

Accu-LABS INC.

4831 S. Whipple Avenue
Chicago IL 60632
Phone: 773.523.3100 Fax: 773.523.4008
www.accu-labs.com

A2LA Accredited ISO/IEC 17025:2005 Certificate # 2558.01

BAC-7

General Description:

Accu-Labs BAC-7 (Bright Acid Copper) process produces very bright and leveled deposits over a wide current density range, at extremely flexible operating parameters. The process offers high conductivity with excellent plate distribution; and performs well in barrel and rack applications.

Advantages:

- Easy to Use – Dual component for makeup and single component for maintenance. Less inventory of chemistry required.
- Versatile & Stable – May be operated within a wide range of concentrations and current densities with excellent throwing power of a bright level deposit.

Operating Guidelines	Rack/Barrel Process
Copper Sulfate	115-225 g/l (15-30 oz/gal) (application dependent)
Sulfuric Acid 66° Be´	3-15% by volume (application dependent)
Chloride Ion	50-90 ppm
BAC-7 Carrier	0.75%-1.50% by volume or per Hull Cell
BAC-7 Brightener	0.50%-0.75% by volume or per Hull Cell
Temperature	70-90°F
Current Density	Cathode: 90 ASF Max Anode: 10-40 ASF
Anodes	1:1 Ratio of High Grade Phosphorized Copper Anode Bags should be polypropylene or Dynel leached in 5% sulfuric for 8 hours.
Agitation	Moderate filtered low pressure air. NOT COMPRESSED
Filtration	Continuous 10-20 microns

New Solution Makeup:

1. NOTE: DI water for makeup and maintenance should not have chloride ion content in excess of 70 ppm.
2. Add required amount of purified liquid copper sulfate.
3. Add the required amount concentrated reagent grade sulfuric acid; add SLOWLY to moderately agitated solution to avoid exothermic reaction.
4. When temperature of solution is 70-90°F analyze the chloride ion and adjust to 70 ppm if necessary. Use CP grade HCl; DO NOT EXCEED 90 PPM.
5. Add required amount of BAC-7 Carrier and Brightener and water to level.
6. Electrolyze solution by “dummy plating” for 30 minutes at normal conditions.

Solution Control:

Regular concentration checks for copper sulfate, sulfuric, and chloride by titration are the best way to maintain effectiveness and economy. A titration procedure is available below. However, the simple use of a hydrometer can be used to assist in maintenance. For each degree Baume´ below 20° Be´ add 1.3 oz/gallon of copper sulfate and 0.2 fluid oz/gallon of sulfuric acid or a ratio determined by your technical service team.

BAC-7 is best controlled by use of a conventional plating test, such as the Hull Cell. The Hull Cell will determine the amount of additive needed to bring the bath to optimum operating level, provided that all other constituents are within proper chemical composition range. The process panels will monitor the production work and keep it cosmetically acceptable. **BAC-7 Brightener** is the only maintenance additive usually required to keep the electrolyte functioning properly. The additive should be replenished at a rate of 500-1000 mls for every 1000 ampere-hours. If high CD areas are burning continuously and the copper sulfate, sulfuric and HCl are in range then **BAC-7 Carrier** can be used to reduce or eliminate by adding in 1.0 ml per liter increments.

NOTE: This replenishment recommendation is a guideline only; certain applications may require more or less depending on the condition of equipment i.e. loss due to drag-out, equipment leaks, operating practices etc.

A sample should be sent to **Accu-Labs** periodically to serve as a check against one’s own analysis.

Analytical Procedure:

Copper Sulfate in Copper Sulfate Solution

- Pipette 2 ml sample into 250 ml Erlenmeyer flask
- Add ~50 ml distilled water
- Add ~1 gram of ammonium bifluoride and mix thoroughly
- Add 10 ml of 15% potassium iodide and mix thoroughly
- Titrate with 0.1N sodium thiosulfate until brown color begins to fade
- Add 5 ml starch indicator (0.5% starch in 1% zinc chloride solution) until blue color disappears for one minute

Calculation:

Mls of 0.1N sodium thiosulfate used x 1.67 = oz/gal copper sulfate pentahydrate

Mls of 0.1N sodium thiosulfate used x 12.51 = g/L copper sulfate pentahydrate

Sulfuric Acid in Copper Sulfate Solution

- Pipette 1 ml sample into Erlenmeyer flask
- Add 50 ml distilled water
- Add 5 drops of methyl-orange indicator (0.1% aqueous solution)
- Titrate with 0.1N sodium hydroxide until color changes from pink to yellow

Calculation:

Mls of 0.1N sodium hydroxide used x 0.28 = % by volume sulfuric acid (66°Be´)

Mls of 0.1N sodium hydroxide used x 0.36 = fluid oz/gal sulfuric acid (66°Be´)

Chloride Ion in Copper Sulfate Solution

- Pipette 25 ml of solution into 250 ml Erlenmeyer flask
- Add 30 ml of distilled water
- Add 20 ml of 1:1 nitric acid
- Add 2-3 drops of silver nitrate to produce turbidity
- Titrate with mercuric nitrate while stirring until turbidity just clears (to make mercuric nitrate dissolve 1.083 grams of mercuric oxide in 5 ml of 1:1 nitric acid and dilute to 1 liter; no need to standardize)

Calculation:

Mls of mercuric nitrate x 355 / ml of sample = ppm chloride ion

NOTE: The range of mls of mercuric nitrate for a 25 ml sample should be 3.5-6.5

Handling Considerations: Always wear eye protection and personal protective gear when handling or working with this product; do not take internally and avoid contact with skin or eyes. Read MSDS prior to use.

Disclaimer: While we believe the aforementioned information to be true and accurate; ***Accu-Labs, Inc.*** disclaims any liability since the conditions of use are beyond our control.