

SurTec® 459

Electropolishing System

Properties

- acidic, liquid
- chromium(VI)-free
- attainment of outstanding surface finish e.g. with regard to gloss expressivity, within short treatment times is possible
- wide range of stainless steels like austenitic, ferritic and martensitic chromium steels can be electropolished
- long service life

Application

The process SurTec 459 includes the following products:

- SurTec 459 A Make-up Solution is a ready-for-use solution without further additives, even without artificial “ageing” fully operational and efficient
- SurTec 459 CV Regulator controls conductivity and viscosity; ensures a high degree of efficiency and outstanding polishing quality even with highly loaded baths; avoids too high variations due to dilution and supersaturation of the electrolyte system
- SurTec 459 N Replenisher is dosed on the basis of the adjusted conductivity value for supplementation of the missing bath volume and ensures always perfect bath working conditions with optimal balance (inorganic acid ratio / organic components)

optional:

- SurTec 459 SK Correction Solution to adjust the acid-base balance
- SurTec 459 K Electropolishing Bath is used as replenishing solution in case of generally too high conductivity (caused by too low utilisation or too high drag-in of water)

make-up values:

SurTec 459 A	100 %vol	(1780 g/l)
SurTec 459 CV	as required	
SurTec 459 N	as required	

application time: 5-30 min

temperature: 50-85°C

iron content: 7-8 %

voltage: 5-20 V

current density 8-15 A/dm² (5-40 A/dm²)

pH-value: < 1

cathode material: stainless steel (alloy 1.4571)

ratio

anode : cathode: 1.5:1 (at least 1:1)

- tank material: PVDF or rubberized stainless steel tanks (1.4571), temperature-resistant in the range of 70-95°C, recommended: insulation of the tank walls to avoid heat loss
- heating: required, made of acid resistant material (heat exchanging material: polyvinylidene fluoride (PVDF))
- exhaust: required for worker's protection
- hints: The system SurTec 459 is hygroscopic, i.e. it absorbs water from the surroundings. Additionally water from rinsing steps of wet chemical processes will be dragged into the electrolyte. This water supply influences density and conductivity conditions of the bath. For electrolytes put out of operation for longer periods it is therefore recommended to store the electrolytes into a closed container to avoid excessively strong water absorption. At high-capacity baths the water absorption is uncritical, since the heat development leads to vaporisation of water constituents.
- The ratio of cathode surface to anode surface (product) is an important parameter for the generation of good gloss. The larger the cathode surface, the better the attainable gloss effect. Therefore a **cathode to anode surface ratio of 1:1.5 (or at least 1:1)** is recommended (cathode material: 1.4571 stainless steel).

Technical Specification

(at 20°C)	Appearance	Density (g/ml)	pH-value (conc.)
SurTec 459 A	liquid, dark green, clear - slightly turbid	1.750 (1.71-1.80)	< 1
SurTec 459 CV	liquid, light green, clear - slightly turbid	1.050 (1.03-1.07)	< 1
SurTec 459 N	liquid, light green, clear - slightly turbid	1.700 (1.68-1.72)	< 1
SurTec 459 SK	liquid, light green, clear	1.835 (1.81-1.86)	< 1
SurTec 459 K	liquid, colourless-yellowish, clear	1.760 (1.74-1.78)	< 1

Maintenance and Analysis

The conductivity of the electrolytes at 20°C is determined for control of the replenishment. For the necessary measures to be taken from the measured values see the table below:

SurTec 459 – Measurement of Conductivity (at room temperature)

Conductivity	Measure
< 50 mS/cm	Add 0.5 %vol SurTec 459 CV per missing mS/cm. If there conductivity deficiency still exists in the bath after that, refill the bath volume with SurTec 459 N up to 60 mS/cm.
≤ 70 mS/cm	If necessary, compensate the existing volume deficiency by addition of SurTec 459 N.
> 70 mS/cm	Heat the electrolyte up to 80°C until the conductivity is fallen to 60 mS/cm ("evaporation"). It is recommended to replenish the bath with SurTec 459 K.

Ingredients

- phosphoric acid
- sulfuric acid

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 m² can be taken as estimated average consumption:

SurTec 459 Electrolyte 200-400 g

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

SurTec 459 CV 200 kg
SurTec 459 N 250 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 459 A	C - Corrosive	WHC 1
SurTec 459 CV	-	WHC 1
SurTec 459 N	C - Corrosive	WHC 1
SurTec 459 SK	C - Corrosive	WHC 1
SurTec 459 K	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>