



Anodal[®] EE Liquid

A produkt for hardcoating anodizing.

Anodal EE Liquid

With the addition of **Anodal EE Liquid** the conventional sulfuric acid electrolyte can be used for hardcoating without the expense of costly refrigeration or a new high-voltage power supply.

By utilizing **Anodal EE Liquid** additive in your electrolyte both normal and hardcoat anodizing can be accomplished in the same tank.

Some advantages offered by **Anodal EE Liquid** are :

- Provides less expensive new hardcoat facilities
- Increases the capacity of sulfuric acid anodizing facilities as it allows higher temperatures
- Requires less refrigeration, power and capital cost as compared to low temperature anodizing processes
- Reduces the dissolution of the oxide film under adverse anodizing conditions
- Improves the uniformity of film thickness throughout the entire anodizing tank
- Minimizes the effect of temperature and current density fluctuations during anodisation
- May eliminate the honing normally required to obtain a smooth RMS final surface after hardcoating.

1. Properties

Appearance :	clear yellowish liquid
Chemical character:	organic acid in aqueous solution
Density:	approx. 1210 kg/m ³
Viscosity at 20°C:	approx. 30 mPa. Brookfield Viscometer, 50 U/Min. , spindle 1
Diluability :	dilutable with water in any proportion.
Boilling point :	~ 100 °C
pH of commercial product :	1 – 1,5
Storage stability :	at least 5 years in closed original containers
Ecotoxicological data :	see Safety Data Sheet.

2. Application

Make-up of the anodizing bath :	20 ml/l to the anodizing solution for most alloys
	40 ml/l for problem alloys, i.e. 2024 or 7075.

3. Handling precautions

Anodal EE liquid is acidic therefore appropriate safety equipment should be used and body contact avoided.

Do not mix **Anodal EE liquid** with concentrated sulfuric acid. The acid must first be diluted by adding it to the water. (Caution ! Never add water to the concentrated acid.)

4. Waste disposal

No special treatment is required for anodizing solutions containing **Anodal EE liquid**.

5. Analysis of Anodal EE solutions

Reagents

0,1 N Ferrous Ammonium Sulfate (FAS)
50 % Sulfuric Acid
Ferrion Indicator
0,1 N Cerric Sulfate Solution

Equipment

400 ml – Beaker
25 ml – Pipette
50 ml – Burette
1 L Volumetric Flask
Glass Beads
Magnetic Stirrer & Hot Plate

Titration

1) Standardisation:

Pipette 25 ml of the approx. 0.1N Ferrous Ammonium Sulfate into a 400 ml beaker.
Add 100 ml of distilled water.
Add 25 ml of 50 % sulfuric acid solution and 4 drops of Ferrion Indicator.
Titrate with 0.1N Cerric Sulfate solution until the red color disappears.

$$\text{Factor } F = \frac{\text{ml of Cerric Sulfate Required}}{25}$$

Note : FAS solution should be discarded if the amount of 0.1N Cerric Sulfate solution required for this titration is less than 15 ml.

2) Bathanalysis :

Pipette 25 ml of the anodizing solution into a 1 liter volumetric flask.
Add distilled water to the 1000 ml mark and mix well.
Pipette 25 ml aliquot of the dilute solution into a 400 ml beaker.
Add 25 ml of 50 % Sulfuric acid.
Using a pipette, accurately add 25 ml of 0.1 Cerric Sulfate solution.
Add 2 – 3 pieces of glass bead and boil 10 – 15 minutes.
Cool and add distilled water to the 200 ml mark.
Add 3 drops of Ferrion Indicator and titrate to a red end point with 0.1N FAS.

Consumption ml of FAS : **A**

Calculation

$$\text{ml/l Anodal EE Liquid} = \frac{25 - (A \times F)}{0,267}$$

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®+ Other Manufacturer's registered trade mark

The signs ®, ®* and ®+ appear only at the first mention of the product.

The information and recommendations presented here were compiled with the utmost care, but cannot be extended to cover

every possible case. They are intended to serve as non-binding guidelines and must be adapted to the prevailing conditions.