CEE-BEE A-663
Non-chromated Deoxidizer

Cee-Bee AVIATION PRODUCTS

data sheet

CEE-BEE A-663 is a new chrome-free, 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.

BENEFITS

- Contains no chromium in any oxidation state.
- 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.
- Increased bath life when processing copper containing alloys.
- Simple titrations can control system components.
- No heat required.

CONFORMS TO

- **UNITED LAUNCH ALLIANCE DPM 8996**
- **LOCKHEED MARTIN STM32-402C, CLASS 1 AND II, TYPE 2**
- **LOCKHEED MARTIN EMAP ITEM G32.0232 VERSION:7**

NOTE: To place an order, email, call or FAX Customer Service at
800-932-7006 / FAX 1-216-441-1377
orders@mcgean.com
Cee-Bee A-663 Product Code # 21023

NOTES PRIOR TO HANDLING

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

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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 25% (by volume of final working solution) 42^{o} Baumé Nitric Acid. This is 350 g/liter 42° Baumé Nitric Acid.
3. The operating range is 20% - 30% by volume 42^{o} Baumé Nitric Acid. This is 280 – 420 g/liter 42^{o} Baumé Nitric Acid)
4. While mixing, slowly add 15% (by volume of final working solution) Cee-Bee A-663. This is 195 g/liter Cee-Bee A-663.
5. The operating range 12.5% - 17.5% by volume Cee-Bee A-663. This is 162.5 – 227.5 g/liter of Cee-Bee A-663.
6. Add water to bring bath up to final working volume.
7. Agitate solution (either air or mechanical) for 50-60 minutes.

USE INSTRUCTIONS

Operating Temperature – Operate solution within a temperature range of 65° – 78° F (18°C - 26° 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.

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 and 30 seconds to 5 minutes for spray.

Rinsing – Immediately rinse parts in cold water by immersion with air agitation or by spray. These tanks should be overflowed to control build up of contaminants.

SOLUTION CONTROL

Reagents and Equipment for Nitric Acid Titration

250 ml Erlenmeyer Flask	50 ml graduated cylinder
5 ml Volumetric pipet	25% KF Solution
Phenolphthalein Indicator	1.0N NaOH Titrating Solution
Deionized or distilled water	

1. Add 50ml of deionized or distilled water into a 250 ml Erlenmeyer flask.
2. Pipet a 5 ml bath sample of Cee-Bee A-663 bath to the flask.
3. Add 15 ml of 25% KF Reagent solution and 5 drops of phenolphthalein.
4. Titrate the sample with 1.0N NaOH to a permanent pink endpoint.
5. ml of 1.0N X 1.2 = % by volume of 42^{o} Baumé Nitric Acid.
6. Operating range is 20% - 30% by volume 42^{o} Baumé Nitric Acid. (280 – 420 g/liter 42^{o} Baumé Nitric Acid).

Reagents and Equipment for Concentration of Cee-Bee A-663

250 ml Graduated Glass Beaker	pH meter and pH electrode; calibrated
5 ml Volumetric pipet	Hotplate – magnetic stirrer
Magnetic stir bar	Magnetic Stirrer
Thermometer	50 ml Buret
0.05M EDTA standard solution	5-Sulfosalicylic Acid, A.C.S Reagent Grade
Boric Acid, A.C.S. Reagent Grade	Deionized or distilled water

1. Pipet a 5 ml bath sample of Cee-Bee A-663 bath into a 250 ml graduated beaker.
2. Dilute to the 125 mL mark with DI or distilled water and add a magnetic stir bar.
3. Add 1-2 g of boric acid and stir until solids dissolve completely.
4. Insert pH electrode(s), stir and measure the pH while adding small quantities of glycine until the pH is 2.5. Remove the electrodes, rinsing thoroughly with DI water back into the beaker.
5. Place on hotplate-stirrer and warm to between 45°C and 50°C.
6. With stirring, add 1g of 5-sulfosalicylic acid. Solution will turn dark red. Titrate with 0.05M EDTA standard solution until a pure yellow color appears. This is the endpoint.
7. Confirm the endpoint by adding a few more crystals of the 5-sulfo salicylic acid. The solution should remain yellow. If not, continue adding the 0.05M EDTA standard solution dropwise until it returns to a pure yellow color.

8. **The temperature of the solution must not fall below 40°C during the entire procedure. If it does, heat it to between 40°C and 45°C again before continuing.**

% by volume of A-663 = mL 0.05M EDTA x 0.575

9. Operating range = 12.5% - 17.5% by volume.

Etch Rate –

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

A 2024 clad panel immersed in a non-agitated solution of Cee-Bee A-663 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 Ammonium Bifluoride along with base material of Cee-Bee A-663.

PROPERTIES

- A greenish brown, acidic liquid. pH less than 1.

PRECAUTIONS

- **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.

Revised 12/16