

riag Ag 811

Bright silver plating electrolyte

riag Ag 811 is an alkaline-cyanide process involving silver and antimony. It is suitable for either barrel or rack operation and is aimed at all applications that do not involve electrical H.F. conductivity.

Make up

	Range	Optimum
Silver cyanide (AgCN)	30 – 45 g/L	37 g/L
Potassium cyanide (KCN)	120 – 130 g/L	125 g/L
Potassium carbonate (K ₂ CO ₃)	10 – 20 g/L	15 g/L
riag Ag 811 Make up	8 – 12 mL/L	10 mL/L
riag Ag 811 Tenside	2 – 3 mL/L	2.5 mL/L

Make up

Dissolve whilst stirring thoroughly the Potassium cyanide, Silver cyanide and Potassium carbonate in cold, deionised water. After filtration add **riag Ag 811 Make up** and **riag Ag 811 Tenside**.

Deposit

Composition:	99.2 – 99.6 % Ag
Deposit density:	10.4 g/ cm ³ , (1.0 mg/cm ² = 1 micron)
Hardness (stable):	120 – 160 HV 0.1 dependent on brightener level
Conductivity:	0.1 megaohm/cm
Internal stress:	approx. 2.1 kg/mm ² tensile
Wear resistance:	Excellent
Solderability:	Excellent

The deposits produced are very bright and ductile. They depend, to some extent, on the condition of the substrate and the condition of the brightener. They have a positive levelling action.

Tolerances

	Range	Optimum
Silver	25 – 36 g/L	30 g/L
Potassium cyanide (KCN)	110 – 130 g/L	120 g/L
Potassium carbonate (K ₂ CO ₃)	10 – 150* g/L	15 g/L

* depending on the applied current density, the value can/has to be lower/higher.

Pre-silver plating

Copper or copper alloy and nickel must be pre-silver plated in a pre-silver plating electrolyte prior to bright silver plating, to ensure the adhesion of the bright silver deposit.

Lead, tin, zinc, iron or steel objects must be brass- or copper plated prior to pre-silver plating.

Operating Conditions

Temperature:	Range: 15 – 25 °C Optimum: 20 °C
Current density:	0.5 – 2.0 A/dm ²
Voltage:	The required rectifier voltage depends on various determinants, e.g. current density, concentration, temperature, type of electrode and electrode interval. Average value: 2 – 4 V.
Anode/Cathode ratio	2 : 1
Anode material	pure silver anodes (999.7 fine- milled)
Rectifier:	Rectifiers have to be adjusted until residual ripple is less than 5 % within the total current density range.
Article movement:	3 – 6 m/min
Filtration:	Continuous filtration of the electrolyte by means of a filter system with PP filters cartridges (filter unit 5 µm has proved to be a trouble-free operation in practice and should be installed in any way). Do not use Kieselguhr!
Deposition rate:	Approx. 0.64 µm/min at 1 A/dm ² (80 mg/A min) Efficiency about 100 %

Equipment

We recommend using tanks of polypropylene or glass fibre-reinforced plastic material with PVC-lining. The electrolyte is heated by porcelain heating elements with temperature control device. An ampere minute meter is recommended to stipulate the regeneration intervals of the electrolyte.

Consumption values

The consumption values of the additives can deviate according to the article- or plants specifications. The consumption values for 1'000 Ah are according to our experience:

riag Ag 811 Replenisher	0.40 L
riag Ag 811 Tenside	0.12 L

Attention

Addition of other chemicals which are not indicated in our Technical Data Sheet may cause disturbance of the operation and may have a negative influence on the electrolyte and the quality of the deposits.

Waste water treatment / Environmental protection

The electrolyte contains cyanide and heavy metal. They are extremely dangerous for the environment. The waste water needs to be prepared according legal regulations before getting in the canalisation.

A static rinse after silver plating coupled with ion exchanger for recycling of the silver is recommended.

Liability

This instruction manual was compiled with reference to the state of the art and all current standards, and is based on the long-term knowledge and experience of riag. However, riag cannot monitor compliance with this instruction manual and the methods described herein at the customer/end-user's premises. Work carried out with riag products must be adapted accordingly to meet local conditions. In particular, riag cannot accept liability for damage, loss or cost incurred due to a failure to adhere to this instruction manual, improper application of the methods, unauthorised technical modifications, insufficient maintenance or the absence of maintenance in respect of the requisite technical hardware or equipment, or in the event of use by unqualified personnel. riag is not liable for damage or loss caused by riag or its employees except where intention or gross negligence can be proved. riag furthermore reserves the right to make changes in relation to products, methods and the instruction manual without prior notice.

Our goods and services are subject to the General Terms and Conditions for Delivery of the Association of Surface Technology Suppliers (VLO), which can be viewed at www.riag.ch (link "terms and conditions", document "General Terms and Conditions for Delivery", version 3/2018), which we gladly send you on request.

This transaction is governed by material Swiss law (Law of Obligations), excluding private international law (conflict of laws) and intergovernmental treaties, specifically the CISG.

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Error index – cause and remedy

Error	Cause	Remedy
Rough and porous deposits	Electrolyte contaminated with dirt, dust or suspended particles (poor anode bags)	Filtration (change filter cartridge) Control anode bags
Burned deposits	Carbonate content too high. Too low metal content Too low temperature Replenishment too low Too low agitation	Dilute electrolyte Increase metal concentration Increase temperature Add 5 – 10 mL/L riag Ag 811 Replenisher Increase agitation
Pitting	Content of riag Ag 811 Tenside too low Organic impurity	Add 1 – 3 mL/L riag Ag 811 Tenside Purify by carbon filtration and add 2.5 mL/L riag Ag 811 Tenside
Deposit dullness all over	Too high temperature Replenishment too low	Lower temperature Add 5 – 10 mL/L riag Ag 811 Replenisher
Deposit dullness in low current density areas	Too high temperature Replenishment too high Free KCN too low Current density too low Content of Silver Star Additive too low	Reduce temperature Reduce Replenishment Increase KCN Increase current density Add 5 mL/L riag Ag 811 Make up
Turbidity, resp. white precipitation in electrolyte	Precipitation of riag Ag 811 Make up if pH of electrolyte is too low Drag-in of contamination	Increase pH (to approx. 13) with KOH Filtration of electrolyte