BONDERITE®

Technical Process Bulletin

BONDERITE C-AK 4338L AERO ALKALINE PERMANGANATE

(KNOWN AS TURCO 4338-L PT 1 & 2)

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INTRODUCTION:

BONDERITE C-AK 4338L AERO (known as TURCO 4338-L) is a 2-part liquid alkaline permanganate formulation developed specifically for jet engine cleaning. BONDERITE C-AK 4338L AERO modifies high temperature heat scale by chemically changing the structure of the oxide deposit to one that is properly conditioned for ease of chemical removal in subsequent processing steps.

FEATURES:

- Supplied as two liquid concentrates that are mixed together with water for greater safety and ease of handling compared to powdered products. Each part may be used for both tank makeup and tank maintenance.
- BONDERITE C-AK 4338L AERO may be used over a wide range of concentrations to handle various types of scale.
- BONDERITE C-AK 4338L AERO is used on all ferrous and high temperature alloys.
- BONDERITE C-AK 4338L AERO can be used in mild steel tanks.

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

HOW TO USE BONDERITE C-AK 4338L AERO:

Prepare a solution of BONDERITE C-AK 4338L AERO by first adding enough water to comprise about 40% of the final volume. While mixing, add sufficient BONDERITE C-AK 4338L AERO Part 1 and BONDERITE C-AK 4338L AERO Part 2 for each individually to comprise 15 to 25% by volume of the final solution. BONDERITE C-AK 4338L AERO Parts 1 and 2 should be used in equal volumes. BONDERITE C-AK 4338L AERO Part 1 should be added to the water first, while mixing. The appropriate amount of BONDERITE C-AK 4338L AERO Part 2 should then be added to that solution, while continuing to mix. Heat to 194°F (90ºC) while mixing. Add sufficient good quality water to make up the final volume while mixing.

Step 1. Immerse parts in BONDERITE C-AK 4181 GL (known as TURCO 4181-GL) at 25-35% by volume at 176° to 203°F (80º to 95ºC) for 30 to 60 minutes.

Step 2. Thorough water overflow dip rinse.

Step 3. Immerse parts in BONDERITE C-AK 4338L AERO solution at 176° to 203°F (80º to 95ºC) for 30 to 60 minutes.

Step 4. Thorough water overflow dip rinse.

Step 5. Optional descaling treatment.

Step 6. Water dip rinse. Follow with pressure rinse with air/water hand rinse gun to blast off the loosened scale deposit and reveal the shiny base metal surface.

Step 7. Final clean in BONDERITE C-AK 4181 GL (known as TURCO 4181-GL) at 25-35% at 176° to 203°F (80º to 95ºC).

Step 8. Thorough water overflow dip rinse.

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CONTROL:
CONCENTRATION OF BONDERITE C-AK 4338L AERO PART 1:

Apparatus:
1. 168522 - Pipet, measuring, 5ml
2. 164014 - Buret, 25 mL
3. 168497 - Beaker, 250 mL
4. 168509 - Cylinder, 50 mL
5. pH meter

Reagents:
1. 1.0 N Sulfuric Acid

Procedure:
1. Obtain a sample from the bath, cool to room temperature.
2. Pipet 5 mL into a 250mL beaker containing 100 mL DI water.
3. Titrate with 1.0 N sulfuric acid to pH 8.3 and record this value as 'A'. Continue titrating to pH 4.0 and record this value as 'B'

Calculation:
[(2 x A)-B] x 1.05 = % by volume BONDERITE C-AK 4338L AERO Part 1

CONCENTRATION OF BONDERITE C-AK 4338L AERO PART 2:

Apparatus:
1. 168522 - Pipet, 5 ml, measuring
2. 168517 – Pipet, 10 mL, volumetric
3. 164014 - Buret, 25 mL
4. 168513 - Erlenmeyer Flask, 250 mL
5. - Flask, Volumetric, 100 mL

Reagents:
1. 596015 - Titrating Solution 1565 (0.1N Ferrous Ammonium Sulfate)
2. 592431 - Titrating Solution 30 (0.1N Potassium Dichromate)
3. 592403 - Indicator 12 (Ferroin Indicator)
4. Concentrated Sulfuric Acid

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Procedure:

1. Obtain a sample from the bath. Filter sample while warm, ~120°F (49°C) through Whatman GF/A glass fiber filter paper or equivalent. Cool the filtered sample to room temperature.

2. Using a 5 mL measuring Pipet, measure 5 mL into a 100 mL volumetric flask. Make to volume with deionized water and mix.

3. Pipet a 10 mL aliquot into a 250 mL Erlenmeyer flask. Add 25 mL of deionized water and slowly add 2 mL of concentrated sulfuric acid.

4. Titrate with Titrating Solution 1565 to a pale yellow or yellowish-brown endpoint.

Calculation:
mL Titrating Solution 1565 x Normality of Titrating Solution 1565 x 21.8 =
% by volume of BONDERITE C-AK 4338L AERO Part 2

Ferrous Ammonium Sulfate Standardization:
1. Pipet 25 mL of 0.1N Ferrous Ammonium Sulfate into a 250 mL Erlenmeyer flask
2. Add 5 mL of concentrated sulfuric acid.
3. Add 4-6 drops of Indicator 12 (Ferroin indicator)
4. Titrate with Titrating Solution 30 (0.1N Potassium Dichromate) to a bluish-green endpoint

Calculation:

$$\frac{(\text{mL 0.1N Potassium Dichromate}) \times (0.100)}{25} = \text{Normality of Ferrous Ammonium Sulfate}$$

DISPOSAL INFORMATION:
Dispose of sludge and/or spent solution per local, state and regional regulations. Refer to your HENKEL MATERIAL SAFETY DATA SHEET for additional information.

PRECAUTIONARY INFORMATION

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

The BONDERITE C-AK 4338L AERO solution contains sodium hydroxide and permanganate. Avoid contact with eyes, skin and clothing. Do not take internally. Use with adequate (equivalent to outdoor) ventilation. BONDERITE C-AK 4338L AERO is a strongly alkaline, highly oxidizing solution which will produce burns on contact with skin. Protective clothing, such as a chemical face shield or goggles, gloves, boots and apron, made of alkali resistant materials should be worn when using and handling this product. 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.)

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Store and transport in closed containers away from organic materials, such as paints, lubricants, paper and wood products, at a temperature below 131°F (55ºC).

Before using this product refer to container label and the HENKEL 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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