



## Product Bulletin

Better Chemistry. **Better Business.**

**Zinconal**

**Product Code: 2900003**  
**Revised Date: 08/01/2006**

### Zinconal

**Zinconal** is an alkaline, cyanide free, liquid product developed to deposit a thin film of zinc, by immersion, on aluminum fabrications so they may be electroplated (copper, nickel, etc), or plated directly with electroless nickel. **Zinconal** can be used in rack or barrel lines on wrought or cast aluminum alloys.

The purpose of **Zinconal** is to convert the aluminum surface into a zinc surface. In this way it will be possible to electroplate the aluminum fabrications in a conventional electroplating cycle.

Note: the copper strike must be free of caustic in such a cycle. The zinc coating, imparted by the **Zinconal** solution on the aluminum surface, will provide an excellent base for an electroless nickel plate. The adhesion of the electroless nickel plate on the thin zinc plate eliminates flaking of the electroless nickel plate from the part.

### OPERATING CONDITIONS

Concentration:	20% (volume), remainder water.
Temperature:	70 to 115F (21 to 46C).
Immersion time:	20 seconds to 2 minutes (max).
Equipment:	mild steel tanks, and steel heating coil if required.

### RACKING

Racking should be done by means of spring contact, using stainless steel or aluminum. It is very important that tight racking be done because aluminum is not heavy enough to make a secure contact when simple hanging contact is made. Good results cannot be guaranteed unless tight contact is made between the work and rack and between the rack and the bus bar. It is recommended that the exposed rack area other than the contacts be coated with a suitable insulating rack coating.

Ventilation: not required.

### SOLUTION MAKE-UP AND OPERATION OF BATH

Slowly add the **Zinconal** to the water and stir thoroughly to insure a homogenous mixture. The **Zinconal** will not raise the temperature of the bath above 115F (46C)., Consequently, the **Zinconal** solution may be used immediately. For replenishment, add **Zinconal** directly to the operating bath - the amount given by analysis.



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### TEMPERATURE

For most purposes, **Zinconal** operates at room temperature. The solution may be heated to a maximum of 115F (46C) to shorten the immersion time or for treating very passive aluminum surfaces.

### IMMERSION TIME

Immersion time depends on the temperature, the alloy, and the passivity of the aluminum surface. Excessive immersion times will result in a spongy, poorly adherent zinc coating which may cause blistering of the subsequent plate. If the alloy reacts vigorously with the **ZINCONAL** solution, the immersion time must be short. If there is no visible reaction, the immersion time must be from 30 seconds to two minutes. A uniform light gray coating should be deposited. If the coating is spotty or bare in certain areas, the preparation of the aluminum surface was incomplete. Occasionally a consistently dark coating occurs on certain alloys. This film is satisfactory for plating and provides excellent adhesion.

### APPLICATION PROCESSES

Either of the following cycles may be used for plating aluminum alloys:

#### PROCESS 1

1. Soak clean cleaner 187 NE.
2. Cold water rinse.
3. Alkaline etch, Etch Cleaner 16, 6 LF or Extend Etch. This step is very important in securing good deposits. Etching removes any dirt which may have worked into the metal surface during the fabricating operation. It removes oxide and also gives a greater surface for the subsequent deposits.

pure aluminum should be treated until it is frosty in appearance. Alloys containing copper or silicon turn black and etching should be continued until the surface is uniformly black. For etch type cleaners, simple steel tanks are satisfactory.

4. Cold water rinse.
5. Cold water rinse.
6. Deoxidize and desmut.



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wrought alloys use Deoxidizer 13.

cast alloys use Descaler D with nitric acid or a solution of Descaler D, nitric and sulfuric acid.

7. Cold water rinse.
8. 20 seconds to 2 minutes immersion **Zinconal** solution at 70-115F (21-46C).
9. Cold water rinse.
10. Cold water rinse.
11. Copper strike in a caustic free bath, pH 10.5. Maintain free sodium cyanide 1.0 to 1.5 oz/gal pH range 10.0 to 10.8.

copper cyanide	7.0 oz/gal
sodium cyanide	9.2 oz/gal
sodium carbonate	4 oz/gal
rochelle salts	8 oz/gal
free sodium cyanide maximum	1.5 oz/gal
temperature	room to 100F (37C)

Current density should initially be 24 amperes per sq ft for two minutes. Reduce this to 12 amperes per sq ft, usually 3 to 5 minutes after, depending on the thickness required. Contact should be on before the surfaces are immersed in the solution.

12. Cold water rinse.
13. Cold water rinse.
14. Subsequent plating processes.

### DOUBLE ZINCATE PROCESS - PROCESS 2

1. Cast alloys.
2. Wrought alloys that do not contain appreciable quantities of magnesium.
3. Alloys of uncertain composition.

With the double zinc immersion treatment, the first zinc layer obtained by using the above cycle is removed by returning work to the nitric acid dip solution. The part is rinsed and then immersed again in the **Zinconal** solution, and the operation continued.

1. Soak clean, cleaner 187 NE.
2. Cold water rinse.



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3. Etch clean, Cleaner 16, 6 LT or Extend Etch.
4. Cold water rinse.
5. Cold water rinse.
6. Deoxidize and desmut - see process 1 for products.
7. Cold water rinse.
8. Zinconal solution.
9. Cold water rinse.
10. 30 seconds to 2 minute immersion in 50 to 60% (volume) nitric acid at room temperature (strips zinc coating).
11. Cold water rinse.
12. Cold water rinse.
13. Zinconal solution.
14. Cold water rinse.
15. Cold water rinse.
16. Copper strike.
17. Cold water rinse.
18. Cold water rinse.
19. Subsequent plating.

### CONTROL PROCEDURE

The concentration of **Zinconal** is not critical and the simplest control is by observing the gassing which occurs at the surface of the aluminum. As the solution becomes depleted, there will be a noticeable increase in gassing. At this point, the solution should be replenished with an addition of approximately 10 percent of the original make-up.

If desired, the bath may be controlled by chemical analysis for zinc metal content by any convenient method used for analysis of zinc plating solutions. The bath should be checked for zinc content when first made up and maintained at that value by additions of **Zinconal**.

### APPARATUS NEEDED

5 ml pipette  
250 ml erlenmeyer flask  
50 ml burette  
10 ml graduate  
50 ml graduate  
spatula



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### REAGENTS NEEDED

0.0575 M EDTA, disodium salt - dissolve 21.4 grams EDTA and 6.0 grams of CP grade NaOH in deionized or distilled water and dilute to 1 liter.

Triethanolamine, 50% by volume.

indicator powder: 1 gram of Eriochrome Black T indicator ground with 100 grams NaCl.

buffer solution: 125 grams AR grade ammonium chloride dissolved in concentrated AR grade ammonium hydroxide and diluted to one liter with ammonium hydroxide.

### PROCEDURE

1. Pipette 10 ml sample of **ZINCONAL** solution into a 250 ml erlenmeyer flask.
2. Add 40 ml of 50% triethanolamine.
3. Add 10 ml buffer solution.
4. Dilute to 100 ml with deionized or distilled water.
5. Add 0.25 gm to 0.5 gm Eriochrome Black T indicator.
6. Immediately titrate with standard 0.0575 M EDTA solution until color changes from red-purple to blue.
7. Record mls 0.0575 M EDTA used.

### CALCULATIONS

**Zinconal (% volume) = 0.65 x mls EDTA solution used.**

### CAUTION

**ZINCONAL** solution is an alkaline product and should be handled accordingly. Avoid skin, eye and oral contact. Wear protective clothing, gloves and goggles when handling the product. Flush exposed areas immediately with clean, cold water. Contact a doctor immediately in case of injury.

### WASTE DISPOSAL

Consult local waste disposal regulations. **Zinconal** contains caustic soda and zinc salt. Neutralize to a pH of between 6 and 8, to neutralize acid and precipitate the zinc metal. Consult local, state and federal regulations for disposal regulations in your immediate area.



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### **WARRANTY**

THE QUALITY OF THIS PRODUCT IS GUARANTEED ON SHIPMENT FROM OUR PLANT. IF THE USE RECOMMENDATIONS ARE FOLLOWED, DESIRED RESULTS WILL BE OBTAINED. SINCE THE USE OF OUR PRODUCTS IS BEYOND OUR CONTROL, NO GUARANTEE EXPRESSED OR IMPLIED IS MADE AS TO THE EFFECTS OF SUCH USE, OR THE RESULTS TO BE OBTAINED.