



## TECHNICAL DATASHEET

# ***Zincostar 3000***

## Acid Zinc Electroplating Process

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## Process Information

The bright acid Zinc process Zincostar 3000 is mainly used for plating on consumer parts to obtain very uniform brightness and levelling in all current density areas. Good corrosion resistance is obtained in combination with suitable chromates and passivations.

The following are some important properties of the zinc solution:

- Free from any complexing agents
- Low consumption
- Excellent and uniform bright plating with outstandingly good bright throwing power
- Good ductility of the zinc deposits, also in continuous operation
- Very well suited for zinc plating of cast iron and hardened or high-strength steels
- High current efficiency and rates of deposition
- Lowest possible costs of the treatment of effluents (simple alkali neutralization)
- If need be, cathode agitation can be replaced by air agitation or supplemented by it in case of operation at particularly high current densities
- Same solution constituents for all types of application = simple storage of materials, reliability of operation, easy maintenance

## Equipment and Working Parameters

<b>Tanks</b>	Hard-rubber-lined steel, PVC/polyester reinforced material, polyethylene or polypropylene Horizontal, fully immersed barrels or upright, open ended barrels should be made of PVC, Plexiglas (= Perspex) polythene or rubber coated steel. They should revolve at a speed of 4 - 8 r.p.m. The anode bars should be made from zinc plated or nickel plated copper or iron. Stainless steel (such as 4301 or 4571) can also be used. In order to prevent corrosion, the anode bars should be covered in such a way that no electrolyte can drip on them.
<b>Tank ventilation</b>	Strongly recommended
<b>Heating/cooling</b>	Graphite, titanium, PTFE, PVC, polyethylene
<b>Temperature</b>	20°C to 40°C (optimum 28°C)
<b>Cloudpoint</b>	Over 80°C
<b>Agitation</b>	Necessary, Mechanical agitation and/or air agitation mechanical agitation is required for rack plating. For barrel plating an additional slow air agitation is recommended to oxidize possibly present iron ions occurring in the electrolyte. (barrel rotation at 4 to 8 RPM).
<b>Fume extraction</b>	Advisable



<b>Filtration</b>		Continuous recommended, 2 to 4 tank volumes per hour throughput, 10 micrometer mesh filter media.
<b>Solution temperature</b>		20 – 40 °C At higher temperatures the bright throwing power deteriorates and the brightener consumption increases. In such a case cooling of electrolyte should be arranged.
<b>Anodes</b>		Pure zinc, minimum 99.95 %
<b>Solution density</b>	d = 1.13 - 1.16 g/cm <sup>3</sup> at 20 °C	
<b>pH</b>	5,0 to 5,8 pH (optimum 5.4) correct with HCl	
<b>Cathode current density</b>	Up to 4 A/dm <sup>2</sup> (rack);approx 1 A/dm <sup>2</sup> (barrel)	
<b>Voltage across the tank</b>	3.0 - 10.0 Volts for fully immersed horizontal plating barrels 2.0 - 4.0 Volts for open ended upright plating barrels 2.0 - 3.0 Volts for rack plating This voltage depends to a large extent upon the geometry of the installation and the type of the perforation of the barrel. The values indicated above can therefore only be regarded as guide figures.	
<b>Current efficiency</b>	95 - 98 %	
	<b>Stroke length</b>	<b>Double strokes/min</b>
<b>Horizontal movement</b>	100 mm	20 - 25
<b>Vertical movement</b>	60 mm	25 - 30

The surface area of the anodes should be as large as possible in order to prevent passivation during continuous operation. Anodes can stay in the solution during idle periods.

In order to stop anode sludge from entering the solution, the anodes must be covered with bags made from cotton cloth or acid resistant fully synthetic special fabric. The anode bags must ensure a good flow of the electrolyte, since otherwise the pH-value in the vicinity of the anode would increase, resulting in the formation of sparingly soluble zinc salts. Anode bag screens or titanium anode baskets with suitable anode bags made of fully synthetic special fabric can also be used.

Please note: Titanium in acid zinc solutions is only stable if the voltage applied is less than 8 Volts.

Electrolyte must not be allowed to dry on the anodes (for example, when the bath is drained). If this is allowed to occur, passive layers can be formed in such cases.



## Make up

Potassium based acid Zinc solution:

	Barrel		Rack	
ZnCl <sub>2</sub>	65	g/l	75	g/l
KCl	180	g/l	200	g/l
Boric acid, H <sub>3</sub> BO <sub>3</sub>	20	g/l	25	g/l
Make up solution Zincostar 3025	20-30	ml/l	30-40	ml/l
Brightener Zincostar 3125	0,5-1	ml/l	0,5-1	ml/l

Ammonium based acid Zinc solution:

	Barrel		Rack	
ZnCl <sub>2</sub>	65	g/l	75	g/l
Ammonium chloride	170	g/l	180	g/l
Make up solution Zincostar 3025	20-30	ml/l	30-40	ml/l
Brightener Zincostar 3125	0,5-1	ml/l	0,5-1	ml/l

Make up procedure:

- Into a separate and clean temperature resistant tank, clean warm water (approx 50 to 60 ° C) is filled up to approximately 75 % tank volume.
- While stirring, add slowly and carefully the required quantity of ZnCl<sub>2</sub>, H<sub>3</sub>BO<sub>3</sub> and KCl to the water and stir until fully dissolved. After the ingredients have fully dissolved while continuous stirring, the solution remains slightly turbid.
- Add 2 to 5 g/l activated carbon powder into the solution and stir for at least 30 minutes, then stop all agitation.
- Allow active carbon to precipitate.
- Filter the solution through a 10 micrometer mesh filter media into the working tank. Make sure no active carbon particles are in the working solution.
- Add the necessary quantity of additives and stir vigorously.
- Top tank with clean water to reach final volume and stir for 30 minutes to obtain a homogeneous electrolyte.
- Adjust operation temperature if necessary to operation range.
- Adjust the pH Value if necessary (normally the pH is automatically within operation range).
- Dummy plate with 2.5A/dm<sup>2</sup> for approx. 1 AH per liter.
- Solution is ready for start up.

## Maintenance

Under standard production conditions dosing of the Brightener **Zincostar 3125** is sufficient to maintain the performance stable.

Regular addition of Make Up solution 3025. Under normal circumstances, Make Up solution 3025 is added only as a corrector depending upon Hull-cell results (Attention, always use steel anode for Hull cell testing).



Consumption per 10.000Ah:

Brightener Zincostar 3125	0.5 - 1.0 L
Carrier Zincostar 3025	1.0- 2.0 L

**Trouble shooting:**

- Roughness while rackplating and barrelmarks are mainly caused by high iron impurities. To eliminate the ferrous ion, it is converted into ferric ion by adding slowly during production break approx. 1 to 2 ml/l hydrogenperoxide and having a thorough filtration afterwards.

**Effluent treatment:**

All concentrates and rinsing waters have to be treated according to local regulations.

## **Health and Safety**

Material Safety Data Sheets are available for all GALVANO MONDO products, they are normally issued with relevant quotations and Technical Data Sheets. They explain hazards associated with the product following classification by European Statutory Requirements. Normally more than one product will be used in a process. Risk evaluation of the process is the users responsibility because the user controls men, materials, methods and machines. The user must consider all of the substances present in the solution, whether they present a risk to people and the environment, whether abatement measures are needed.