

BONDERITE M-CR T5900 AERO CHROMATE COATING

(KNOWN AS ALODINE T 5900)

Issued: 5/9/2019

INTRODUCTION

BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) treatment develops a complex trivalent chromium conversion coating on aluminum and its alloys, metals coated with IVD aluminum, magnesium, titanium and zinc surfaces. The process provides corrosion resistance and it serves as a base for bonding of paints and adhesives. Neither the product itself nor the conversion coating developed by the process contain hexavalent chromium. BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) can be used in immersion or pressure spray applications.

BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) is a non-hexavalent chrome complex conversion coating which meets the requirements of MIL-DTL-81706, Type II, Classes 1A (A) and 3 (B), Methods A, B, and C.

BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) is listed on the QPL for MIL-DTL-81706

BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) is authorized for use on parts that need to meet MIL-DTL-5541 Type II coatings.

OPERATING SUMMARY

<u>Chemical:</u>	<u>Bath Preparation per 100 Gallons:</u>
BONDERITE M-CR T5900 AERO (known as ALODINE T 5900)	5 gallons (5% by volume)
BONDERITE M-AD T5900 AERO (known as ALODINE T 5900 TONER)	1 gallon (1% by volume)

<u>Operation and Control:</u>	
pH	3.8 to 4.0
Concentration	3% to 10 %
Temperature	68 – 110°F (20-43°C)
Immersion Time	5 – 10 minutes
Spray Time	1.5 – 10 minutes

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PROCESS

The complete process sequence for Henkel BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) treatment normally consists of the following steps:

- A. Non-etch Alkaline Cleaning
- B. Water rinse
- C. Deoxidizing for MIL-DTL-5541, Class 3; optional for Class 1A
- D. Water rinse
- E. Treating with the BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) processing solution
- F. D.I. water rinsing
- G. Drying

MATERIALS

BONDERITE M-CR T5900 AERO (known as ALODINE T 5900)
BONDERITE M-AD T5900 AERO (known as ALODINE T 5900 TONER)
Sulfuric (5% by volume) Acid Solution

EQUIPMENT

Process tank and housing for the BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) should be fabricated from stainless steel, such as 316L or 304L. Alloy 316L being preferred for maximum tank life. In all cases, approved welding techniques must be used. Polyvinyl chloride (PVC) or CPVC lined mild steel can be used.

In spray applications process piping and pumps should be constructed of 316 or 304 stainless steel alloys. Various formulations of plastic pipe may be used with recommended support spacing, Schedule-80 is recommended. PVC Type I is limited to maximum process temperatures of 140° Fahrenheit. CPVC and PP may be used up to a maximum process temperature of 190° Fahrenheit. PVDF may be used for all expected operating temperatures.

Heat exchanger plates should be polished 316 stainless steel. Gas fired burner tubes are not recommended. All process circulation pump seals, valve seats, door seals, etc., which may come into contact with the process solution and occasional acid equipment cleaners, should be EPDM, FKM or PTFE.

Chemical feed pump parts and other elastomers which may come into contact with the concentrated replenishing chemical should be FKM or PTFE.

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SURFACE PREPARATION

Cleaning:

All surfaces to be treated with BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) must be free from grease, oil and other foreign matter before the treatment.

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 other contamination.

Deoxidizing (optional):

If the aluminum is to be treated with BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) processing chemical for Class 3 coatings or if the surface has corrosion products or heavy oxides, it should be conditioned by installing two additional steps between the post cleaner rinse and the BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) treatment step. One is for deoxidizing with a deoxidizing chemical, such as BONDERITE C-IC METAL GLO 6 AERO (known as TURCO METAL GLO #6), and one is for an additional cold-water rinse.

TREATING WITH THE BONDERITE M-CR T5900 (known as ALODINE T 5900) PROCESSING SOLUTION

Buildup:

Acid proof equipment is required. Fill the tank about three-fourths full using DI water, temperature 75° to 100° Fahrenheit (24 to 38°C). For each 100 gallons (378.5 liters) of final solution volume, add 1 gallon (3.8 liters) of BONDERITE M-AD T5900 AERO (known as ALODINE T 5900 TONER) and circulate or thoroughly mix, then add 5 gallons (18.9 liters) of BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) and thoroughly mix. Finally, add sufficient water to bring the solution up to the working level and then heat, if necessary, to the desired operating temperature.

Operation:

Time: 1 to 10 minutes

Temperature: 68° to 110° Fahrenheit (20 to 43°C)

Each alloy reacts with the BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) solution to produce a coating that is characteristic of that alloy. The bath should produce a light, blue to iridescent blue, coating within the operating conditions selected.

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Immersion Processing:

Concentration of BONDERITE M-AD T5900 AERO	1%
Concentration of BONDERITE M-CR T5900 AERO	5%
pH	3.8 - 4.0
Temperature	68 - 110°F (20-43°C)
Time	5 - 10 minutes
Agitation	Slow

Spray Processing:

Concentration of BONDERITE M-AD T5900 AERO	1%
Concentration of BONDERITE M-CR T5900 AERO	5%
pH	3.8 - 4.0
Temperature	68 - 110°F (20-43°C)
Time	1.5 – 10 minutes
Pressure	6 - 12 psi

Note: DI water, with conductivity less than 5 micro siemens, should be used to charge the BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) tank.

Monitoring pH is very important for BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) bath. Levels of pH outside of the prescribed ranges will result in failure of the bath to provide optimal coating.

For bath makeup and maintenance, if the pH is less than 3.8, small additions of BONDERITE M-AD T5900 AERO (known as ALODINE T 5900 TONER) must be made with agitation or circulation

For bath makeup and maintenance, if the pH is above 4.0 but less than 4.4, small additions of 5% Sulfuric Acid must be made with agitation or circulation. Use Sulfuric acid only for this pH adjustment. For baths over a pH of 4.4 the BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) cannot be put back into solution and the bath should be replaced.

For working solutions, always make any needed additions of water, BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) to the bath and allow for complete mixing before adjusting the pH, as stated above.



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TESTING AND CONTROL

Never pipet by mouth, use a pipet filler bulb.

HACH Method 8024, Alkaline Hypobromite Oxidation Method.

Hach meter DR/890 Colorimeter is used for the following procedure.

Concentration:

Pipet a 10 mL sample of the BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) bath into a 100 mL volumetric flask and dilute to the mark with deionized water (dilution #1). Pipet 5 mL of the dilution #1 into a 500 mL volumetric flask and dilute to the mark with deionized water (dilution #2). Dilution #2 will be the testing solution (sample) for the following HACH Method 8024 needed to determine the chromium level.

First fill the round sample cell with 25 mL of the above sample. Add the contents of one Chromium 1 Reagent Powder Pillow cap and mix well. Remove the cap and place in a boiling water bath for 5 minutes. Replace the cap and be sure to secure tightly. Cool the sample cell to 77°F (25°C) under running water. Remove the cap and add the contents of one Chromium 2 Reagent Power Pillow, cap and invert to mix. Remove cap and add one Acid Reagent Powder Pillow, cap and invert to mix. Remove cap and add one ChromaVer 3 Chromium Reagent Powder Pillow, cap and invert to mix. Allow a 5-minute reaction time.

Prepare a blank by filling another sample cell with 25 mL of the sample prepared in the 500 mL volumetric flask.

Zero the colorimeter with the blank and read the prepared sample.

To determine the bath concentration:

Reading in mg/L of Prepared Sample X 11.79 = % of BONDERITE M-CR T5900 AERO (known as ALODINE T 5900)

To increase the value of BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) by 1 point (%):

Add 1 gallon of BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) to 100 gallons of the bath and follow with 0.2 gallons of BONDERITE M-AD T5900 AERO (known as ALODINE T 5900 TONER).

AFTER TREATMENT

Water Rinsing:

After treating with BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) the work should be thoroughly rinsed in clean, cold water. The rinse should be continuously overflowed such that the main body of the rinse never becomes excessively contaminated.



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Post Treatment:

After the treated metal is given a 'tap or city' water rinse, a 5 - 15 second D.I. water rinse is desired to remove water borne salts from the conversion coated surface. These salts normally cause spotting or leave behind light films which may adversely effect paint adhesion, paints resistance to moisture blistering, appearance, etc.

Drying:

Parts coming from the final water rinse or post treatment stage can be dried in an indirectly fired oven or by any other means which will not contaminate the treated metal. Peak metal temperature should not exceed 140° Fahrenheit (60° C).

STORAGE REQUIREMENTS

No special storage requirements are required for BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) or BONDERITE M-AD T5900 AERO (known as ALODINE T 5900 TONER). If any of these products were to freeze after extended storage at a low temperature, thaw in a warm place and very carefully stir thoroughly (until no solids are observed) before use.

WASTE DISPOSAL INFORMATION

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

Disposal information for BONDERITE M-CR T5900 AERO (known as ALODINE T 5900) and BONDERITE M-AD T5900 AERO (known as ALODINE T 5900 TONER) is given on the Material Safety Data Sheet for each product.

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

PRECAUTION

Consult the appropriate Material Safety Data Sheets for safety and handling guidelines for the products listed in this bulletin.

NOTICE:

The above information and recommendations concerning this product are based upon our laboratory tests and field use experience with this or similar products. However, since conditions of actual use are beyond our control, any recommendations or suggestions are made without warranty, express or implied. Manufacturer's and seller's sole obligation shall be to replace that portion of the product shown to be defective. Neither shall be liable for any loss, damage, or injury, direct or consequential, arising out of the use of this product.



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

<u>Code</u>	<u>Quantity</u>	<u>Item</u>
xxxxxx	2*	Volumetric Flask, 100-mL
89000-794**	2*	Volumetric Flask, 500-mL
89003-482** ...	2*	Pipet, 5-mL Volumetric
89003-350** ...	2*	Pipet, 10-ml Volumetric
53497-009** ...	1	Pipet Filler

Contact the Hach Company at (800) 227-4224 for the following reagents and apparatus.

xxxxxx	1	Hach meter DR/890 Colorimeter
24019-06	2	HACH Sample Cells
22425-00	1	Total chromium reagent set (100 tests)

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

** VWR Part # - vwr.com or 800-932-5000

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