Product Data Sheet

Cee-Bee® A-504-NP

Cee-Bee® A-504-NP is a powdered, alkaline etchant for aluminum where cleaning and etching are required. This product produces a fine etch on aluminum and its alloys.

Conforms To

- Boeing
  - BAC 5786
    - "Etch Cleaning of Aluminum Alloys"
- Lockheed
  - STM 32-303 Rev. C
  - EMAP - Item Number G32.222

Benefits

- Provides a fine etch on aluminum and its alloys.
- Cleans and removes scale from aluminum prior to further operations.
- Produces a foam blanket to control sodium hydroxide mist and hydrogen that is generated during the etching process.
- Etch rates of about 2 mils/surface/hour.

Properties

- Free-flowing powder
- White in color

Notes Prior to Handling

Before using your Cee-Bee® products, all safety and operating instructions should be read and understood. If you have any questions, please contact your Cee-Bee® representative before proceeding.

Use Procedure

Equipment Recommendation

- The process tank, all piping, pumps, and associated equipment should be fabricated from stainless steel (316L preferred) or acid resistant plastic.
- All pump seals, valve seats, and other elastomers which come in contact with the solution should be EPDM, Teflon, or Viton.

Make Up Instructions

1. Fill the tank 50% full of clear, ambient temperature water.
2. Slowly add between 2 - 4 ounces per gallon (15 - 30 gram/liter) Cee-Bee® A-504-NP
3. Mix to ensure complete dissolution of the product.
4. Add water to bring bath up to final working volume.
5. Agitate solution (either air or mechanical) for 50-60 minutes.
6. Bring to operating temperature.

Use Instructions

- **Operating Temperature**
  - Operate solution within a temperature range of 120 - 160°F (50 - 70°C). Heating is necessary to achieve etch rates of 1.3 – 2.2 mils/surface/hour. At the lower end of the temperature scale, the etch rate will be about 1.3 mils/surface/hour. At the high end, the rate will exceed 4 mil/surf/hour.
- **Processing Time**
  - Processing times will vary with alloy, condition of bath, amount of oxide/discoloration/smut on the part, and temperature. Generally speaking, 2-10 minutes for immersion.
- **Rinsing**
  - Immediately rinse parts in cold water by immersion with air agitation or by spray. These tanks should be overflowed to control buildup of contaminants.

Solution Control

Reagents and Equipment for Analysis of Cee-Bee® A-504-NP

- 250 ml Erlenmeyer Flask
- 10 ml Volumetric Pipet
- Phenolphthalein Indicator
- Deionized or Distilled Water
- 100 ml Graduated Cylinder
- Sodium Fluoride, Reagent Grade
- 0.5 N Sulfuric Acid

Part A - Determination of "Total" Cee-Bee® A-504-NP

1. Add 100 ml of deionized or distilled water into a 250 ml Erlenmeyer flask.
2. Pipet a 10 ml bath sample of Cee-Bee® A-504-NP to the flask.
3. Add 5 drops of phenolphthalein indicator.
4. Titrate the sample with 0.5N Sulfuric Acid until the pink color disappears.
    a. **KEEP SOLUTION FOR USE IN PART B.**

Calculations

ml of 0.5 N Acid x 0.416 = Total ounces/gallon of Cee-Bee® A-504-NP
ml of 0.5 N Acid x 3.12 = Total g/l of Cee-Bee® A-504-NP.

Part B – Determination of Consumed Cee-Bee® A-504-NP

1. Add 1 gram of sodium fluoride to the Part A solution. The solution should turn pink again as aluminum releases hydroxide back into the solution.
2. Titrate with 0.5 N Sulfuric acid until pink color disappears.

Calculations

ml of 0.5 N acid x 0.262 = ounces/gallon of "consumed" Cee-Bee® A-504-NP.
ml of 0.5 N acid x 1.965 = grams/liter of "consumed" Cee-Bee® A-504-NP

Solution Control is Continued on Page 4.

Solution Control (continued)

Etchant Control

Imperial

$$\left(\frac{\text{ounces}}{\text{gallon}}\text{ of Total Cee-Bee}^{®}\text{ A-504-NP (Part A)}\right) - \left(\frac{\text{ounces}}{\text{gallon}}\text{ of Consumed Cee-Bee}^{®}\text{ A-504-NP (Part B)}\right)$$
$$= \left(\text{ Available Cee-Bee}^{®}\text{ A-504-NP in }\frac{\text{ounces}}{\text{gallon}}\right)$$

- Add Cee-Bee® A-504-NP to bring "Available" Cee-Bee® A-504-NP to 3.0 ounces/gallon.

Metric

$$\left(\frac{\text{grams}}{\text{liter}}\text{ of Total Cee-Bee}^{®}\text{ A-504-NP (Part A)}\right) - \left(\frac{\text{grams}}{\text{liter}}\text{ of Consumed Cee-Bee}^{®}\text{ A-504-NP (Part B)}\right)$$
$$= \left(\text{ Available Cee-Bee}^{®}\text{ A-504-NP in }\frac{\text{grams}}{\text{liter}}\right)$$

- Add Cee-Bee® A-504-NP to bring "Available" Cee-Bee® A-504-NP to 22.5 grams/liter.

Note

- The solution should be dumped when "Consumed" Cee-Bee® A-504-NP reaches 8.0 ounces/gallon or 60 grams/liter.

Etch Rate Calculation

- The etch rate of the bath can be measured using the formula below:

$$Etch\ Rate = \frac{(I-F)(Th)30}{(I)(I.T.)} = mil/surface/hour$$

I = Initial mass (grams)
F = Final mass (grams)
Th = Initial Thickness (mils)
I.T. = Immersion Time (minutes)

- A 2024 bare panel immersed in a non-agitated solution of Cee-Bee® A-504-NP should exhibit an etch rate of 1 - 4 mils/side/hour.

Safety, Handling, and Precautions

- **WARNING!** This product contains sodium hydroxide. It can cause severe burns to eyes and skin.
- Wear face shield, gloves, boots and other proper protective clothing sufficient to avoid contact with eyes and skin. Proper eye protection is always absolutely essential.
- In case of accidental contact, flush area with water for at least 15 minutes. Seek medical attention promptly if irritation persists.
- Avoid splashing nearby personnel during spray rinsing.
- Avoid breathing spray mist. Use adequate ventilation.

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