

Protection upgraded

SurTec® 650 A Additive for Passivations

Properties

- liquid
- is additionally added directly into the passivation bath
- contains effective wetting agents for improved wettability of the parts during the passivation process
- improves the corrosion protection of passivation layers for the blank corrosion protection on aluminium, especially in case of subsequent oven drying of the passivated parts

Application

SurTec 650 A Additive is added directly into the passivation bath of SurTec 650.

Make-up values: SurTec 650 20 %vol
 SurTec 650 A 5 %vol

Make-up: Steps for make-up:

1. Fill SurTec 650 concentrate into the tank and dilute it with deionised water with thorough agitation.
2. Before adding SurTec 650 A, first lower the pH-value to about pH 3.4 with 5 % sulfuric acid. Then add SurTec 650 A Additive slowly with agitation. (*SurTec 650 A is foaming; therefore, mix the bath mildly during the addition!*)
3. Check the pH-value and adjust it stepwise with 1 % sodium hydroxide solution to the working pH-range of pH 3.7-3.9, if necessary.

Temperature: 30 °C

pH-value: 3.8 (3.7-3.9)

Application time: 5 min

Tank material: stainless steel, or steel with acid- and fluoride-resistant lining

Rack material: titanium, stainless steel (V4A), aluminium, plastic

Filtration: necessary; 0.1-0.5 times the total bath volume per hour;
before passivation: with pore size $\leq 25 \mu\text{m}$

Heating: necessary; made of acid- and fluoride-resistant material

Exhaust: required for worker's protection

Hint: Oven drying improves the corrosion protection properties of the passivation layers considerably. The drying time is inversely proportional to the temperature. That means, at 60 °C, drying for 20-30 min is recommended, at 80 °C for 15-20 minutes. At the end the parts must be completely dry (see "Recommended process sequence").



Recommended process sequence for best corrosion protection:

1. Degreasing e.g. 5 vol% SurTec 061 + 0.5 %vol SurTec 089, at 60°C, 10 min
2. Alkaline etching e.g. 5 %vol SurTec 181, at 40-60°C, 1-2 min; the etch removal should be about 2 g/m² and can be adjusted by temperature and immersion time
3. Desmutting e.g. 17-20 %vol SurTec 496, at RT-35°C, 5-15 min
4. Passivation 20 %vol SurTec 650 + 5 %vol SurTec 650 A; for best corrosion protection, passivate for 5 min at 30°C and pH 3.9
5. Drying in the oven at 60-80°C; the temperature must not exceed 100°C, parts must be completely dry
 - a. e.g. drying at 60°C for 20-30 minutes
 - b. e.g. drying at 80°C for 15-20 minutes

After each step, rinsing is required. The rinsing methods need to be adapted to the plating line. It is recommendable to adjust the last rinse before the SurTec 650 bath to pH 3.5-4 (with 5 % sulfuric acid), to avoid strong pH variations in the SurTec 650 bath.

Maintenance and Analysis

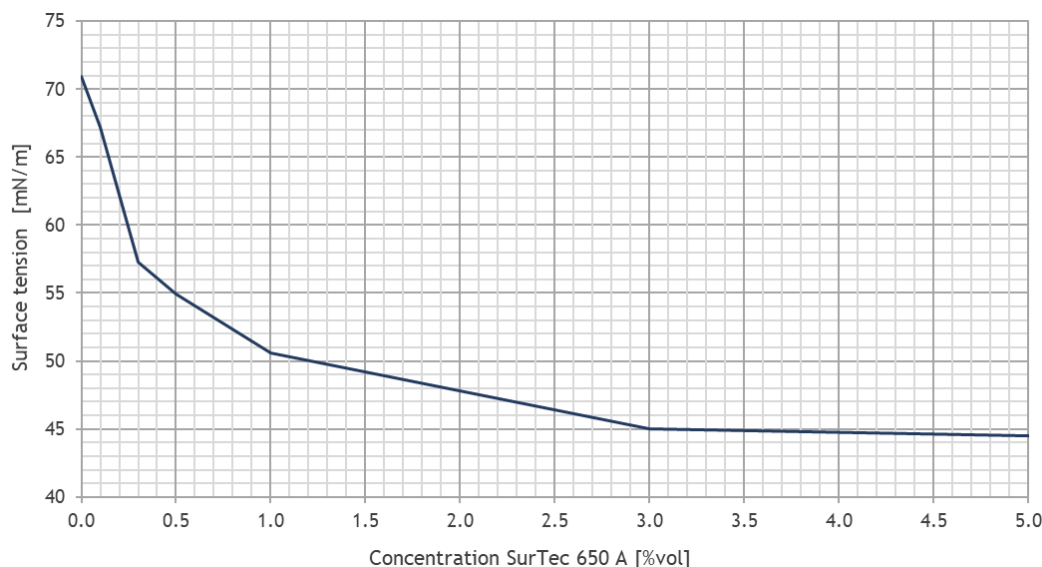
Check the pH-value of the passivation bath regularly. Due to expected drag-out of bath solution and consumption of active substances, analyse and adjust the concentration of SurTec 650 A regularly.

SurTec 650 A - Analysis by Bubble Pressure Tensiometer

SurTec 650 A decreases the surface tension of the passivation bath. This effect can be used for the control of the concentration of SurTec 650 A. Measurement conditions:

Temperature of the solution: 30°C

Frequency of the bubble pressure tensiometer: 1 Hz



Sample Preparation

Take a bath sample at a homogeneously mixed position and let it cool down to room temperature. If the sample is turbid let the turbidity settle and filter through a blue-ribbon filter paper.

SurTec 650 A - Analysis by Photometer

- Test: Cuvette Test LCK 433 Nonionic Surfactants by Co. HACH
- Measuring device: photometer with 600 nm wavelength
(e.g. from HACH, see package leaflet of HACH cuvette test)
- Procedure:
1. Pipette exactly 5 ml of the filtrated bath sample into a 100 ml volumetric flask.
 2. Fill up to the mark with deionised water and mix well.
- Use this dilution for the cuvette test LCK 433 according to the enclosed instruction leaflet of the test. Therefore, proceed as follows:
3. Pipette exactly 0.2 ml of this dilution into the cuvette.
 4. Close the cuvette properly and shake it intensively for thorough mixing of both phases.
 5. Then let the cuvette rest for 20 minutes until the two phases are separated again.
 6. When the lower phase is clear and free of inclusions, the sample is ready to be measured in the photometer.
- Calculation: readout value of surfactant in mg/l · 0.165 = %vol SurTec 650 A

SurTec 650 - Analysis by Titration

- Reagents:
- sulfuric acid (conc.)
 - sodium peroxodisulfate p. a.
 - 0.1 mol/l silver nitrate solution
 - potassium fluoride p. a.
 - potassium iodide solution (10 %)
 - 0.1 mol/l sodium thiosulfate solution (=Na₂S₂O₃ solution)
 - starch solution (2 %)
- Procedure:
1. Pipette 100 ml bath sample into a 250 ml Erlenmeyer flask.
 2. Acidify with 3 ml sulfuric acid.
 3. Add 12 g sodium peroxodisulfate.
 4. Add 10 ml silver nitrate solution.
 5. Cover the Erlenmeyer flask with a watch glass. Then heat the solution up and boil it slightly for 20 min (*the solution must not evaporate completely!*).
 6. Let it cool down to room temperature.
 7. Add a spatula tip of potassium fluoride.
 8. Add 15 ml potassium iodide solution.
 9. Leave 5 min for reaction.
 10. Titrate with 0.1 mol/l sodium thiosulfate solution until the solution is weakly yellow.
 11. Add 5 ml starch solution (*sample turns blue-black*).
 12. Continue to titrate until the colour changes to milky light green.
- Calculation: consumption in ml · 1.613 = %vol SurTec 650

Technical Specification

(at 20°C)	Appearance	Density (g/ml)	pH-value (conc.)
SurTec 650 A	liquid, colourless to slightly yellowish	approx. 1.005	approx. 5-7

Ingredients

- wetting agents

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 650 A 50 kg

Product Safety and Ecology

Classification and designation are noted in the **Material Safety Data Sheets** (according to the European legislation). The safety instructions and the instructions for environmental protection have to be followed in order to avoid hazards for people and environment. Please pay attention to the explicit details in our Material Safety Data Sheets.

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 further processing of our products do not exist. For details, please find our country-specific **General Terms and Conditions** for downloading on our homepage or ask your regional SurTec representative.

Further Information and Contact

If you have any questions concerning the process, please contact your local technical department.

For further information and contact details, please visit our homepage:

<http://www.SurTec.com>