

SurTec® 760 K

Grain Refiner for Continuous Zinc Plating on Tubes

Properties

- produces ductile zinc layers with good adhesion and corrosion resistance on top of tubes, wires or stripes out of iron or copper
- liquid, easy to dose
- homogeneous deposition
- depolarisation effect at anode and cathode, that means fast deposition and uniform anode corrosion
- zinc depositions are easy to passivate

Application

make-up values:	zinc sulfate · 7 H ₂ O	790	g/l	
	boric acid	6	g/l	
	zinc chloride	3.5	g/l	
	SurTec 760 K	6	ml/l	(4-8 ml/l)

analytical values: zinc: 180 g/l

make-up: Steps for make-up:

1. Fill 75 % of deionised water into the tank.
2. Dissolve zinc sulfate, zinc chloride and boric acid at 80-95 °C portion by portion, stirring vigorously.
3. When the salts are completely dissolved, the bath has to be filtered for several hours (at desired bath temperature).
4. Fill up to the final volume with deionised water.
5. Add SurTec 760 K Grain Refiner.
6. Adjust the pH-value with sulfuric acid to pH 2.5-2.9.

temperature: 60 °C (50-75 °C)

pH-value: 2.7 (2.5-2.9)
adjust with sulfuric acid

current density: 25-100 A/dm²

agitation: line speed with min. 5 m/min and
continuously circulation of the electrolyte

anodes: pure zinc: 99.99 %

filtration: continuous filtration required

To prevent an increase of decomposition compounds, we suggest making an active carbon filtration in regular intervals.

Maintenance and Analysis

Check the pH-value regularly. Analyse and adjust the concentration of zinc, chloride and boric acid regularly. Dose SurTec 760 K according to plated Ampère-hours. SurTec 760 K can be analysed by HPLC.

Sample Preparation

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

Zinc – Analysis by Titration

reagents:	0.1 mol/l EDTA (Titriplex III, Merck) buffer solution (100 g/l NaOH, 240 g/l acetic acid 100 %) indicator: xylenol orange tetra sodium salt (1 % in KNO ₃)
procedure:	<ol style="list-style-type: none">1. Pipette 0.5 ml bath sample into a 250 ml beaker.2. Dilute to approx. 150 ml with deionised water.3. Add 20 ml buffer solution.4. Add a spatula tip of indicator.5. Titrate with 0.1 mol/l EDTA from red-violet to yellow.
calculation:	consumption in ml · 13.074 = g/l zinc
correction:	rise by 1 g/l zinc = addition of 4.4 g/l ZnSO ₄ · 7 H ₂ O

Chloride – Analysis by Titration

reagents:	0.3 N silver nitrate solution nitric acid (1:1) chloride indicator (5 g K ₂ Cr ₂ O ₇ + 95 g NaHCO ₃) or potassium chromate solution (5 %)
procedure:	<ol style="list-style-type: none">1. Pipette 5 ml bath sample into a 250 ml Erlenmeyer flask.2. Dilute with approx. 100 ml deionised water.3. Acidify slightly with nitric acid.4. Add some indicator.5. Titrate with 0.3 N silver nitrate solution from yellow to brown.
calculation:	consumption in ml · 2.128 = g/l chloride
correction:	rise by 1 g/l chloride = addition of approx. 2.3 g ZnCl ₂

Boric Acid – Analysis by Titration

reagents:	0.1 N sodium hydroxide solution mannitol EDTA sodium salt sodium hydroxide solution (10 %)
procedure:	<ol style="list-style-type: none">1. Pipette 2 ml bath sample into a 250 ml Erlenmeyer flask.2. Dilute with 150 ml deionised water.3. Add 3-4 g EDTA sodium salt.4. Adjust the pH to 7.9: first with 10 % sodium hydroxide solution (some ml) up to pH 7.0, than with 0.1 N sodium hydroxide solution up to pH 7.9.5. Add 2-3 g mannitol to the clear solution.6. Titrate with 0.1 N sodium hydroxide solution to pH 7.9.
calculation:	consumption in ml · 3.09 = boric acid

Technical Specification

(at 20 °C)	Appearance	Density (g/ml)	pH-value (conc.)
SurTec 760 K	liquid, colourless, clear	1.046 (1.03-1.06)	7.5

Ingredients

- thiourea
- organic sulfur compounds

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](#). The following values per 10,000 Ah can be taken as estimated average consumption:

SurTec 760 K 0.3-0.6 l

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

SurTec 760 K 200 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 760 K	Xn - Harmful	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>