



# Surface Technologies

## TECHNICAL SERVICE BULLETIN

### ALODINE 1200 L DIP/SPRAY APPLICATION

#### A. SUMMARY

##### 1. INTRODUCTION:

ALODINE 1200L is a liquid chemical used for producing paint-bonding, corrosion-resisting coatings on aluminium and its alloys by either spray or dip processing. For manual application of ALODINE 1200L, refer to Technical Bulletin for ALODINE 1200L/1000L.

##### 2. MAKE-UP AND OPERATION:

ALODINE 1200L is usually made up at 100 litres per 1,000 litres of bath.

The same concentration of ALODINE 1200L is normally used for both spray and immersion processes. The bath is operated at 65-70°C and controlled by pH and a titration.

##### 3. PROCESS SEQUENCE:

1. Preclean
2. Clean with RIDOLENE cleaner
3. Cold water rinse
4. Coat with ALODINE 1200L
5. Cold water rinse
6. Passivation with DEOXYLYTE.

##### 4. EQUIPMENT:

The tank and equipment for ALODINE 1200L should be constructed from stainless steel; type 316 preferred for weldability.

If necessary, heated tanks should be fitted with steamplate coils and side heating (for more even temperature distribution).

Detailed recommendations on equipment and specific process sequences are available from Henkel Technical representatives.

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## **B. TECHNICAL DETAILS:**

### **1. BATH MAKE-UP AND CONTROL:**

#### **(a) Make-up**

For each 1,000 litres of bath volume, add with stirring:

Water	900 litres
ALODINE 1200L	100 litres

#### **(b) Control Points (for normal operation)**

Contact Times Immersion	1-3 mins/Spray	15-30 secs
Spray Pressures	56-84 kPa	
Bath Pointage	6- 7 mls	
pH	3.5 – 4.5	
Temperature	65-70°C	

See Section on Test Methods.

### **2. SURFACE PREPARATION:**

The ALODINE 1200L system requires a perfectly clean surface for uniform results. The work is usually cleaned with a RIDOLINE cleaner. Any corrosion products or heavy uneven oxide layers should be removed by immersion in a Henkel Deoxidiser or Aluminium Etchant. Henkel Technical Representatives will recommend the required cleaning procedure for each installation.

The RIDOLENE Cleaner stages are usually followed by two 30 second, or one 60 second unheated rinse.

The rinse is constantly overflowed to prevent buildup of contamination products.

### **3. TESTING AND BATH MAINTENANCE**

#### **(a) General**

The ALODINE 1200L bath is controlled by pH measurement and one titration.

The pointage is determined regularly and determines the required amounts of ALODINE 1200L to be added to replenish the bath.

#### **(b) Bath Pointage**

- i. Pipette a 50ml sample into a 250ml Iodometric Flask and dilute to about 100ml with water
- ii. Add about 2gm Potassium Iodide crystals, and stir until dissolved.
- iii. Add about 10ml concentrated Hydrochloric acid to the lip of the flask and raise the stopper slightly to allow the acid to run into the flask.
- iv. Rinse stopper with water and raise stopper slightly to allow washings to run into flask.
- v. Allow flask and contents to stand for approximately one minute before titrating with 0.1N Sodium Thiosulphate solution until a pale straw yellow colour is obtained.
- vi. Add a small quantity of Iodine indicator and continue titrating until the blue-black colour just disappears.
- vii. Record the number of millilitres of 0.1N Sodium Thiosulphate used as the Bath Pointage.
- viii. To increase bath pointage by 1ml, add 7.5 litres of ALODINE 1200L per 1,000 litres of bath volume.

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- (c) **Bath pH**
- i. Standardise the pH meter with the correct buffer according to manufacturer's instructions.
  - ii. Dry electrodes and immerse in sample of ALODINE 1200L bath.
  - iii. Take reading when meter stabilises. The optimum pH is just under 4.0
  - iv. Remove electrodes, rinse with distilled water and store in the correct solution.
  - v. The pH will increase as the bath ages. When it reaches 4.5, the solution is exhausted and must be discarded.

4. OPERATIONAL RECOMMENDATIONS:

- (a) The initial charge and replenishment data contained herein are satisfactory for most installations. However your Henkel Technical Representative may suggest a deviation from data if indicated by local conditions.
- (b) If the ALODINE coating is powdery, the cause may be one or more of the following:
- pH too low
  - Temperature and/or concentration too high for treatment time
  - Work improperly cleaned or rinsed
  - ALODINE bath contaminated – analysis required
- (c) If the coating are uniform but iridescent the cause may be one or more of the following:
- pH too high
  - Concentration too low
  - Bath temperature too low for the contact time used
  - Contact time too short
  - Reaction products in solution – analysis required
- (d) If the coatings look patchy, the cause may be one or more of the following:
- Cleaner bath exhausted
  - Incorrect cleaner used
  - More etching required
- (e) if the coatings look yellow instead of clear, the cause could be either:
- Excessive etching leading to smut formation
  - Desmuter could be required
  - Contact time is too long

5. AFTER TREATMENT:

(a) **Cold Water Rinse**

After immersion in the ALODINE 1200L bath, the work should be rinsed for a minimum of 30 seconds in cold water. This tank should have a continuous overflow to avoid build up of contaminants.

(b) **DEOXYLATE Passivation**

The work is then rinsed for 30 seconds with clean, salt-free water containing DEOXYLATE (for maximum corrosion resistance). This stage may be operated hot to facilitate drying, and in some cases may avoid the need for a dry off oven.

(c) **Drying**

The work should then be dried in a indirect fired oven or by other means which will not contaminate the coating with oil fumes or partially burnt gases. The temperature should not exceed 82°C.

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Solution trapped in cavities should be removed by suction, or with compressed air before drying.

6. PLANT MAINTENANCE:

Water rinses are ideally dumped each day and made up afresh. Local Water Authorities should be consulted as to the allowable levels of contaminants that can be discharged to sewer.

Cleaning stages should be skimmed to keep the surface clean and the bath dumped when excessive soil accumulates in the bath.

7. HANDLING PRECAUTIONS:

ALODINE 1200L liquid and bath are acidic and poisonous. Fume or spray vapour from an ALODINE bath is toxic. ALODINE baths should be situated in a positively ventilated area.

If rags, paper or clothing contaminated with ALODINE dry out, they constitute a fire hazard. Clothing should be promptly washed out and rags and paper should be disposed of in the wet state.

Operators handling ALODINE 1200L should wear rubber or heavy plastic gloves, respirators and eye protection. If ALODINE 1200L is splashed onto skin or into eyes, immediately flush with water and seek medical attention.

8. SPECIFICATIONS:

ALODINE 1200L conforms to MIL-S-5002 provided the final rinse is in warm water. It also conforms to MIL-C-5541B, Class 3, Methods A & C.

9. GENERAL:

(a) Electrical Resistance

ALODINE coatings are electrically conductive. The resistance of a coating depends upon its thickness and its age. The lowest resistance is obtained with the lightest coatings, and when coatings are fresh (ie <12 hours old), deoxidised surfaces allow a more uniform deposition (and hence lower resistance) to be obtained.

A typical figure for the resistance for a fresh coating with a weight around 0.1 g/m<sup>2</sup> (9mg/sq.ft) would be 200 micro-ohms. Conversely, the typical conductivity value is 5000 siemens.

(b) Coatings Thickness

This usually ranges from 0.125 – 0.25 micrometres (0.005-0.01 thousandths of an inch).

(c) Coating Flexibility

The flexibility of the conversion coating is equivalent to that of the base metal.

(d) Solubility

The coating is insoluble in alcohol, water, organic and petroleum solvents. It is soluble in strong acids or alkalis.

(e) Coating Weight

Optimum production coatings weights are determined by service and product requirements. Typical prepaint coatings range from 0.06 – 0.1 g/m<sup>2</sup> (5-9 mg/sq.ft).

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