

SurTec® 696

Black Passivation for Zinc/Nickel

Properties

- chromium(VI)-free black passivation based on chromium(III)
- produces uniform, black surfaces
- for electroplated zinc-nickel layers about 12-15 % nickel
- very high corrosion resistance with respective post-treatment, also after thermal treatment at 120 °C for 24 h
- low working temperature (22-30 °C)
- passivation with little abrasion
- very long service time
- high adhesive and scratching resistance
- IMDS-number: 1223017

Application

SurTec 696 can be used in rack und barrel application.

make-up value: 10 %vol (8-11 %vol)

make-up: Steps for make-up:

1. Fill the desired amount of SurTec 696 into the tank.
2. Fill up to the final volume with deionised water and mix well.
3. Adjust the pH-value.
4. Control the temperature and adjust if necessary.

temperature: 25 °C (22-30 °C)

pH-value: 1.6 (1.5-2.0)
adjust with SurTec 696, caustic soda (30 %)
or with nitric acid (65 %)

application time: 90 s (70-120 s)

agitation: *rack*: electrolyte agitation, e.g. air agitation
barrel: barrel rotation

tank material: PVC, polypropylene (PP) or polyethylene (PE)

heating: required: heating elements out of Teflon, PVDF
or plastic coating, with automatic temperature control

exhaust: required for worker's protection

recommended process sequence:

1. Zinc/Nickel Process SurTec 715 or SurTec 716
2. cascade rinsing
3. optional: activation in hydrochloric acid, pH 1.6-2.2 (+ rinsing)
4. **Black Passivation SurTec 696**
5. cascade rinsing
6. sealing
7. drying at 70-80 °C

The rinsing methods have to be adapted to the plating line.

Technical Specification

(at 20 °C)	Appearance	Density (g/ml)	pH-value (conc.)
SurTec 696	liquid, dark green-violet	1.26 (1.22-1.30)	< 1

Maintenance and Analysis

Check the pH-value regularly. SurTec 696 can be easily controlled by consumption, pH-value and analysis.

Analyse and adjust the concentration of chromium(III) regularly and adjust by adding SurTec 696.

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 696 – Analysis by Photometry

equipment:	spectrophotometer or filterphotometer with 562 nm filter unit (± 10 nm) 100 ml and 1000 ml measuring flask 10 ml pipette 1 cm cuvette
reagents:	hydrochloric acid (1:1.) p.a.
procedure:	Preparation of a 10 %vol standard: Pipette 10 ml half conc. hydrochloric acid into a 1000 ml measuring flask. Add 10 ml SurTec 696 Passivation Concentrate. Fill up with deionised water and mix well. Fill these standard into a 1 cm cuvette, clean the cuvette with a soft cloth and measure in the photometer at 562 nm against air. Note the extinction ES . Sample measurement: <ol style="list-style-type: none">1. Pipette 10 ml of the filtrated bath sample into a 100 ml measuring flask.2. Add about 1 ml of half conc. hydrochloric acid.3. Fill up with deionised water and mix well.4. Fill this solution into a 1 cm cuvette.5. Clean the cuvette with a soft cloth and measure in the photometer at 562 nm against air.6. Note the extinction EP.
calculation:	$EP / ES \cdot 10 = \%vol$ SurTec 696
possible errors:	<ul style="list-style-type: none">▪ Bath turbidity simulates a higher concentration, therefore filter the sample prior to the measurement.▪ High amounts of iron impurities lead to wrong results.

SurTec 696 – Analysis by Titration

reagents:	sulfuric acid (1:1) p.a. ammonium persulfate p.a. 0.1 M silver nitrate solution potassium iodide solution (10 %) p.a. 0.1 M sodium thiosulfate solution starch solution (1 %)
procedure:	<ol style="list-style-type: none">1. Pipette 10 ml bath sample into a 250 ml Erlenmeyer flask.2. Dilute with approx. 100 ml deionised water.3. Acidify with 10 ml sulfuric acid.4. Add 2 g ammonium persulfate.5. Add 25 ml silver nitrate solution.6. Boil it for 20 minutes.7. After cooling down dilute with 100 ml deionised water.8. Add 10 ml potassium iodide.9. Titrate with 0.1 M sodium thiosulfate solution from brown to pale yellow.10. Add 5 drops of starch solution (solution colour turns to blue).11. Continue titrating until the colour changes to pale yellow again.
calculation:	consumption in ml · 4.6 = ml/l SurTec 696

Ingredients

- chromium(III) salts
- cobalt salts
- nitric acid
- ammonium fluorides

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 696 15-20 ml per m² treated surface

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

SurTec 696 150 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 696	T - Toxic 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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