

SurTec® 810

Cyanide Brass Process

Properties

- for bright brass deposits
- good metal distribution

Application

The process SurTec 810 includes the following products:

- SurTec 810 Make-up Salt is responsible for the good metal distribution
- SurTec 810 I Brightener effects the desired brightness together with SurTec 810 II
- SurTec 810 II Brightener works together with SurTec 810 I for the desired brightness of the layer; a lack of brighteners can be seen at mate deposits over the whole current density

make-up values:	<i>rack application</i>	<i>barrel application</i>
SurTec 810 Make-up Salt	70 g/l	70 g/l
copper cyanide (CuCN)	25 g/l	35 g/l
zinc cyanide (Zn(CN) ₂)	35 g/l	25 g/l
sodium cyanide (NaCN)	67 g/l	78 g/l
SurTec 810 I Brightener	20 ml/l	20 ml/l
SurTec 810 II Brightener	15 ml/l	15 ml/l
analytical values:		
copper	18 g/l	25 g/l
zinc	20 g/l	18 g/l
free NaCN	63 g/l	63 g/l
ratio NaCN : Zn	3-3.5 : 1	3-3.5 : 1

make-up:	Steps for make-up:
	1. Dissolve sodium cyanide in deionised water.
	2. Add SurTec 810 Make-up Salt, copper cyanide and zinc cyanide in that order.
	3. Fill up with deionised water to completion.
	4. Heat up to working temperature.
	5. Add SurTec 810 I Brightener and SurTec 810 II Brightener.

temperature:	45°C	(30-50°C)
pH-value:	9.5	(9-10)
	adjust with NaOH or tartaric acid	
cathodic current density:	1 A/dm ²	(0.1-1.5 A/dm ²)
current efficiency:	40-50 %	
anodes:	30 : 70 to 40 : 60 % Zn : % Cu	
tank:	plastic tanks or coated steel tanks	

agitation: barrel or rack movement (3-6 m/min) recommended,
no air agitation

filtration: continuous filtration recommended

exhaust: essential for worker's protection

Technical Specification

(at 20 °C)	Appearance	Density (g/ml)	pH-value (conc.)
SurTec 810	powder, white	0.900 (0.83-0.97) kg/l	10.3 (at 10 g/l)
SurTec 810 I	liquid, yellow	1.045 (1.03-1.06)	1.6
SurTec 810 II	liquid, light brown	1.024 (1.01-1.04)	7.6

Maintenance and Analysis

It is important to keep the electrolyte composition within the given limits. Once adjusted values for Zn, Cu and NaCN which are best for the given plant, have to be kept with only small variations. Adjust the concentration of SurTec 810 Make-up Salt, SurTec 810 I Brightener and SurTec 810 II Brightener according to test platings in a beaker resp. to the appearance of the coated material.

Important: Do all analysis under an exhaust hood (danger of HCN development)!

Sample Preparation

Take a sample at a homogeneously mixed position. If necessary, let it cool down to room temperature. If the sample is turbid, let the turbidity settle down and decant or filter the solution.

Copper (Cu) – Analysis by Titration

reagents: sulfuric acid (50 %)
potassium iodide solution (10 %)
ammonium persulfate
starch solution (1 %)
0.1 N sodium thiosulfate solution

procedure:

1. Pipette 10 ml bath sample into a 250 ml Erlenmeyer flask.
2. Add 5 g ammonium persulfate
3. Acidify with 15 ml sulfuric acid.
4. Heat up and keep boiling until sulfuric acid fume appears.
5. Let it cool down and dilute to 100 ml with deionised water.
6. Add 10 ml potassium iodide solution.
7. After 5 min add 2 ml starch solution.
8. Titrate with sodium thiosulfate solution until the blue colour disappears.

calculation: consumption in ml · 0.635 = g/l copper

correction: rise by 1 g/l = addition of 1.41 g/l CuCN

Zinc (Zn) – Analysis by Titration

reagents:	0.02 mol/l EDTA solution (Titrplex III) buffer solution (54 g/l NH ₄ Cl + 350 ml/l 25 % NH ₃ solution) Erio T-indicator 1:400 formaldehyde solution (30 %)
procedure:	1. Pipette 2 ml bath sample into a 250 ml Erlenmeyer flask. 2. Dilute to approx. 100 ml with deionised water. 3. Add 20 ml buffer solution. 4. Add a tip of spatula Erio T-Indicator. 5. Titrate with 0.2 M EDTA solution until colour changes to blue. 6. Add 2 drops formaldehyde solution. If the colour changes back to purple continue the titration with EDTA until colour changes to blue once more.
calculation:	consumption in ml · 0.654 = g/l zinc
correction:	rise by 1 g/l = addition of 1.80 g/l Zn(CN) ₂

Free Sodium Cyanide (NaCN) – Analysis by Titration

reagents:	sodium hydroxide solution (20 %) potassium iodide solution (10 %) 0.1 N silver nitrate solution
procedure:	1. Pipette 10 ml bath sample into a 250 ml Erlenmeyer flask. 2. Dilute to approx. 100 ml with deionised water. 3. Add 25 ml sodium hydroxide solution. 4. Add 2 ml potassium iodide solution. 5. Titrate with silver nitrate solution until precipitation of AgCN is clearly visible.
calculation:	consumption in ml · 0.980 - 0.289 · g/l Zn = g/l free NaCN

Test Plating in a Beaker

Fill 800 ml bath solution into a 1000 ml beaker and warm up to the plating temperature. Plate a good pretreated V-shaped iron panel for 10 min at 1 A/dm² under low stirring.

The panel should be regular yellow to golden. Brass has no levelling properties, so the roughness of the panel can be seen.

Consumption and Stock Keeping

The consumption depends heavily on the drag-out. To determine the exact amounts of drag-out, see [SurTec Technical Letter 11](#).

In order to prevent delays in the production process, per 1,000 l bath the following amounts should be kept in stock:

SurTec 810 Make-Up Salt	75 kg
SurTec 810 I Brightener	25 kg
SurTec 810 II Brightener	25 kg

Product Safety and Ecology

The safety instructions and the instructions for environmental protection have to be followed in order to avoid hazards for people and environment. The Material Safety Data Sheets (according to European legislation) contain explicit details for this.

The following hazard designations and classifications into water hazard classes (WHC) have to be taken into account:

<u>product</u>	<u>hazard designation</u>	<u>water hazard class</u>
SurTec 810	Xi - Irritant	WHC 1
SurTec 810 I	-	WHC 1
SurTec 810 II	-	WHC 1

Warranty

We are responsible for our products in the context of the valid legal regulations. The warranty exclusively accesses for the delivered state of a product. Warranties and claims for damages after the subsequent treatment of our products do not exist. For details please consider our [general terms and conditions](#).

Further Information and Contact

In our forum, you can discuss topics of the surface technology:

<http://forum.SurTec.com/>

If you have any questions concerning the process, please contact your local technical department: <http://SurTec.com/International.html>

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