



Technical Process Bulletin

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ALODINE® 2000

1. Introduction:

ALODINE 2000 produces a chromium free conversion coating on metal surfaces. A chemical seal is usually applied subsequent to ALODINE 2000 treatment. The coating ranges in color from light purple to golden, and is especially well-suited for aluminum and its alloys.

The ALODINE 2000 coating produces a visually apparent conversion coating which, when used with a seal, provides excellent corrosion protection to bare or painted aluminum.

2. Operating Summary:

<u>Chemical:</u>	<u>Bath Preparation per 100 Gallons:</u>
ALODINE 2000 Makeup	10 gallons
ALODINE 2000 Additive	1.75 gallons
ALODINE 2600 Toner	0.5 gallon
<u>Operation and Control:</u>	
Temperature	100° to 140° Fahrenheit
Time	3 to 12 minutes
Concentration	12 to 17 points
pH	6.8 to 7.2

3. The Process:

The complete process sequence normally consists of the following steps:

- A. Degrease (optional)
- B. Cleaning
- C. Water rinsing
- D. Desmutting
- E. Water rinsing
- F. Treating with the ALODINE 2000 processing solution
- G. Water rinsing
- H. Post treatment (seal)
- I. Water rinsing
- J. Drying

4. Materials:

ALODINE 2000 Makeup
ALODINE 2000 Additive
ALODINE 2600 Toner
Deoxidizer (optional)
Desmutter (optional)
(Post treatment)
Testing Reagents and Apparatus

5. Equipment:

It is recommended that process tanks and housing for use with the bath be constructed of 304L or 316L stainless steel. The 316L being preferred for maximum tank life.

HDPE is also suitable material for tanks and housing of this material.

Process piping and pumps should be constructed of 316L and 304L stainless steel alloys. The only plastic pipe recommended is CPVC or PP/PVDF plastic pipe with proper support spacing.

All process circulation pump seals, valve seats, door seals, etc., which come into contact with the process solution and occasional acid equipment cleaners should be EPDM, Hypalon™ or Teflon™.

Heat exchanger plates should be polished 316 stainless steel. Teflon coated heating elements may also be used.

If immersion processing is used, the tank should also be equipped with an air sparger to bubble air through the bath during buildup. Mechanical or air agitation of the bath should be provided.

6. Surface Preparation:

Cleaning:

All metal to be treated with the processing solution must be free from grease, oil and other foreign matter before the treatment. A complete line of cleaners is available from Henkel Surface Technologies under the RIDOLINE® or PARCO® trademark and our representative will recommend the proper one for each installation.

Water Rinsing:

After cleaning, the metal must be thoroughly rinsed with water. The rinse should be overflowed continuously at a rate which will keep it clean and free from scum and contamination.

Deoxidizing:

Aluminum surfaces with corrosion products or thick oxide-coatings should be treated with a deoxidizer prior to the conversion coating treatment step. The deoxidizing step should follow the water rinse and should be followed by a separate water rinse. Our representative can recommend the correct deoxidizer to use.

Rinsing After the Deoxidizer:

It is important to have thorough rinsing of the deoxidizer from workpieces prior to using this conversion coating because relatively small amounts (10 ppm) of sulfate, chloride, fluoride, phosphate severely affect the coating reaction.

The use of a fresh deionized water halo-rinse at the end of the rinse stage just before the conversion coating step is highly recommended to minimize contamination.

Iron based deoxidizers generally cannot be used since greater than 10 ppm of iron in the treatment bath can catalytically decompose the bath.

7. Treating with the ALODINE 2000 Solution:Buildup:

Fill the tank about one-half full with deionized water. Add 10 gallons (U.S.) of ALODINE 2000 and 1.75 gallon of ALODINE 2000 Additive for each 100 gallons of working volume and mix thoroughly. **With the bath temperature 60° to 85° Fahrenheit**, and the spray washer turned on (air sparge if immersion processing) slowly add 0.5 gallon of ALODINE 2600 Toner for each 100 gallons of working volume. Check pH and keep it in the range of 6.8 to 7.2 by adding ALODINE 2000 Additive for increasing the pH and by adding ALODINE 2600 Toner if the pH gets too high. Warm the bath to operating temperature with the spray washer turned on (or air sparge if immersion).

Operation:

Time:

Spray: 90 to 180 seconds.
Immersion: 3 to 12 minutes.
Temperature: 100° to 140° Fahrenheit.

8. Testing and Control:

Never pipet by mouth, use a pipet filler.

The ALODINE 2000 bath is monitored by concentration and pH.

pH Control:

The pH of the treatment is maintained at 6.8 to 7.2 with the addition of ALODINE 2000 additive. When the bath is not being air sparged in immersion processing or sprayed, no change in pH will occur (carbon dioxide in the air is the only contaminant which lowers bath pH provided that no acid from the deoxidizer is dragged in). Addition of 0.3 gallon of ALODINE 2000 Additive per 100 gallons of working bath will raise the pH about 0.25 pH units.

Concentration:

ALODINE 2000 concentration is tested by the following titration:

- A. Pipet a 20 ml sample of working bath into approximately 50 ml of deionized water in a 250-ml beaker (if an aged sludge containing bath is to be titrated the sludge should be filtered or centrifuged from the sample to determine the effective concentration of ALODINE 2000).

- B. Add 1/2 teaspoon (about 2 grams) of sodium bicarbonate (baking soda), stir until dissolved.
- C. Slowly add 5 ml of Reagent Solution 46. Gassing will occur and the solution will turn green. Allow the solution to stand with stirring for about 15 minutes.
- D. Add 5 grams of Reagent 2 and stir until dissolved.
- E. Measure out 10 ml Reagent Solution 49 in a graduated cylinder. Add this slowly to avoid excessive gassing. Allow this to sit one minute. Solution will be orange brown at this point.
- F. Titrate with Titrating Solution 104 until the solution just changes from orange to yellow then add 3 to 5 ml of Indicator 10.
- G. The sample will now be blue black in color. Continue titrating until the blue black color changes to a light pink color.

Concentration of ALODINE 2000: 12 to 18 points (fresh bath typically 13 to 16 points).

Replenishment:

During bath replenishing ALODINE 2000 Makeup, ALODINE 2000 Additive and ALODINE 2600 Toner are added in the same ratio as used during initial charge. To increase the ALODINE concentration 1.0 point (ml) 0.71 gallon per 100 gallons of ALODINE 2000 Makeup is added. Also added for every 1.0 point (ml) increase in concentration (per 100 gallons of bath volume) are 0.125 gallon of ALODINE 2000 Additive and 0.036 gallon of ALODINE 2600 Toner.

9. After Treatment:

Water Rinsing:

After the conversion coating treatment, the work is thoroughly rinsed in room temperature tap water. The rinse should be continuously overflowed and the overflow should be regulated with the rate of production so that the main body of the rinse never becomes excessively contaminated.

Post Treatment:

The coated metal, wet from the water rinse, is treated with a post treatment solution. This treatment substantially increases the adhesion and corrosion resistance of the coating and is an essential part of the process. A number of post treatment chemicals are available and the proper one for each installation will be recommended.

Drying:

Oven drying at 120° to 200° Fahrenheit for approximately 5 to 20 minutes is recommended.

10. Storage Requirements:

Protect product from extreme heat or cold. If product should freeze, thaw in a warm place and mix thoroughly before using.

11. Waste Disposal Information:

Applicable regulations covering disposal and discharge of chemicals should be consulted and followed.

Disposal information for the chemicals in the form as supplied is given on the Material Safety Data Sheet for each product.

The treatment bath and sludge from the bath or waste treatment operation can contain ingredients other than those present in the chemical as supplied and analysis of the solution and/or sludge may be required prior to disposal.

12. Precautionary Information:

When handling the chemical products used in this process, the first aid and handling recommendations on the Material Safety Data Sheet for each product should be read, understood and followed.

The treatment bath contains cobalt. Adequate ventilation should be provided for the process area. Operators should be equipped with rubber gloves and aprons. In case of contact, follow the recommendations on the Material Safety Data Sheet for the ALODINE 2000 chemical.

Testing Reagents and Apparatus

(Order only those items which are not already on hand)

<u>Code</u>	<u>Quantity</u>	<u>Item</u>
205402	2*	Beaker 250-ml
205010	1	Indicator 10
205947	1	Pipet Filler
205943	2	Pipet, Volumetric, Glass, 10-ml
205082	1	Reagent 2 (potassium iodide)
205246	1	Reagent 46 (30% hydrogen peroxide)
205249	1	Reagent 49 (concentrated HCl)
205984	1	Pocket Thermometer (0-220°F)
205104	1	Titrating Solution 104 (0.100N sodium thiosulfate)
205942	1	Volumetric pipet, 5 ml

* One more than necessary to allow for possible breakage.

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