



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

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INTRODUCTION:

BONDERITE C-AK 4338C AERO (known as Turco 4338-C) 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.

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

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

USE INSTRUCTIONS:

1. Immerse parts in BONDERITE C-AK 4181L AERO (known as TURCO Alkaline Rust Remover (T-4181) at 240 to 360 g/L and 90° to 95°C for 30 to 60 minutes.
2. Water overflow dip rinse.
3. Immerse parts in BONDERITE C-AK 4338C AERO at 180 to 300 g/L and 90° to 95°C for 30 to 60 minutes. (Tanks may be of mild steel.)
4. Water overflow dip rinse thoroughly.
5. Final clean in BONDERITE C-AK 4181L AERO (known as TURCO Alkaline Rust Remover (T-4181) at 240 to 360 g/L and 90° to 95°C.
6. Water dip rinse and follow with pressure rinse with air/water hand rinse gun to blast off the loosened scale deposits and reveal the shiny base metal surface.





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CONTROL:

Alkalinity Titration:

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. Perform the Alkalinity Titration before the Potassium Permanganate.

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 40mL 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 0.135 = lbs /gal BONDERITE C-AK 4338C AERO





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Maintenance:

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

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

Example: If the bath was found to contain 1.6 lbs/gal, and it was desired to maintain the concentration in the range 1.5 - 2.5 lbs/gal, in a 100 gal tank add:

$(2 - 1.6) \times 100 = 40 \text{ lbs BONDERITE C-AK 4338C AERO to be added}$

Recommended Concentration: 1.5 - 2.5 lbs/gal

Potassium Permanganate Titration

This procedure is run after the alkalinity has been passed and adjusted.

Apparatus:

1. Buret, 50 mL
2. 250 mL Erlenmayer flask
3. Magnetic stirrer
4. Pipet, 2 mL

Reagents:

1. 0.1 N Potassium Permanganate
2. Sulfuric acid, conc.

0.1 N Ferrous Ammonium Sulfate prepared by dissolving 39.214 grams of Ferrous Ammonium Sulfate, $\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$ in 10% sulfuric acid/DI water (**Warning!! check MSDS, wear safety glasses and protective clothing**). Cool solution, dilute to 1 liter with DI water. Standardize against 0.1 N Potassium Permanganate before using.

Procedure C:

1. Allow the sample of BONDERITE C-AK 4338C AERO to cool and to settle before sampling. Manganese dioxide will settle out.
2. Pipet 2.0 ml BONDERITE C-AK 4338C AERO into an Erlenmayer flask. Add 20 mL DI water and 1 mL conc sulfuric acid (**Warning: check MSDS, use safety glasses and protective clothing**).
3. Pipet 50 mL of 0.1 N Ferrous Ammonium Sulfate into the Erlenmayer flask.
4. Back titrate with 0.1 N Potassium Permanganate until the solution turns pink.





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Calculation:

$(50.0 - \text{mL of } 0.1 \text{ N Potassium Permanganate}) \times 0.211 = \text{oz/gal Potassium Permanganate in BONDERITE C-AK 4338C AERO}$

Maintenance:

Maintain bath concentration within recommended range by adding fresh materials. Recommended range: 6.3 - 8.0 oz/gal

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 4338C AERO solution.

DISPOSAL INFORMATION:

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

PRECAUTIONARY INFORMATION:

DANGER! Contact may cause severe burns to skin and eyes.

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

BONDERITE C-AK 4338C 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 equipped with a mechanical filter should be worn for mist conditions.

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.





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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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