

# AURUNA-COLOR®

## 100 - 160 and 3062

### Operating Instructions

Edition: 2 May 2005

- Colour gold plating up to 0.2 µm thickness
- Wide range of colours including standard colours
- Colour-constant deposition
- Coatings colour-constant and tarnish-resistant
- Easy bath control

### Characteristics

AURUNA-COLOR® hard gold electrolytes are colour gold electrolytes with addition of hardeners. The hardener renders those colour gold coatings harder and more wear-resistant without affecting the colour which due to their composition are relatively soft.

AURUNA-COLOR® 3062 and the coatings deposited from it do not contain nickel!

AURUNA-COLOR® hard gold electrolytes serve for the deposition of thin (approx. 0.1 - 0.2 µm), decorative gold coatings, which are as bright as the substrate metal. More than 50 different, exactly reproducible colour shades can be supplied, including baths for the deposition of coatings in the standard colours according to ISO 8654. Each AURUNA-COLOR® electrolyte, i.e. each colour, is distinguished by a number. For selection, please send a colour sample and submit some unplated components ready for sample gold plating. Particularly note that an exact colour comparison is only possible between parts which are exactly equal in shape and structure of the surface.

Bath type:	Cyanide
Gold content:	1 g/l
KCN content:	2 g/l
pH-value:	Alkaline
Temperature:	65 °C
Bath voltage:	> 7 volts
Deposition speed:	Approx. 0.2 µm/min
Maximum coating thickness:	0.2 µm
Not suitable for barrel plating.	

### Form of Supply

Bath makeup: a<sub>1</sub>) AURUNA-COLOR® No. Makeup Salt (**with Au**)  
contains cyanide  
pure gold content 1 g per litre of bath  
Storage stability: min. 2 years

**or alternatively:**

a<sub>2</sub>) AURUNA-COLOR® No. Makeup Salt (**without Au**)  
contains cyanide  
Storage stability: min. 2 years  
**and**  
AURUNA® Potassium Gold Cyanide 68.2 %  
1.47 g for 1 g of gold per litre of bath  
Storage stability: unlimited

Bath replenishment: b<sub>1</sub>) AURUNA-COLOR® No. Replenisher Salt (**with Au**)  
contains cyanide  
packages with a gold content of 10, 50, or 100 g  
Storage stability: min. 2 years

**or alternatively:**

b<sub>2</sub>) AURUNA-COLOR® No. Replenisher Salt (**without Au**)  
contains cyanide  
Storage stability: min. 2 years  
**and**  
AURUNA® Potassium Gold Cyanide 68.2 %  
1.47 g per 1 g of gold deposited  
Storage stability: unlimited

# AURUNA-COLOR®

## 100 - 160 and 3062

### Bath Makeup

AURUNA-COLOR® Makeup Salt is supplied for a specific bath volume which is noted on the package. In any case, the whole quantity of salt must be dissolved; subdivision of the Makeup Salt into smaller portions is not permitted!

If smaller baths than intended are to be made up, the whole salt has to be dissolved and this solution has to be subdivided.

Makeup sequence: For AURUNA-COLOR® Makeup Salt **with Au:**

Dissolve the AURUNA-COLOR® Makeup Salt (**with** Au) in warm deionized water - to approx. 80 % of the intended bath volume. Filter and fill up to the desired final volume with deionized water.

For AURUNA-COLOR® Makeup Salt **without Au:**

Dissolve the AURUNA-COLOR® Makeup Salt (**without** Au) in warm deionized water - to approx. 80 % of the intended bath volume. Then add per litre of bath volume 1.47 g of AURUNA® Potassium Gold Cyanide 68.2 % for a gold content of 1 g per litre, previously dissolved in warm, deionized water. Filter and fill up to the desired final volume with deionized water.

### Operating Conditions

Gold content:	0.9 - 1.1 g/l
KCN content:	2 g/l (1 - 2.5 g/l)
Operating temperature:	65 ± 3 °C
pH-value:	Approx. 11 control not required
Bath density:	Rising with use control not required

**Important:**  
**Product agitation:**

**Not permitted!**  
(see "Special Process Hints")

**Bath agitation: Not permitted!**  
(see "Special Process Hints")

Current density: The baths are operated according to voltage. An exact adjustment of the current density is not required. The current density should be **at least** 5 A/dm<sup>2</sup>, however.

Voltage: At least 7 volts.  
Up to more than 10 volts in the case of a large bath volume, parts with large surfaces or with many links like chains.  
On principle adjust the bath voltage high enough that a further increase will not result in a change in colour.

Deposition rate: Approx. 4 mg/Amin  
(depending on voltage, loading per litre, distance anode/cathode)

Deposition speed: Approx. 0.2 µm/min

Duration of gold plating: 30 - 60 sec. (0.1 - 0.2 µm)

Loading per litre: 10 - 20 cm<sup>2</sup>/l

Lifetime: With careful treatment and replenishment maximally 10 turnovers, i.e. deposition of 10 g of alloy from 1 l of bath

### Bath Replenishment

In order to replenish the components withdrawn from the solution, AURUNA-COLOR® Replenisher Salt is supplied in given package sizes for 10, 50, or 100 g of gold deposition.

Replenishment is profitable for solutions of at least 10 l bath volume. Dissolve the Replenisher Salt in deionized water in such a manner that 1 l of replenishing solution contains exactly 10 g of gold. 100 ml of this solution will then contain 1 g of gold. 1 g of Au with a coating thickness of 0.1 µm is deposited on approx. 50 dm<sup>2</sup> of product surface. Add the replenishment at the latest after one tenth of its gold content has been taken out of the bath; add 100 ml of replenisher solution to a 10-litre bath at the latest after approx. 50 dm<sup>2</sup> of product surface have been gold plated with 0.1 µm in 30 sec.

**Alternatively,** AURUNA-COLOR® Replenisher Salt **without Au** may be used. AURUNA® Potassium Gold Cyanide 68.2 % then is added separately.

The gold content of an AURUNA-COLOR® bath must be kept between 0.9 - 1.1 g/l. The concentration of free potassium cyanide should be 2 g/l (1 - 2.5 g/l).

# AURUNA-COLOR®

## 100 - 160 and 3062

It is possible to add max. 10 times the gold content of an AURUNA-COLOR® bath in the form of replenishment. As soon as changes in colour of the deposit occur, a new solution must be prepared. In the case of AURUNA-COLOR® 109 (pure gold colour), a higher throughput is possible.

If the bath is operated without replenishment, a new bath must be made up as soon as the colour of the coatings changes. In order to establish colour changes in time, a colour sample of the first batch of the new solution is retained. Careful comparison with this colour sample is particularly important, because in case of an extended use of an AURUNA-COLOR® bath without replenishment the pure gold content and the tarnish resistance of the coating may rapidly decrease.

### Bath Monitoring and Correction

The solution must be kept clean. Cover when not in use. When a precipitate is formed, filtration is required. When not in use for a longer time, store the solution in closed containers. Do not heat unnecessarily.

Evaporation losses should be replenished, using recovery rinse water.

Regular analysis of the gold concentration:  
Correction with prepared replenisher solution.

**Frequent analysis of the KCN concentration:**  
Correct the lacking amount (specified content 2 g/l) with KCN, if the gold content is correct.

### Special Process Hints

#### Important:

Bath voltage at least 7 volts and on principle high enough that a further increase will no longer result in colour changes.

Agitation of the products and the electrolyte **is not permitted!**

The parts must have perfect contact. Parts consisting of several components (e.g. chains), should be stretched when mounted on the rack.

If chains are gold plated and product agitation is unavoidable, it must be carried out very slowly (1 - 2 cm/sec), strictly observing the above instructions about the minimum bath voltage. Minimal colour deviations have to be expected.

**Pretreatment:** If a bright gold coating is desired, polish the parts correspondingly, then pre-clean them.

Degrease electrolytically, rinse thoroughly in running water, finally in deionized water.

**Posttreatment:** Rinse in deionized recovery rinse water, then in running water and again in deionized water to ensure spotless drying. Possibly rinse in denatured alcohol and dry.

### Equipment

**Bath tanks:** Rubber-lined steel tank (alkali-resistant up to 70 °C) or polypropylene tank

**Heating:** Adjustable immersion heaters suitable for the bath volume coated with porcelain, quartz, or Teflon

**Filtration and bath agitation:** Permitted only outside the operating phase

**Anodes:** Stainless steel; anode surface at least equivalent to surface of the parts

**Racks:** With alkali-resistant insulation

**Barrels:** Baths not suitable for barrel plating (agitation!), because colour differences will occur

**Current source:** Rectifier, current infinitely variable, voltmeter

### Note

Our information relating to the storage stability refers to storage in closed original storage containers under the conditions stated on the label.

### Precautionary Measures/Safety Hints

For information on safety, please see the corresponding Material Safety Data Sheets!  
The valid accident prevention regulations and safety information must be observed.

---

# AURUNA-COLOR®

## 100 - 160 and 3062

---

The information and statements contained herein are provided free of charge. They are believed to be accurate at the time of publication, but we make no warranty with respect thereto, including but not limited to any results to be obtained or the infringement of any proprietary rights.

Use or application of such information or statements is at the user's sole discretion, without any liability on our part. Nothing herein shall be construed as a license of or recommendation for use which infringes upon any proprietary rights. All sales are subject to our General Conditions of Sale and Delivery.

### **Umicore Galvanotechnik GmbH**

P.O. Box 12 40 • D-73502 Schwaebisch Gmuend

Delivery address:

Klarenbergstraße 53-79 • D-73525 Schwaebisch Gmuend  
GERMANY

Telephone +49 (0) 71 71 / 6 07 - 01

Fax +49 (0) 71 71 / 6 07 - 2 88

e-mail: [galvano@eu.umicore.com](mailto:galvano@eu.umicore.com)

[www.umicore-galvano.com](http://www.umicore-galvano.com)