

**BONDERITE C-AK 4338 AERO  
ALKALINE PERMANGANATE  
(KNOWN AS TURCO 4338)**

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**INTRODUCTION:**

BONDERITE C-AK 4338 AERO is an alkaline permanganate formulation developed specifically for jet engine cleaning. It is used to modify high temperature heat scale by chemically changing the structure of the oxide deposit to one that is less tenacious and properly conditioned for ease of removal.

BONDERITE C-AK 4338 AERO should not be used on reactive alloys such as aluminum.

**FEATURES:**

- A free flowing granular mixture having a characteristic permanganate color
- Diluted with water for use
- Used on all ferrous and high temperature alloys
- Meets the corrosion requirements of MIL-D-26549A, Amd. 2
- Used in mild steel tanks

**USE INSTRUCTIONS:**

**Step 1.** Immerse parts in BONDERITE C-AK ARR-4181 AERO at 240 to 360 g/L and 90° to 95°C for 30 to 60 minutes.

**Step 2.** Water overflow dip rinse.

**Step 3.** Immerse parts in BONDERITE C-AK 4338 AERO at 180 to 300 g/L and 90° to 95°C for 30 to 60 minutes. (Tanks may be of mild steel.)

**Step 4.** Water overflow dip rinse thoroughly.

**Step 5.** Final clean in BONDERITE C-AK ARR-4181 AERO and 240 to 360 g/L at 90° to 95°C.

**Step 6.** Water dip rinse and follow with pressure rinse with air/water hand rinse gun to blast off the loosened scale deposits.

**CONTROL:**

**This procedure is run first before Potassium Permanganate Concentration. Two procedures may be used. Procedure A is used when a pH meter is available. Procedure B is used when a pH meter is not available.**



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**Apparatus:**

1. pH Meter
2. 205402 - Beaker, 250 mL
3. Magnetic stirrer
4. 205953 - Pipet, 5 mL
5. 205700 - Buret, 25 mL

**Reagents:**

1. 1.0 N Sulfuric Acid
2. 205003 - Indicator 3 (Phenolphthalein)
3. Methyl Alcohol
4. Whatman Filter paper # 41

**Procedure A:**

1. Pipet 5 mL sample cooled to room temperature into a 250-mL beaker.
2. Add 100 mL DI water.
3. Titrate with 1.0 N Sulfuric Acid to pH 7.

**Procedure B:**

1. If pH meter is not available, pipet 5 mL of sample cooled to room temperature into a 250 mL beaker.
2. Add 5 mL of methyl alcohol and stir until the solution turns brown. Add 40 mL of DI water and mix. Filter and wash with DI water.
3. Add 3 drops of Indicator 3 to the filtrate.
4. Titrate to the disappearance of the pink color with 1.0 N sulfuric acid.

**Calculation:**

mL of 1.0 N Sulfuric Acid X 0.140 = lbs /gal Bonderite

**Maintenance:**

1. Maintain bath concentration within recommended range by adding fresh materials
2. If the concentration of BONDERITE C-AK 4338 AERO is below the bottom of the desired concentration range:

(B - lbs/gal found) X solution tank volume = lbs BONDERITE C-AK 4338 AERO to be added  
(Where B is the middle of the desired concentration range)

Example: If the bath were found to contain 1.6 lbs/gal, and it was desired to maintain the concentration in the range 2 -2.5 lbs/gal, in a 100 gal tank add:

(2.25 - 1.6) X 100 = 65 lbs T 4338 to be added

Recommended Concentration: 2 -2.5 lbs/gal

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**BONDERITE C-AK 4338 AERO  
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This procedure is run after BONDERITE C-AK 4338 AERO Concentration (Alkalinity) has been passed and adjusted.

**Apparatus:**

1. 205700 - Buret, 25 mL
2. 205892 - 250 mL Erlenmeyer flask
3. Magnetic stirrer
4. 205941 - Pipet, 2 mL

**Reagents:**

1. 205326 - Titrating Solution 26 (0.1 N Potassium Permanganate)
2. Sulfuric acid, conc.
3. 205443 - Titrating Solution 1565 (0.1 N Ferrous Ammonium Sulfate)

**Procedure:**

1. Allow the sample of BONDERITE C-AK 4338 AERO to cool and to settle before sampling. Manganese dioxide will settle out.
2. Pipet 2.0 ml BONDERITE C-AK 4338 AERO into an Erlenmeyer flask. Add 20 mL DI water and 1 mL conc sulfuric acid.
3. Pipet 50 mL of TS 1565 into the Erlenmeyer flask.
4. Back titrate with TS 26 until the solution turns pink.

**Calculation:**

$(50.0 - \text{mL of TS 26}) \times 0.211 = \text{oz/gal potassium permanganate in the BONDERITE C-AK 4338 AERO operating bath}$

**Maintenance:**

1. Maintain bath concentration within recommended range by adding fresh materials.
2. Recommended range: 6.3 - 8 oz/gal of potassium permanganate

**Note: A rapid drop in Potassium Permanganate content of the solution can result from contamination with organic materials and /or reducing agents. Be sure that all carbon and oil contamination is removed from work and that parts are thoroughly cleaned and water rinsed before immersion in the BONDERITE C-AK 4338 AERO solution.**

**DISPOSAL INFORMATION:**

Dispose of spent solution per local, state and regional regulations. Refer to HENKEL SURFACE TECHNOLOGIES MATERIAL SAFETY DATA SHEET for additional disposal information.



**BONDERITE C-AK 4338 AERO  
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**DANGER! Contact may cause severe burns to skin and eyes.**

BONDERITE C-AK 4338 AERO contains potassium hydroxide, potassium permanganate and fluoride salt. Avoid contact with eyes, skin and clothing. Do not take internally. Use with adequate (equivalent to outdoor) ventilation.

BONDERITE C-AK 4338 AERO is a strongly alkaline, highly-oxidizing compound which will produce burns on contact with skin. Protective clothing, such as a chemical face shield or goggles, gloves, boots and apron made from alkali-resistant materials should be worn when using and handling this product. A **NIOSH-approved** respirator should be worn when handling dry powders.

Make-up compound should be added to the tank by carefully sprinkling the powder on top of the tank solution while solution is being agitated. Add make-up compound to tank when tank has been allowed to cool to room temperature to prevent steam eruptions.

Hazardous carbon monoxide gas can be formed upon contact with food and beverage products in enclosed spaces and can be fatal. Follow appropriate tank entry procedure. (See ANSI Z117.1-1977.)

Store and transport in closed containers, away from organic materials, such as paints, lubricants, paper and wood products, at a temperature below 55°C.

Before using this product refer to container label and HENKEL SURFACE TECHNOLOGIES MATERIAL SAFETY DATA SHEET for additional precautionary, handling and first aid information.

**NOTICE:**

**The above information and recommendations concerning this product are based upon our laboratory tests and field use experience. 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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