eyes and skin. Use gloves and safety goggles. Keep away from cyanide based chemicals. For further information please refer to the relative MSDS.

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.