Future Coat Technology

Acid zinc 3000A
Acid zinc 3001B

INDRODUCTION

Acid zinc 3000 series is a bright acid zinc process based on a potassium chloride electrolyte the additive system has been designed for operating at temperature between 50 -60 °C in order to achieve the optimum in thickness distribution and plating speed. The process is suitable for both rack and barrel operation and deposits accept all types of chromate conversion coating giving excellent chromate adhesion. In the most cases the use of a single organic maintenance brightener ensures ease of operation and process control.

The acid zinc 3000 process uses a non-water-soluble, single brightener system.

A conversion from one type to the other can be done by simply exchanging the previously used ammonium chloride with potassium chloride. It exhibits covering power, can be used over a wide range of zinc metal contents and is therefore well suited for both rack and barrel plating.

Acid zinc 3000 produces extremely bright, chrome like deposits which show a marked degree of leveling, not generally experienced in the zinc plating.

Acid zinc 3000 has low power requirements, lower than alkaline or cyanide solutions and produces zinc deposits which can easily be blue-, yellow-olive-or black-chromate.

PHYSICAL PROPERTIES: Acid zinc 3000A (brown liquid)
Acid zinc 3001B (Clear Transparent to Yellow)

PRINCIPAL FEATURES OF Acid zinc 3000

Excellent deposit thickness distribution.

- Outstanding coverage in deeply recessed areas
- Bright, leveling deposit
- High plating speed
- Recommended when working to minimum thickness specification.

SOLUTION COMPOSITION

Ammonia bath:

Chemicals	Barrel	Rack
-Zinc chloride	40 gm/ Ltr	80 gm/ Lt
- Ammonium chloride	180 gm/ Ltr	150 gm/Ltr
-pH-value	4.6 -5.3	4.6-5.3

Above plating solutions are typical ammonia solutions, which can be changed according to each requirement

Initial addition:

Acid zinc 3000A	20-30 M1/Ltr
Acid zinc 3001B	0.5-1M1/ Ltr

Potassium-bath:
Chemicals

	Barrel	Rack
- Zinc chloride	50-70 gm/Ltr	80 gm/Ltr
- potassium chloride	180 – 240 gm Ltr	200 gm/Ltr
- Boric acid	25 gm/Ltr	25 gm/Ltr
- pH-value	4.6 – 5.3	4.6- 5.3

OPERATION INSTRUCTIONS

Current:

-Cathode current density	0.2 – 8.0 A/dm²
-Anode current density	0.5 – 3.0 A/ dm²
-Voltage	3 – 8 volts
-Temperature	15 – 50 °C
-Cathode efficiency	85 - 95
-pH-value	4.6 – 5.3

PRETREATMENT

An optimum pretreatment of the parts is very important. Concerning pretreatment it is to say that this must correspond with pretreatment for the nickel plating.
Above all, by use of potassium chloride as potassium chloride as conducting salt, a very good pre-treatment is decisive

EQUIPMENT REQUIRMENTS

Tanks

Steel, with hard rubber or synthetic linings, synthetic tanks.

AGITATION

For zinc plating in rack baths a good air agitation is very important. 3-5 m^3 of oil- and dust-free air per hour and m^2 of bath surface are necessary.
The air agitation shows the advantage that precipitated iron is continuously being oxidized and following led off through the filter pump.

FILTRTION

Constant filtration is vital for high-performance rack baths.

ANODES

It is important to use a very good quality of zinc anodes (99.99% Zn).
For rack baths the titanium baskets should be provided with anode bags. This is very important in order to avoid roughness. The material of the anodes bags shall refer to that one which is used in nickel baths

Anode bags

Polypropylene.

Heating and cooling coils

Titanium or Teflon.

IMPORTANT ADVICE

At zinc plating in barrels perforation spots occur again and again on flat parts, which are by hook and by crook problematic to zinc plate (stick one on top of the other)

In case that this appearance is grave and if the conducting salt is potassium chloride, we recommend to add 10-20 gm/Ltr of ammonium chloride to the bath. By that means, these problems occurring again and again at zinc plating in barrels, are as good as eliminated. It goes without saying that ensuring regularly small quantities of ammonium chloride should be added. If for ex. 20 gm/Ltr of potassium chloride are added, 2 gm/Ltr of ammonium chloride should be admixed.

PROCESS MAKE-UP

1. Chemicals should be dissolved in ½ of the required amount of warm, de-ionized water.
2. After filling up with cold water and filtration, pH should be adjusted and required amounts of Acid zinc 3000A– AND Acid zinc 3001B should be added.
3. It is important that 3000A is added first, stirred well, then 3001

FUNCTION OF ADDITIVES

3000A is the main carrier brightener of the system and is normally used only for bath make-up. The key ingredients for the carrier are also included in the 3001B. Maintenance addition of 3000A will only be required in cases of high drag – out.
The 3001 B has been formulated to ensure optimum thickness distribution and LCD coverage and is also responsible for controlling the mechanical properties of the deposits such as the excellent ductility

The normal concentration of the 3000A IS 40ml/Ltr. The concentration should not be allowed to exceed 50 ml/Ltr.

3001B Brightener is responsible for the overall brightness of the deposits as well as maintenance of the carrier components.

Typical dosing rate per 1000Ah:

3001B 200-250ml

Acid zinc 3000contains the brightener and the proper proportion of wetting agent for normal maintenance. Should however, part of the wetting agent be emulgated or saponified, it might be necessary to add Acid zinc 3000

The required amount of Acid zinc 3000 can be determined by running Hull cell panels.
Acid zinc 3000Usually the process is only operated with the 3001B However, with strong drag-outs it can be necessary to add also 3000A

(The make-up solution is solubilizer for the 3001B, a sufficiently large content of 3001A must always be in the plating solution.)

Should the above-mentioned white cloud not disappear within a few seconds after addition of 3001B, AND 3-5 Mi/l of 3000A

pH – value

The continuous control of the pH-value is very important. Above all for the potassium chloride as conducting salt the pH-value has to be checked daily and kept within the prescribed range (4.6-5.3)
If the pH -value is too low, it is increased with KOH (50%)
If the pH- value is too high, it is decreased with 1: 1 HCI, chime. Pure

Please add slowly under powerful stirring.
If hydrochloric acid is added without powerful stirring, organic can get precipitated, which cannot be dissolved anymore.

GENERAL INFORMATION

Since acid zinc processes in general have no inherent cleaning power like those of cyanide solutions, it is very important that work to be plated enter the plating tanks thoroughly clean. The pH-value should be checked electrometrically at least once every four working hours parts, which may have fallen into the plating tank should be taken out immediately, to avoid iron contamination. Dark brown spotting or barrel perforation marks are indications of iron contamination.

INFLUENCE OF PLATING SOLUTION PARAMETERS

The following statements are not necessarily true for all installations. Parameters can vary and are interdependent on each other. These statements should be considered as guidelines, only whenever problems occur.

Zinc metal concentration too high:
This can be the reason for a poor metal thickness distribution.

Zinc metal concentration too low:
- This can be the reason for HCD burring.

Chloride concentration too high:
- This can lead to dissolving of metal (zinc and/or basic metal). It can also causes some brittleness

Chloride concentration too low:
-This can lead to reduction in zinc metal content and a slight bum in the HCD area

Boric acid (or ammonium) concentration too high:
-This can be the reason for grey deposits and roughness in the LCD area

Boric acid low:

-This can lead to rough deposit at the HCD a loss of Zinc metal concentration and formation of metal hydroxides.

pH-values too high (above 5.3)
-This can lead to burning at the HCD a loss of zinc metal concentration and formation of
Metal hydroxides.

pH-value too low (below 4.6):
_This can lead to an increase in metallic impurities (dissolving of basis metal), a decrease in covering power and metal distribution.

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HANDLING AND SAFETY INSTRUCTION

For detailed information consult the material safety data sheet for this product. Please read material safety data sheet carefully before using the product.

“The above information is given in good faith and is based on our experience but no condition of warranty is to be implied”