

## RH2FXL

RHODIUM CONCENTRATE PLATING BATH 2G/250ML EXTRA WHITE COLOR

### DESCRIPTION

RH2FXL is the concentrated version for the XL type white rhodium plating solution. The excessive throwing power of this rhodium plating electrolyte allows for easy distribution in difficult to reach places making it ideal for substrates with a lot of details. This formulation has been developed specifically for items with a lot of stones as in micro-pave or in the case where the stones have been wax-set prior to casting (stone-in-place casting technique). The chemical make-up of this rhodium enables the metal to penetrate below the stone producing a compact white deposit. This deposit grants the stone a more luminous base which allows the stone to appear more brilliant and visually appealing.

- The whitest formulation available
- Enhances pavé and transparent stones
- Ideal for pavé or wax-set designs
- Higher throwing power
- Thickness up to 0.5 micron

### DEPOSIT DATA

Purity (%)	99.0
Hardness [HV 0.01]	800 - 900
Density [g/cm <sup>3</sup> ]	12.4
Thickness from-to [µm]	0.02 - 0.50
Aspect	Shiny
Color	Extra white

### PRODUCT FORM

Metal concentration	2 g Rh/250 ml
Product pH	Acidic
Format	Concentrated liquid
Color of the product	Dark orange – reddish
Storage time	2 years
Volume	250 ml

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PRODUCT USAGE	RANGE	OPTIMAL
Voltage [V]	2 - 6	3 - 4.5
Current density [A/dm <sup>2</sup> ]	0.5 - 10	3
Working temperature [°C]	20 - 65	40 - 60
Treatment time [sec]	20 - 60	40
Cathodic efficiency [mg/Amin]	4 - 12	8
Anode/cathode ratio	1:1 - 4:1	2:1
Anode type	Ti/Pt	
Stirring	Moderate	

METAL CONCENTRATION		
METAL	RANGE	OPTIMAL
Rh	0.4 - 2.0	2 g /250 ml

COLOR COORDINATES	
L *	90.9
a*	0.8
b*	1.5
c*	1.6

**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

RH2FXL.250ML\* Rhodium concentrates plating bath 2 g/250 ml extra white color - 250 ml

## RELATED PRODUCTS - MAINTAINING

RH5RXL.100ML*	Rhodium XL replenisher 5 g/100ml - 100 ml
RH2RXL-C.100ML*	Correction replenisher for rhodium XL 2 g/100ml - 100 ml
BRIGHTXL.1L	Brightener additive for XL type rhodium - 1 L

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

**USER GUIDE****READY TO USE SOLUTION PREPARATION**

RH2FXL is a rhodium electrolytic make-up at a concentration of 2 g/250 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 RH2FXL 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 (generation of mists diffused by gaseous hydrogen development also can be irritant if inhaled or with allergenic effects .

**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.

**SUPPLEMENTARY INFORMATION**

Higher current density and voltage is advantageous in order to achieve the best brightness and luminosity in short plating time. For excellent results with a very short plating time, we recommend the following operating data:

- VOLTAGE: 4V;
- TEMPERATURE: 60°C;
- PLATING TIME: 15 – 20 seconds.

**TO INCREASE THICKNESS**

An initial rhodium concentration of 2.5 g/l at least is recommended to get thickness higher than 0.4 microns.

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### FOR ROTOBARREL APPLICATION

Recommended standard values are the following: apply a voltage within the range of 6 -9 V in order to get a current density of 1 A/dm<sup>2</sup> and at the temperature of 40°C. Deposition speed is approximately 0.03 µm/min but remember: this value is given as guide since the deposition speed strongly depends on the type and rotation of the barrel as well as shape and number of parts in the barrel.

### ITEMS AND PLATING SOLUTION MOVEMENT

Being Rh bath a strong acidic solution, hydrogen bubbles will adhere to the items and must be removed by agitating the solution, by moving the rack or by tapping or knocking on the rack. Otherwise darker stains on the parts may occur.

In any case bath agitation by air is not suitable.

The movement of the rack can be provided by a cathodic bar movement system at a speed of 5-10 cm/s.

### PLATING SOLUTION MAINTENANCE

Small-sized of Rh bath (until 5 liters) can be used until the rhodium solution is completely exhausted without adding any rhodium concentrate replenisher solution.

For larger volumes use RH5RXL replenisher solution to restore the optimal rhodium concentration.

For perfect electrolyte performance it is advisable to maintain the rhodium concentration at values not lower than 80% of the initial concentration: i.e., with a plating rhodium solution as RH2XL working at 2 g/l, additions should be done after a consumption of not more than 0.4 g/l of Rh.

Keep always in mind that at optimum conditions a bath working at 2 g/l deposits about 8-10 mg of Rh per ampere minute.

Given the cost of rhodium and to have a precise evaluation of the metal consumption it is always advisable to run periodic analytical checks of both Rh and free sulphuric acid content.

ALWAYS USE RH5RXL REPLENISHER SOLUTION TO RESTORE THE RHODIUM CONTENT.

### ABOUT CONTAMINANTS

If the plating solution will result contaminated by organic pollutants it is advisable to run an active carbon treatment by adding 2 g/l of carbon into the plating solution to be purified. Then stir for 2 hours at a working temperature and filter it off. The important organic components withdrawn from the rhodium electrolyte after an active carbon treatment or after several drag-out steps can be easily restored by addition of RH2RXL-C replenisher correction. Regarding the quantities of RH2RXL-C to be added into RH2XL plating solution, add 3 ml/l each step. After any addition check the brightness of the deposition and if it is not yet satisfactory add further 3 ml/l but, in any case, do not do more than 4 subsequent additions. If, after 4 additions (12 ml/l totally), brightness level is not finally the desired level, you will need to stop immediately any other addition of this replenisher and change completely the RH2XL solution.

WE STRONGLY RECOMMEND THE USAGE OF RH2RXL-C WHEN THE LEVEL OF FOAM ON THE PLATING SOLUTION IS VERY LOW WITH RESPECT TO THE INITIAL CONDITION ONLY. ON THE CONTRARY USE THE MAIN BRIGHTENER SOLUTION BRIGHTXL IN ORDER TO NOT SATURATE TOO MUCH THE BATH WITH ORGANIC ADDITIVES.

In fact, in case it will be necessary to restore just the brightness compounds they can be easily restored by addition of BRIGHTXL replenisher by adding 2 ml/l at a time and with not more than 4 subsequent additions.

BRIGHTXL has also to be added in the rhodium plating solution in these two cases only:

- after filtration through active carbon
- after our Technical Service suggestion.

For a longer life of the rhodium plating solution avoid any possible metallic contaminant particularly: Silver (Ag), Copper (Cu) and Zinc (Zn).

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### PRETREATMENTS

The ready to use solution obtained by RH2FXL can be directly deposited on Gold, Silver, Palladium and palladium alloys. For all the other metals (i.e. Copper and its alloys) it is necessary to make an intermediate deposit (strike) of precious metal especially to prevent any contamination for the plating solution from other metallic species like i.e. copper and zinc. All base metals that can suffer passivation over time must be reactivated before the application of the ready to use solution obtained by RH2FXL.

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 alkalinedegreasing 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 Rh plating solution for the plating treatment.

### POST TREATMENTS

The electrolyte should be removed from the surface as quick as possible. Wash off the bath 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 both its preparation and any subsequent replenishing operations, use demineralized water with a conductivity of less than 3  $\mu\text{S}/\text{cm}$  (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 < 1 and no control is required for rhodium plating solution.

Vice versa is recommended to check periodically the free acid content in ml or g per liter of ready -to-use Rh plating solution by knowing that its value tends to increase with the usage of the plating solution and time (by replenishment).

### ABOUT SOLUTION DENSITY

Density raises with the use of the bath (by replenishment).

### ABOUT THE APPLIED VOLTAGE

Stay inside the range reported on the Operating Condition Table if possible.

If the surface of the items and thus the required current can not be calculated, work with a bath voltage applied which is just sufficient for the minimal evolution of hydrogen gaseous bubbles.

### DEPOSITION SPEED

The deposition speed is, as reference-guideline- of around 0,025 microns/minute while working at 35°C at 1 A/dm<sup>2</sup>.

### ABOUT THE CURRENT DENSITY

The plating of a flash deposit at increased current density is advantageous in some cases when you want to increase the throwing power or when you want to plate on silver or copper alloys in general, also especially onto hollow parts. At this purpose a flash plating at a current 3-4 times higher than normal operating current density is applied for approximately 1 minute (avoidance of passive layers, faster covering also in undercuts and recessions. The evolving hydrogen must be allowed to escape without hindrance).

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### **SAFETY INFORMATION**

AVOID ANY DRAG IN OF CYANIDES IN RHODIUM PLATING SOLUTION TO AVOID THE DEVELOPMENT OF HIGHLY TOXIC FUMES! 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.