

Cee-Bee[®] A-601L

Cee-Bee[®] A-601L is a liquid chromated, medium-to-heavy duty deoxidizer that will deoxidize, desmut, and etch aluminum and aluminum alloys prior to dye penetrant inspection, anodizing, resistance welding, and conversion coating.

Conforms To

- Boeing
 - BAC 5765 (Partial Testing)
- Lockheed
 - STM 32-402C
 - Class II, Type 2
 - EMAP G32.024 Version: 37
- Thrush Manufacturing
 - Process Spec #525-11

Benefits

- One chemistry process.
- Can be used in both spray and immersion applications.
- Effectively removes surface oxides, surface discoloration due to heat treatment, and smut resulting from alkaline etching or chemical milling.
- Can be made up with either nitric acid (improved bare salt spray performance) or sulfuric acid (low surface resistance for spot welding).
- Can be used to strip anodizing films.
- Simple titrations can control system components.
- No heat required.

Properties

- Orange brown liquid
- Approximate pH of 3.2

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

- 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 with clear, ambient temperature water.
2. Slowly add 10% (by volume of final working solution) 42° Baumé Nitric Acid or 5% (by volume of final working solution) 66° Baumé Sulfuric Acid.
3. While mixing, slowly add 7% (by volume of final working solution) Cee-Bee[®] A-601L.
4. Add water to bring bath up to final working volume.
5. Agitate solution (either air or mechanical) for 50-60 minutes.

Use Instructions

1. Operating Temperature

- a. Operate solution within a temperature range of 65-85°F (18-30°C). Heating is not necessary unless the temperature falls below 65°F (18°C). It must be noted that there is an increase in metal removal (etch rate) as the temperature increases. A new solution will generate more heat (exothermic) when first made up; however, it will stabilize over a couple of days. Air agitation helps assist in reducing this exothermic condition.

2. Processing Time

- a. 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 and 30 seconds to 5 minutes for spray. For immersion, agitation is recommended for a uniform removal of oxide from the surface of aluminum.

3. Rinsing

- a. 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

Nitric/Sulfuric Acid Titration

Reagents and Equipment

- 250 ml Erlenmeyer Flask
- 2 ml Volumetric Pipet
- Bromcresol Green Indicator
- 100 ml Graduated Cylinder
- Deionized or Distilled Water
- 1.0N NaOH Titrating Solution

Nitric/Sulfuric Acid Titration Instructions

1. Add 100 ml of deionized or distilled water into a 250 ml Erlenmeyer flask.
2. Pipette a 2 ml bath sample of Cee-Bee[®] A-601L to the flask.
3. Add 10 drops of bromcresol green indicator.
4. Titrate the sample with 1.0N NaOH to a blue-green endpoint.

Nitric/Sulfuric Acid Titration Calculations

ml of 1.0N NaOH X 3.4 = % by volume of Nitric Acid or
ml of 1.0N NaOH X 1.4 = % by volume of Sulfuric Acid.

- Add 42° Baume Nitric Acid or 66° Baume Sulfuric to bring the percentage up to 10% (for nitric acid) or 5% (for sulfuric acid).

Solution Control (Continued)

Cee-Bee[®] A-601L Concentration

Reagents and Equipment

- 250 ml Erlenmeyer Flask
- 5 ml Volumetric Pipet
- 10% KI Solution
- 0.5% Soluble Starch Solution
- Deionized or Distilled Water
- 100 ml Graduated Cylinder
- 1:1 HCl Solution
- 0.1N Sodium Thiosulfate
- 15 ml Volumetric Pipette

Cee-Bee[®] A-601L Concentration Titration Instructions

1. Add 100 ml of deionized or distilled water into a 250 ml Erlenmeyer flask.
2. Pipette a 5 ml bath sample of Cee-Bee[®] A-601L to the flask.
3. Add 30 ml of 10% KI solution.
4. Add 15 ml of 1:1 HCl solution. Let stand for approximately 1 minute.
5. Titrate with 0.1N Sodium Thiosulfate until a golden color appears. Add several drops of the soluble starch solution. A blue-black color will appear.
6. Continue titration until the blue-black color disappears to a colorless endpoint.

Cee-Bee[®] A-601L Concentration Calculations

ml of 0.1N Sodium Thiosulfate X 0.33 = % by volume of Cee-Bee[®] A-601L. (Target 21 mls).

! Etch Rate Calculation

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

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

I = Initial mass (grams)

Th = Initial Thickness (mils)

F = Final mass (grams)

I.T. = Immersion Time (minutes)

- A 2024 clad panel immersed in a non-agitated solution of Cee-Bee[®] A-601L should exhibit an etch rate of 0.1 – 0.4 mils/side/hour. The etch rate can be maintained by periodic additions of HF or ABF (ammonium bifluoride) along with base material of Cee-Bee[®] A-601L. To prolong the solution life of Cee-Bee[®] A-601L, it is suggested to maintain etch rate of 0.15 – 0.25. It also should be noted that an increase in agitation of the solution will result in an increase in etch rate as more solution is circulated around the parts.

! Safety, Handling, and Precautions

- CONTAINS CHROMIC ACID**
- WARNING!** 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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