SurTec® 402
E6-Complete Etching

Properties

- alkaline liquid
- free of nitrate, nitrite, chlorate and chloride
- produces a brilliant E6 finish surface on aluminium and aluminium alloys
- perfectly suited for the levelling and compensation of pressing marks
- caused by the material removal during the etching process and the subsequent drag-out of etching solution, a steady-state concentration of aluminium is established in the etching and achieves a constant finish quality
- ensures uniform etching finish even from start up of the bath operation
- no formation of aluminium stone in case of high aluminium concentration
- environmentally friendly

Application

make-up value:	100 g/l
temperature:	50-70°C
application time:	10-20 min
aluminium content:	120-180 g/l
agitation:	essential: circulation of the bath solution by compressed air
tank material:	heatable steel tanks (alloy ST 35), stainless steel or polypropylene (PP) tanks
heating:	required, made of alkaline resistant material
exhaust:	required for worker´s protection
filtration:	not necessary
hints:	Energy saving instructions: to avoid losses of heat and thus energy, it is recommended to insulate the outer bath walls of the tank. Additional cooling will be necessary if you are operating at full capacity (work piece flow). This can be done by steel radiators filled with cold water. These water can also be used for the rinsing baths. For the highly concentrated alkaline solutions heatable steel tanks can be used.

Technical Specification

(at 20°C)	Appearance	Density (g/ml)	pH-value
SurTec 402	liquid, yellow-brown	1.470 (1.44-1.50)	> 14

Maintenance and Analysis

Analyse the concentration of SurTec 402 and aluminium regularly and determine the nominal value of replenishment of SurTec 402 according to the aluminium content.

Sample Preparation

Take a bath sample at a homogeneously mixed position and filter the warm solution with a band-pass filter.

SurTec 402 and Aluminium – Analysis by Titration

reagents:
1 mol/l hydrochloric acid (= 1 N)
potassium fluoride solution (KF solution, 35 %)
indicator: phenolphthalein solution (0.1 % in 70 % ethanol)

procedure:

1. Pipette 5 ml of the chilled filtered bath sample into a 300 ml Erlenmeyer flask.
2. Fill up to 100 ml with deionised water.
3. Add 3-4 drops of indicator solution (colour change to pink).
4. Titrate with 1 mol/l hydrochloric acid to discolouration.

   = consumption **A** (ml)
5. Add 70 ml of potassium fluoride solution (colour change to pink again).
6. Refill the burette with 1 mol/l hydrochloric acid up to zero.
7. Titrate again from pink to colourless.

   = consumption **B** (ml)
8. For checking the end-point of the titration add another 5 ml potassium fluoride solution. When the colour of the solution remains colourless the titration is finished. If the colour turns to pink again, titrate once again to colourless.

calculation:
(consumption **A** - 1/3 consump. **B**) in ml · 20.4 = g/l SurTec 402

consumption **B** in ml · 2 = g/l aluminium

nominal value:
The nominal value of SurTec 402 can be determined with the following equation:

SurTec 402 in g/l = 0.698 · aluminium content in g/l + 103

Ingredients

- alkali hydroxides
- complexing agent
- surfactants

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 value can be taken as estimated average consumption:

SurTec 402	80 g per m^2

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

SurTec 402	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 human and environment. The Material Safety Data Sheets (according to European legislation) contain detailed information.

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

product	*hazard designation*	*water hazard class*
SurTec 402	C - Corrosive	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

22 December 2010/DK, WT