

# SurTec® 351

## Grain Refiner for Acidic Sulfate Based Nickel Electrolytes

### Properties

- deposits ductile, well adhering, corrosion resistant nickel layers on tubes, wires and strips out of iron or copper
- produces fine crystalline, homogeneous nickel deposition
- nickel layers can be adjusted from matt to glossy
- significant cost reduction in comparison to a sulfamate electrolyte
- wide current density and velocity range
- simple analytical control of the electrolyte and the additives
- applicable with soluble and insoluble anodes with only little modification
- IMDS-number: 748706

### Application

make-up values:

nickel sulfate · 7 H <sub>2</sub> O	350-450 g/l	
nickel chloride · 6 H <sub>2</sub> O	0-30 g/l	(for Ni anodes)
boric acid	30-50 g/l	
sulfuric acid (96 %)	0 - 4 g/l	
SurTec 351 I	10-15 ml/l	
SurTec 850 L	2 - 6 ml/l	(if required)

temperature: 60-75°C

pH-value: 1.8-4.0

cathodic

current density: 10-50 A/dm<sup>2</sup>

current efficiency: at 25 A/dm<sup>2</sup>  
(with rising current density the current efficiency increases)

pH 4.0-3.0 99-92 %

pH 3.0-1.8 92-74 %

agitation: band velocity at min. 8 m/min

anodes: pure nickel 99.99 %

filtration: continuous filtration required

In order to prevent a build-up of breakdown products, the electrolyte should be filtered with active carbon regularly.

### Technical Specification

(at 20°C)	Appearance	Density (g/ml)	pH-value (conc.)
SurTec 351 I	liquid, colourless	1.033 (1.02-1.04)	approx. 7.5
SurTec 850 L	liquid, yellowish	1.003 (0.99-1.02)	4.2 (3-5)

## Maintenance and Analysis

Check the pH-value regularly. Analyse and adjust the concentration of nickel, sulfate, and chloride regularly. Add SurTec 351 I continuously. Its concentration can be determined by UV spectroscopy.

## 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 351 I                    1.0-3.0 l

The consumption increases with lower pH-values and higher current densities.

## 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 351 I	-	WHC 0
SurTec 850 L	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>