ROHM AND HAAS ELECTRONIC MATERIALS

AUROVEL™ UP 24

24-KARAT ELECTROLYTIC GOLD

For Electronic Finishing Applications

Regional Product Availability			
N. America	Japan/Korea	Asia	Europe
✔		✔	

DESCRIPTION

Aurovel UP 24 electrolytic gold is a multipurpose 24-karat gold electroplating product that can be adapted for use in rack, barrel and strip line operations. Deposits are semi-bright to bright, ultrapure, ductile and meet the requirements of Mil Spec G45204C, Type III, Grade A and ASTM B 488, Type III, Code A.

ADVANTAGES

- Wide operating current density range
- Stable deposit color over a wide range of operating conditions
- Low gold concentration
- Ease of operation and control

DEPOSIT PROPERTIES

Purity: 99.9+%

Density: 19.0–19.3 g/cc

Hardness: 70–90 Knoop

Bath Make-up		
Chemicals Required	**Barrel**	**Rack**
Aurovel UP 24 Make-up Solution	750 ml/l (75% v/v)	750 ml/l (75% v/v)
Potassium Gold Cyanide	As required (see Operating Conditions)	

CAUTION! Hazardous cyanide-containing chemical.

MAKE-UP PROCEDURE

CAUTION! Hazardous cyanide-containing chemical.

1. Add Aurovel UP 24 Make-up Solution to a clean tank.
2. Dissolve Potassium Gold Cyanide separately in warm distilled or deionized water and add to the above.
3. Adjust to final volume with distilled or deionized water.
4. Mix thoroughly.
5. Check pH and specific gravity and adjust if necessary.

BATH OPERATION–Barrel—Metric		
Component	**Range**	**Recommended**
Gold Concentration	6.0–8.0 g/l	8.0 g/l
pH	5.5–6.5	6.0
Specific Gravity	1.12–1.16	1.14
*Temperature	32–60°C	52°C
Agitation	Solution and mechanical	
Current Density	0.05–0.3 ASD	
Cathode Efficiency	110–122 mg/amp min. 90–100%	
Deposition Rate	1 micron in 15 minutes at 0.1 ASD	

BATH OPERATION–Barrel—U.S.		
Component	**Range**	**Recommended**
Gold Concentration	0.75–1.0 toz./gal.	1.0 toz./gal.
pH	5.5–6.5	6.0
Specific Gravity	16–20° Baumé	18° Baumé
*Temperature	90–140°F	125°F
Agitation	Solution and mechanical	
Current Density	0.5–3 ASF	
Cathode Efficiency	110–122 mg/amp min. 90–100%	
Deposition Rate	2.7 microinches/minutes at 1 ASF	

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BATH OPERATION–Rack—Metric

Component	Range	Recommended
Gold Concentration	8.0–16.0 g/l	Dependent upon application
pH	5.5–6.5	6.5
Specific Gravity	1.12–1.16	1.14
*Temperature	32–60°C	52°C
Current Density	0.1–1 ASD	
Agitation	Solution and/or mechanical	
Cathode Efficiency	110–122 mg/amp min. 90–100%	
Deposition Rate	1 micron in 7.5 minutes at 0.2 ASD	

***Note:** Lower temperatures will generally produce brighter deposits as well as reduce the amount of gold immersion on hybrid packages.

BATH OPERATION–Rack—U.S.

Component	Range	Recommended
Gold Concentration	1.0–2.0 toz./gal.	Dependent upon application
pH	5.5–6.5	6.5
Specific Gravity	16–20° Baumé	18° Baumé
*Temperature	90–140°F	125°F
Current Density	0–10 ASF	
Agitation	Solution and/or mechanical	
Cathode Efficiency	110–122 mg/amp min. 90–100%	
Deposition Rate	5.4 microinches/minutes at 2.0 ASF	

BATH OPERATION–High-speed Selective—Metric

Component	Range	Recommended
Gold Concentration	8.0–20.0 g/l	Dependent upon application
pH	5.5–6.5	6.5
Specific Gravity	1.12–1.16	1.14
Temperature	52–71°C	60°C
Current Density	0.1–15.0 ASD	Dependent upon gold content and agitation
Agitation	Vigorous solution combined with cathode movement	
Cathode Efficiency	110–122 mg/amp min. 90–100%	
Deposition Rate	1 micron in 20 seconds at 5.0 ASD	

BATH OPERATION–High-speed Selective—U.S.

Component	Range	Recommended
Gold Concentration	1.0–2.5 toz./gal.	Dependent upon application
pH	5.5–6.5	6.5
Specific Gravity	16–20° Baumé	18° Baumé
Temperature	125–160°F	140°F
Current Density	10–150 ASF	Dependent upon gold content and agitation
Agitation	Vigorous solution combined with cathode movement	
Cathode Efficiency	110–122 mg/amp min. 90–100%	
Deposition Rate	2.0 microinches/second at 50 ASD	

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BATH MAINTENANCE

CAUTION! Hazardous cyanide-containing chemical.

Aurovel UP 24 Gold Metal

Gold metal is replenished by additions of Potassium Gold Cyanide. Replenishment is carried out on the basis of analysis or on an amp minute schedule confirmed by analysis.

Add 1 troy ounce of gold metal every 250–280 amp minutes dependent upon cathode efficiency.

Pure Gold Brightener

It may be necessary to replenish the brightener separately in addition to that which is contained in the Potassium Gold Cyanide, particularly after idle periods. If deposits have become red or brown in appearance, up to 2.5 ml/gallon of Aurovel UP 24 Brightener w/ Pure Gold Brightener may be added.

Aurovel UP 24 Acid Salt

pH should be measured daily and maintained in the recommended range. Additions of 1.9 g/l Aurovel UP 24 Acid Salt will lower pH by 0.1 units. Additions of 2.0 g/l Potassium Hydroxide will raise pH by 0.1 units.

Aurovel UP 24 Conductivity Salts

Specific Gravity should be measured daily and maintained in the recommended range by additions of Aurovel UP 24 Conductivity Salts. 23.0 g/l Aurovel UP 24 Conductivity Salts will raise the specific gravity by 0.01 (1.0° Baume).

Acid Gold Strike

When plating nickel or nickel alloys, such as Kovar for high reliability, an acid gold strike is recommended. Consult operational data on Auro-Strike GP electrolytic gold.

Aurovel UP 24 Unit Replenisher

Add 38 ml of Aurovel UP 24 Unit Replenisher per one troy ounce of gold metal.

EQUIPMENT

Tanks:	Temperature-stabilized unpigmented polypropylene
Anodes:	Platinized (titanium, tantalum or columbium)
Heaters:	PVDF-clad immersion heater fitted with thermostatic control
Filtration:	Continuous using 0.5–5.0 micron filters with pump capacity for 4 turnovers per hour
Electrical Supply:	Stabilized 20 volt D.C. with ampere-minute meter

EQUIPMENT PREPARATION

Prior to make-up, the process tank and ancillary equipment should be thoroughly cleaned and then leached as outlined below.

This procedure is particularly important for new equipment or equipment previously used for other processes.

I Cleaning Solution

a) Trisodium Phosphate: 15 g/l (2 oz./gal.)

b) Sodium Hydroxide: 15 g/l (2 oz./gal.)

II. Leaching Solution

Sulfuric Acid: 50 ml/l (5% v/v)

III. Procedure

a) Thoroughly wash down tank and ancillary equipment with clean water.

b) Recirculate water through the complete system to remove water soluble materials.

c) Discard rinse water.

d) Add cleaning solution to the tank, heat to 55–60°C (130–140°F) and recirculate through the complete system.

e) Discard cleaning solution.

f) Recirculate water through the complete system.

g) Discard rinse water.

h) Add leaching solution and recirculate through the complete system.

i) Leave leaching solution in tank for a minimum of 8 hours.

j) Recirculate leaching solution through the complete system.

k) Discard leaching solution.

l) Recirculate water through the complete system.

m) Discard rinse water.

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PRODUCT DATA

For the specific Product Data values, please refer to the Certificate of Analysis provided with the shipment of the product(s).

ASSOCIATED PRODUCTS

Aurovel UP 24 Make-up
Pure Gold Brightener
Aurovel UP 24 Acid Salt
Aurovel UP 24 Conductivity Salts

HANDLING PRECAUTIONS

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

WARNING! DO NOT ACIDIFY this product or working bath containing this product below specified operating pH range, or below pH 7 if no range is specified. Acidification may release highly toxic cyanide gas, which can be fatal if swallowed, inhaled or absorbed through the skin.

CAUTION! Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

CAUTION! Failure to maintain proper volume level when using immersion heaters can expose tank and solution to excessive heat resulting in a possible combustion hazard, particularly when plastic tanks are used.

STORAGE

Store products in tightly closed original containers at temperatures recommended on the product label.

DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Rohm and Haas Electronic Materials Technical Representative for more information.

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