



# Technical Process Bulletin

Technical Process Bulletin No. 234087  
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ALODINE® 1500  
 Immersion or Spray Application

1. Introduction:

ALODINE 1500 is a liquid chemical used to produce a protective coating on aluminum or aluminum alloys. The coating provides protection for aluminum and is an excellent bond for clear organic coatings. ALODINE 1500 should be used when the characteristic aluminum appearance must be retained.

ALODINE 1500 is listed on the register for QPL-MIL-C-81706 and is approved to be used by Methods A and C (spray and immersion processing) to produce class 3 coatings in accordance with Military Specification MIL-C-5541 (current issue).

ALODINE 1500 may also be used to process aluminum under Specification MIL-S-5002; however, in processing certain exterior aircraft surfaces, approval of the procuring agency should be secured.

2. Operating Summary:

|                               |  |
|-------------------------------|--|
| <u>Chemical:</u>              | <u>Bath Preparation per 100 gallons:</u> |
| ALODINE 1500                  | 8.7 pounds (1.0 gallon)                  |
| <u>Operation and Control:</u> |  |
| ALODINE Titration             | 6.8 to 7.2 ml                            |
| Temperature                   | 70° to 160° Fahrenheit                   |
| Time                          |  |
| Immersion:                    | 2 to 5 minutes                           |
| Spray:                        | 15 to 30 seconds                         |
| pH                            | Optimum below 4.0                        |

### 3. The Process:

The complete process sequence normally consists of the following steps:

- A. Cleaning
- B. Water Rinsing
- C. Deoxidizing (optional)
- D. Water Rinsing
- E. Treating with ALODINE 1500 processing solution
- F. Water Rinsing
- G. Drying

### 4. Materials:

ALODINE 1500 chemical  
Testing Reagents and Apparatus

### 5. Equipment:

The process tank, housing, pumps and piping should be constructed from stainless steel, such as 316L or 304L. The 316L being preferred for maximum tank life. In all cases, approved welding techniques must be used.

Heat exchanger plates should be polished 316 stainless steel. Gas fired burner tubes are not recommended. All process circulation pump seals, valve seats, 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 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.

### 6. Surface Preparation:

#### Cleaning:

All metal to be treated must be free from grease, oil and other foreign matter before the treatment. A complete line of cleaners is available and our representative should be consulted.

#### Water Rinsing:

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

#### Deoxidizing (optional):

When aluminum to be treated with ALODINE 1500 chemicals has corrosion products or heavy oxide on the surface, it should be cleaned by installing two additional stages between the post cleaner rinse and the treatment stage. One is used for deoxidizing and the second is for an additional cold water rinse.

## 7. Treating with the ALODINE 1500 Processing Solution:

### Buildup:

Fill the tank about three fourths full with cold water. For each 100 gallons of bath add 8.7 pounds (1.0 gallons) of ALODINE 1500 chemical and circulate until thoroughly mixed. Finally, add sufficient water to bring the solution up to the working level and adjust temperature, if necessary.

### Operation:

#### Time

Immersion: 2 to 5 minutes.  
Spray: 15 to 30 seconds.

Temperature: 70° to 160° Fahrenheit.

## 8. Testing and Control:

### ALODINE Titration:

Pour a 50 ml sample of the ALODINE 1500 bath into an iodimetric flask and dilute with water to approximately 100 ml. Add approximately 1 gram (1/2 teaspoon) of Reagent 2 and agitate the solution until the solid material is completely dissolved. Add approximately 10 ml of Reagent Solution 49 in 5 ml increments to the lip of the flask, raising the stopper slightly after each addition to allow the acid to run into the flask. Rinse the lip several times with water and replace the stopper.

Allow the sample to react for approximately one minute, titrate with Titrating Solution 104 until a straw color is obtained. Add several milliliters of Indicator Solution 10 to the sample. The solution should turn blue-black. Continue to titrate with Titrating Solution 104 until the blue-black color disappears.

Record the number of milliliters of Titrating Solution 104 as the ALODINE titration.

ALODINE titration range: 6.8 to 7.2 ml.

To increase the ALODINE titration 1.0 ml: 1.2 pounds (1.1 pints) of ALODINE 1500 chemical per 100 gallons of bath.

### pH Determination:

A pH determination should be made each time the ALODINE 1500 bath is titrated. The pH of the bath should be 4.0 or lower. Should the pH go above 4.0 the bath should be discarded.

## 9. After Treatment:

### Water Rinsing:

To avoid staining, after treating with ALODINE 1500, a final rinse in warm water is recommended. If operating in accordance with MIL-S-5002, the final rinse is mandatory.

### Drying:

Parts coming from the final water rinse should be dried as soon as possible in an indirectly fired oven or by other means which will not contaminate the metal with fumes, oil, or partially burnt gases.

10. Storage Requirements:

ALODINE 1500 chemical freezes at 27° Fahrenheit. Should the chemical become frozen, it should be agitated upon thawing, prior to use. Do not store with chlorine containing materials.

11. Waste Disposal Information:

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

Disposal information for ALODINE 1500 chemical is give on the Material Safety Data Sheet.

The processing bath is acidic and contains chromium and complex fluorides. Waste treatment and neutralization will be required prior to discharge to sewer. (Refer to Waste Treatment Information Bulletin WT1004, available on request.)

12. Precautionary Information:

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

Testing Reagents and Apparatus  
 (Order only those items which are not already on hand.)

| <u>Code</u> | <u>Quantity</u> | <u>Item</u>  |
|-------------|-----------------|--|
| 205999      | 1               | Bung Wrench  |
| 205700      | 1               | Buret assembly, 25-ml Automatic, Glass                                       |
| 205897      | 2*              | Flask, iodimetric, 250-ml  |
| 205852      | 1               | Graduated Cylinder, 50-ml  |
| 205010      | 1 qt            | Indicator 10 (starch solution)   |
| 205590      | 1               | Indicator Dropping Bottle, 2 oz  |
| 205953      | 1               | Pipet, 5-ml, Measuring   |
| 205947      | 1               | Pipet Filler   |
| 205082      | 1 lb            | Reagent 2 (KI)   |
| 205249      | 5 pt            | Reagent Solution 49 (HCl, C.P.)  |
| 205104      | 1 gal           | Titrating Solution 104 (0.1N Na <sub>2</sub> S <sub>2</sub> O <sub>4</sub> ) |

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

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