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## **CL Bright ZINC AZ**

**Alkaline, cyanide-free zinc electrolyte**

### **PROPERTIES**

CL Bright Zinc AZ deposits bright zinc layers on iron and steel without pores or blisters. The throwing power as well as the metal distribution are excellent. The zinc layer is very ductile and it is therefore possible to bend, form and weld the parts without any problems.

The CL Bright Zinc AZ can be used in barrel- as well as on rack application.

Even an increase of the working temperature up to 45°C has compared with other processes very little influence on the working conditions.

<b>PARAMETER</b>	<b>RACK APPLICATION</b>	<b>BARREL APPLICATION</b>
Zinc	7 – 15 g/l	6 – 18 g/l
Sodium Hydroxid	100 – 150 g/l	110 – 180 g/l

### **MAKE-UP FOR 100 LTR. ZINC ELECTROLYTE**

	<b>RACK APPLICATION</b>	<b>BARREL APPLICATION</b>
Zinc oxide	1,0 kg	1,2 kg
Sodium Hydroxide	12,0 kg	14,0 kg
CL –Brightener AZ	1,2 – 1,6 ltr.	1,2 – 1,6 ltr.

Instead of caustic soda it is also possible to use potassium hydroxide. This gives a slightly better current efficiency.

Fill up the alkaline resistant tank (PVC or hard rubber lining) up to ¼ of the required volume. (advantageous is the use of deionised water). Solve the sodium hydroxide (Attention the solution gets hot). Solve the zinc oxide in the hot solution whilst stirring thoroughly. The solution must become clear. A turbid solutions is caused by calcareous water. A filtration is then necessary.

Now fill up the tank up to its end volume with deionised, soft water. The CL-Brightener AZ is added to the electrolyte after cooling the solution to working temperature. The electrolyte is then ready to use.

Bankverbindung : Stadt – Sparkasse Solingen, BLZ 342 500 00, Konto nr. 5353248  
HRB 5025 Amtsgericht Solingen. Ust-ID-Nr. DE 813 359 241  
Geschäftsführer : Fred Lüdtke

If no deionised water is applied and if the water is calcareous, add 2 ml/l Correction solution AZ (solve at a ratio of 1 : 4 with water to avoid turbidity of the electrolyte). This also avoids an increase of the consumption of CL –Brightener AZ Hard water leads to dark deposition in the low current density area.

## WORKING CONDITIONS

Cathodic current density	0,5 – 6 A/dm <sup>2</sup>
Anodic current density	up to 2 A/dm <sup>2</sup> with zinc anodes up to 4 A/dm <sup>2</sup> with steel anodes
Voltage	6 – 12 Volt in the barrel 2 – 6 Volt with rack application (Optimum 4 Volt)
Bath temperature	20 – 30°C (Optimum 25°C)
Cooling/Suction device	necessary
Current efficiency	65 – 80%, depending on the zinc content and current density
Anodes	fine zinc anodes 99,99%, non-alloy steel anodes or nickel plated steel anodes. Apply nickel plated iron baskets with pellets and eventually nickel anodes. Mixed zinc- and iron anodes on one rectifier is impossible. Zinc- and iron anodes in the same electrolyte should be avoided.
Anode/Cathode ratio	4 : 1 – 1 : 1
Bath movement (Rack)	3 – 5 times per min.

We recommend you to solve the zinc anodes chemically in an external dissolving tank. This to avoid to abstract the zinc anodes during idle periods. For approx. 12.000 ltr. electrolyte is a dissolving tank of approx. 400 – 500 ltr volume required.

## CONSISTANCY

The zinc content stays constant by normal working conditions. The zinc content is kept constant by the rotation of the dissolving tank. If the zinc content strongly increases, diminish the zinc anode surface (baskets must be scaled down). If the zinc content is decreased, enlarge the zinc anode surface. As a bath anode application anodes. The rotation must be adjusted in such a way that the zinc content does not fluctuate too much by the continuous rotation.

The caustic soda content changes the conductivity and should lie at a ratio of 1 : 15 by rack applications and 1 : 12 by barrel application to the zinc content. The more modest the zinc content, the higher the ratio of caustic soda.

## WORKING PROCESS

The to be plated parts must be extremely well degreased and pickled. A hydrogen charge should be avoided. After zinc plating a careful rinse is necessary followed by a passivation. Normal steel can be zinc plated without any problems. Hard steel and alloyed steel do eventually require a special pre-treatment. Lead alloyed steel can in most cases not be treated in an alkaline zinc electrolyte.

## GENERAL PRE-TREATMENT SEQUENCE

Hot degreasing, hydrochloric acid pickling, electrolytical degreasing.

A through rinse is required between each working step.

Attention should be paid that an increasing current density reduces the current efficiency. By a current density of 1 A/dm<sup>2</sup> are approx. 0,2 – 0,3 µm zinc per minute deposited.

## MAINTENANCE

The consumption per 10.000 Ah for rack- and barrel application is approx. 0,8 –1,5 ltr. CL Brightener AZ. By operation with higher temperatures the consumption may increase.

An automatic dosing system is recommendable.

By a strong drop in brightness, it is necessary to adjust the basic values of the electrolyte first of all. If the brightness is not achieved, we recommend a hull cell test. The additives must be added to the hull cell in very small proportions.

### Hull cell test

Bath movement	stirrer, magnet stirrer or air agitation
Current	1,5 A rack application and 1,0 A by barrel application
Time	10 minutes for brightness control, 20 minutes for adhesion control or blister formation. The hull cell panel should be uniform and bright without burnings after a brightening in 0.3 % nitric acid.

Foreign metals, for example copper and ferrous metals must be removed immediately from the electrolyte. **Sulfides cannot be applied.** Remove the foreign metals by means of selective cleaning with corrugated sheets.

Attention: Do not add caustic soda to the electrolyte directly. Pre-solve the caustic soda in water first.

## WASTE WATER TREATMENT

A simple neutralisation by a pH value of approx. 8,6 is sufficient as the electrolyte does not contain any cyanide.

## **TROUBLE SHOOTING**

### **Burnings in high current density area**

Too high zinc content	Reduce by dummy plating with steel anodes
Lack of brightness	Add 1 – 2 ml/ltr. CL- Brightener AZ
Too high current density	Check ratio current : surface
Bath temperature not o.k.	Cool or heat

### **Dark up to matt coatings in the low current density area**

Foreign metals	Selective cleaning
Lack of CL-Brightener AZ	Add 4 – 6 ml/ltr. CL –Brightener AZ
Too high zinc content	Work with steel anodes
Too little caustic soda	Increase to 120 g/ltr.

### **Matt deposition in the low and medium current density**

Lack of CL- Brightener AZ	Add 2,0 – 4,0 ml/ltr. CL- Brightener AZ
Too little caustic soda	Increase to 120 g/ltr.

### **Bad adhesion and blistering**

Lack of pre-treatment	Avoid overpickling, remove oils and grease
Material problems	Use special process
Overdosage of additives	Dummy plate, do not add Brightener

### **Bad anodesolubility**

Too high current density	Increase zinc-anode surface
Too little caustic soda	Increase to 120 g/ltr.

### **Zinc content increases in the electrolyte**

Zinc anode surface too large	Decrease the anode surface in such a way that the anode current density lies $> 2 \text{ A/dm}^2$
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**Important!! Extra additions of Brightener must be determined in the hull cell before addition to the electrolyte. The Make-up quantities must not be exceeded.**

## **HAZARD INDICATION**

Attention has to be paid to the legal regulations for the handling of dangerous working substances. Chemicals without a hazardous indication should not be seen as harmless.

Also with the handling of chemicals which do not require a registration, we recommend to take care and to avoid for example skin contact.

## **WARRANTY**

Seller makes no warranty, whether of merchantability, fitness or otherwise, expressed or implied, concerning the product other than it shall be of the specifications stated herein. Any recommendations made by Seller concerning the use of the product are believed to be reliable, but seller makes no warranty of the results obtained. Buyer agrees to inspect the product supplied hereunder immediately after delivery. Failure to give notice in writing as aforesaid within the specified time constitutes an unqualified acceptance of the product and a waiver of all claims with respect thereto.

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