



# Technical Process Bulletin

Technical Process Bulletin No. 1722

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ALODINE® 5200

Conversion Coating Process for Aluminum

## 1. Introduction:

ALODINE 5200 treatment is a chromium free product and specifically formulated for treating aluminum and its alloys. Spray or immersion application may be used. The process provides an excellent base for organic finishes.

## 2. Operating Summary:

<u>Chemical:</u>	<u>Bath Preparation per 100 gallons:</u>
ALODINE 5200	1.5 to 7.5 gallons (configuration dependant)
<u>Operation and Control (Rinsable):</u>	
Concentration*(points)	27 to 7.8
Time*(seconds)	5 to 180
pH*	3.0 to 3.6
Temperature (°Fahrenheit)	70° to 120°
* The actual control ranges used are application specific and will be established through application testing.	

## 3. The Process:

The complete process sequence normally consists of the following steps:

- A. Cleaning
- B. Water Rinsing
- C. Treating with ALODINE 5200 solution
- D. Water Rinsing (preferred)
- E. Drying

## 4. Materials:

ALODINE 5200

ALODINE 5220 Replenisher (optional)

PARCO® Neutralizer 700 (if rinsing after treatment)

PARCOLENE® 95B Defoamer

Testing Reagents and Apparatus

## 5. Equipment

Process tank, housing, pumps and piping should be fabricated from 316L or 304L stainless steel. The 316L being preferred for maximum tank life. A secondary choice is 316 or 304 stainless steel fabricated with approved welding techniques. In spray applications, nozzles fabricated from 316 stainless steel are preferred.

Heat exchanger plates or other heating devices should be polished 316L stainless steel. 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, Viton™ or Teflon™.

Chemical feed pump parts and other elastomers which may come into contact with the concentrated replenishing chemical should be EPDM, Viton or Teflon.

Support equipment available from Henkel Surface Technologies for this process includes: chemical feed pumps, level controls, transfer pumps and bulk storage tanks.

Our sales representative should be consulted for information on Henkel Surface Technologies automatic process control equipment for this process and any additional questions. In addition, the "Henkel Surface Technologies Equipment Design Manual" may be consulted.

All equipment which will be in contact with ALODINE 5200 (or 5220 Replenisher) or processing solution should be thoroughly cleaned prior to use with the process. This includes such items as chemical metering pumps, solution tank, spray nozzles, spray zone shields and housings. Our representative will supply a recommended clean-out procedure which may be followed.

## 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 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.

## 7. Treating with the ALODINE 5200 Processing Solution:

### Buildup:

Recommended buildup is 1.5 to 7.5 gallons of ALODINE 5200 per 100 gallons of processing solution volume.

Fill the tank about three-fourths full with water. Add the proper amount of ALODINE 5200 and then add sufficient water to bring the solution up to the working level. Mix thoroughly and heat to the operating temperature. PARCOLENE 95B Defoamer must be used in spray applications. If bath foams, add 0.1 ounce per 100 gallons of PARCOLENE 95B until foam subsides.

### Operation:

Time: 5 seconds to 2.0 minutes.

Temperature: Ambient to 120° Fahrenheit.

The solution concentration may be increased or reduced to meet specific line conditions. Our representative will assist in establishing the proper concentration.

Replenishment:

ALODINE 5200 Makeup or ALODINE 5220 Replenisher will be used for replenishment, depending on the surface area of metal and type of work processed (the testing and control for both products is the same).

Our representative will recommend the proper replenisher for your system.

8. Testing and Control:

Never pipet by mouth, use a pipet filler.

Concentration:

The concentration of the treatment solution is determined by a simple titration.

Since this is a reverse titration, the treatment bath is used to titrate the solution prepared below.

Pipet (or discharge from a buret) exactly 10 ml of Titrating Solution 15 into a 150 ml beaker, add 50 ml of water, then 5 ml of Reagent Solution 44. The endpoint for this titration is reached when the purple color completely disappears resulting in a clear or slightly brown solution.

The concentration may be determined from the following table:

<u>Titration (ml)</u>	<u>Concentration % by volume</u>
27 .....	1.5
20.0 .....	2.2
14.7 .....	3.0
10.8 .....	4.5
9.8 .....	6.0
7.8 .....	7.5

NOTE: The greater the concentration, the lower the number of mls (points) of titration.

pH Adjustment:

When ALODINE 5200 is used as a rinsable coating during initial tank charge it is necessary to raise the pH of the bath to about 3 to prevent the treatment from etching the aluminum. It is normally required that PARCO Neutralizer 700 be added initially to a rinsable coating bath at 500 ml to 2000 ml per 100 gallons of bath volume. If the product is used dry-in-place, no pH adjustment is used.

9. After Treatment:

Drying:

Parts coming from the coating bath should be dried in an indirectly fired oven or by other means which will not contaminate the metal with fumes, oil or partially burned gases.

Products with cavities or pockets which trap moisture should be blown dry with a jet of clean, compressed air.

If handling of the dried, unpainted work is necessary, operators should wear clean cotton gloves.

10. Storage Requirements:

ALODINE 5200 should be protected from freezing. If the chemical is frozen, it will be irreversibly damaged and should not be used. ALODINE 5200 may precipitate if stored at temperatures below 40° or above 100° Fahrenheit. The product must be stored between 40° and 100° Fahrenheit. If exposed to temperatures outside that range for short periods, the product should be immediately returned to the proper temperature and stirred.

11. Waste Disposal Information:

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

Disposal information for ALODINE 5200 and ALODINE 5220 Replenisher is given on the Material Safety Data Sheet for each product.

The processing bath is pH 3 to 4 and contains fluorides. Waste treatment and neutralization may be required prior to discharge to sewer.

12. Precautionary Information:

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

The processing solution is acidic and may be irritating to skin and may cause burns to eyes. Avoid contact with skin and eyes. In case of contact follow the recommendations for contact given on the Material Safety Data Sheet for ALODINE 5200.

## Testing Reagents and Apparatus

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

<u>Code</u>	<u>Quantity</u>	<u>Item</u>
205400 .....	2*.....	Beaker, 150-ml
205700 .....	1 .....	Buret Assembly, 25-ml Automatic
205943 .....	2* .....	Pipet, 10-ml Volumetric
205947 .....	1 .....	Pipet Filler
205956 .....	1 .....	Pitcher, Graduated, Plastic
205244 .....	2.5 L .....	Reagent Solution 44 ( $50\% \text{H}_2\text{SO}_4$ )
205215 .....	1.0 L .....	Titrating Solution 15 ( $0.042\text{N KMnO}_4$ )

\* Includes one more than actually required, to allow for possible breakage.

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Henkel Surface  
Technologies  
32100 Stephenson  
Highway  
Madison Heights, MI  
48071  
Telephone:  
248-583-9300  
Fax: 248-583-2976

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