

# SurTec® 321

## Complete Copper Colouring

### Properties

- acidic solution
- liquid replenishing concentrate
- for copper colour baths
- advantageous dosing capability
- stabilising compounds are formulated in addition to the metal salt
- colour tones light copper to black are achieved

### Application

*For immersion application:*

make-up values:	90-95 g/l
application time:	0.5-15 min (depending on colour)
temperature:	18-24 °C
tank material:	polypropylene (PP), glass fibre reinforced plastic (GRP) or gummed steel tanks
heating:	necessary
exhaust:	required for worker's protection
filtration:	possible: 10 µm (filtration performance: 0.1 -0.5 times of the bath volume per hour)

### Technical Specification

(at 20 °C)	Appearance	Density (g/ml)	pH-value (conc.)
SurTec 321	liquid, blue, clear	1.100 (1.08-1.12)	4 (3.8-4.2)

### Maintenance and Analysis

Because bath fluid is constantly carried over by the material being coloured and the colouring process uses up the active substances, analyse the concentration of SurTec 321 by titration at regular intervals and replenished with SurTec 321 if necessary.

## 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.

## SurTec 321 – Analysis by Titration

reagents:	0.1 mol/l sodium thiosulfate solution (= 0.1 N Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> -solution) 6 mol/l sulfuric acid (= 12 N) potassium iodide solution (KI-solution (10 %)), freshly prepared indicator: starch solution (0.5 g starch dissolved in 100 ml water and boiled for 15 minutes)
procedure:	<ol style="list-style-type: none"><li>1. Pipette 20 ml bath sample into a 300 ml Erlenmeyer flask.</li><li>2. Acidify with 10 ml sulfuric acid.</li><li>3. Add 10 ml of the freshly prepared KI-solution.</li><li>4. Mix well and let it react for 20 minutes.</li><li>5. Add 2 ml of the indicator solution (solution becomes blue).</li><li>6. Titrate with 0.1 mol/l sodium thiosulfate solution from blue to colourless.</li></ol>
calculation:	consumption in ml · 8.33 = g/l SurTec 321
nominal values:	90-95 g/l SurTec 321 10.8-11.4 ml of 0.1 mol/l sodium thiosulfate solution

## Sulfuric acid – Analysis by Titration

reagents:	0.1 mol/l (0.1 N) caustic soda solution (NaOH solution) indicator: methylorange (0.1g/100 ml 20 % ethanol)
procedure:	<ol style="list-style-type: none"><li>1. Pipette 5 ml bath sample into a 300 ml Erlenmeyer flask.</li><li>2. Dilute to 100 ml with deionised water.</li><li>3. Add some drops of the indicator solution (solutions becomes red).</li><li>4. Titrate with 0.1 mol/l NaOH solution from red to yellow/orange.</li></ol>
calculation:	consumption in ml · 0.98 = g/l sulfuric acid
nominal values:	20-25 g/l sulfuric acid 20.4-25.5 ml of 0.1 mol/l NaOH solution

## Ingredients

- copper salts

## 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 can be taken as estimated average consumption:

SurTec 321                      14-67 g per m<sup>2</sup>                      (light copper to black)

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

SurTec 321                      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 321	N - Dangerous for the environment	WHC 2

## 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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