

EBONOL® C-115

Immersion oxidising material for copper and brass

BENEFITS OF USING EBONOL C-115

Properties

Benefits

Produces a wide range of colours

Less products to inventory; reduced storage requirements

All liquid concentrate; diluted with water

Lower shipping and material costs; no chemicals to dissolve

Fast acting to produce uniform colour rapidly

Reduced production time; process more work per shift

Reliable and versatile

Finishes will not change colour; consistent, uniform coating; processes large, flat surfaces as well as small irregular shapes

Applicable to barrel operations

Used in batch processing

EBONOL C-115 is a liquid concentrate that is diluted with water to make an operating solution that produces decorative oxide finishes on copper and copper alloys in a minimum amount of time. The EBONOL C-115 process produces a wide range of attractive colours from light brown to statuary bronze (including U.S. 10B finishes) to jet black. However, the process is particularly effective on brass and brass plate where attractive brown colours, such as antique brass and English bronze, can be developed.

The EBONOL C-115 coating is a quality finish that is very adherent; however, the coating has little corrosion resistance and is used primarily for decorative purposes on items such as architectural hardware and lamps. Finishes produced by EBONOL C-115 do not change colour when hot-air dried, burnished, or lacquered. In addition, EBONOL C-115 produces consistent uniform coatings on large, flat surfaces as well as small irregular shapes and is applicable to barrel operations for batch processing.

OPERATING CONDITIONS

Concentration	Varies
Temperature	24-29°C
Time	30 seconds to 3 minutes as required

COLOUR FORMATION

Colour formation is dependant upon the time of immersion and the concentration of the solution. The longer the immersion time, the darker the colour produced; the more concentrated the solution, the faster the formation of a dark coating. Some experimentation should be performed to determine the immersion time and solution concentration necessary to produce the specific colour required.

The following can serve as a guideline for producing the desired colour:

Black finish:

250 ml/l EBONOL C-115 at 24 - 29°C produce the black finish (usually 1 - 3 minutes depending upon the copper alloy).
Determine by test the shortest immersion time necessary to produce the black finish (usually 1 - 3 minutes depending upon the copper alloy).

Brown finish:

50-110 ml/l EBONOL C-115 at 24 -29°C 30 - 60 second immersion, depending upon the alloy. A light brown statuary colour will be developed with a intermediate brown to black brown colours will be developed with proportionately stronger concentrations. Required immersion time can be shortened or lengthened by varying the amount of water added to the concentrate.

OPERATION

Surface condition of the metal before immersion determines the type of final finish.

For a high gloss finish, polish metal before colouring. Flat, non-reflective finishes are obtained on etched or sand blasted surfaces. Parts should be clean when immersed in the EBONOL C-115 solution.

Use alkaline soak cleaners or vapor degrease.

Do not use petroleum solvents. Plated surfaces must be free of brighteners and chromate's.

Residual cyanide from plating processes must be neutralised with a 5% by volume sulfuric acid solution.

Rinse with running water. A thorough rinse must be used following alkaline cleaners and sulfuric acid to avoid contaminating the mildly acidic EBONOL C-115 solution.

Immerse parts in EBONOL C-115 solution for the length of time necessary to achieve desired colour.

Agitate parts and/or solution to break air bubbles and to assure solution contact with all surfaces.

Small parts are most easily coloured by tumbling them in solution. Perforated plastic baskets should be used to contain the parts. Remove the parts from the solution and rinse thoroughly with running water.

The final finish is easily relieved when wet by steel wool wiping, scratch brushing or mechanical buffing to produce a variety of antiques or highlighted finishes. To produce a uniform colour finish, tumble small parts in saw dust or cob meal to dry them and remove the fine layer of spent chemicals from the surfaces.

Large pieces can be wiped dry or buffed. It is recommended that a clear, protective lacquer be applied to the coating to provide maximum service life and enhance the depth of colour.

Brass plated parts processed in EBONOL C-115 solutions should have at least 7.6 microns of brass plate in low current density areas to ensure proper colour formation.

Solutions can be stored indefinitely in closed containers without loss of strength. When not in use, open tanks of solution should be covered to minimise water evaporation. The active chemicals will not evaporate. The solution is depleted only through use. Life of the solution will be reduced by immersing parts longer than necessary.

EQUIPMENT

Plastic tanks or tanks lined with polyethylene, polyethylene, or rubber can be used for EBONOL C-115 solutions. Ceramic tanks are also satisfactory. Exhaust ventilation is required to remove fumes. Suitable filtration such as plastic or rubber-lined filters are recommended to remove any particles which may form during the colouring reaction.

CONTROL

The colouring process with EBONOL C-115 is a chemical reaction between the solution and metal surface. Chemical activity is gradually diminished as the solution is used but may be restored to desired strength by adding fresh EBONOL C-115 concentrate.

The following can serve as a basis for replenishing the working solution:

Length of immersion time:

When the immersion time required to produce the desired colour increases, add sufficient EBONOL C-115 concentrate to reduce the immersion time to the previous duration.

Surface area to be coloured:

One litre of EBONOL C-115 concentrate will colour approximately 11 - 14 m². By determining the number of parts or the dm² of metal surface to be coloured per hour or per shift, the proper time for replenishing can be calculated.

Alternatively, the following detailed analytical procedure for replenishing EBONOL C-115 operating solutions may be used:

Apparatus needed

10 ml pipette
25 ml graduated cylinder
50 ml burette
500 ml Erlenmeyer flask
Eyedropper

Reagents needed

0.1N sodium thiosulfate (Na₂S₂O₃·5H₂O)
Dissolve 24.8 grams of AR grade Na₂S₂O₃·5H₂O in water and dilute to 1 litre in a volumetric flask. Standardise as needed.

1.1N hydrochloric acid (HCl)
Dilute 500 ml of AR grade HCl to 1 litre with water.

1% potassium iodide solution (KI) - Dissolve 1 gram of AR grade KI in 100 ml of water. Discard when solution becomes yellow.

0.2% starch solution
Mix 2 grams soluble starch with a little cold water to make a smooth paste. With stirring, dilute this paste to 1 litre with boiling water. Boil the mixture until it clears. Add a pinch of red mercuric iodide as a preservative.

0.0575M EDTA solution
Dissolve 21.4 grams EDTA · 2H₂O, Na₂, (disodium ethylene diaminetetra-acetate) and 6 grams of AR grade sodium hydroxide in 500 ml of distilled water. Allow to cool and dilute to 1 litre with distilled water in a volumetric flask. This solution should be standardised vs. a zinc solution of known concentration.

Murexide indicator

Mix 0.2 grams of murexide powder (acid ammonium purpurate) with 10 grams of sodium chloride, AR grade. Grind together with a mortar and pestle.

Procedure

1. Pipette a 10 ml sample of the bath into a 500 ml Erlenmeyer flask. Add 50 ml of water.
2. Add a "pinch" of murexide indicator and mix well; solution should be orange in colour.
3. Titre with 0.0575M EDTA solution to a purple endpoint.
4. Add 25 ml of 1.1N HCl and several drops of starch indicator solution.
5. With an eyedropper, add several drops of 1% KI solution to just form a clear blue colour in flask. Avoid excess KI.
6. Titre with 0.1N Na₂S₂O until the blue colour begins to fade. Add another drop of KI solution and continue to titre repeating KI additions drop-wise until a permanent endpoint is achieved. Record ml used.

Calculation

(ml Na₂S₂O₃ titrated) x (Normality of Na₂S₂O₂) x 123.5 = ml/l EBONOL C-115

WASTE TREATMENT

A detailed waste treatment procedure for EBONOL C-115 solutions is available on request.

CAUTION

Exhaust ventilation must be provided to remove fumes from the EBONOL C-115 solution. Do not allow the EBONOL C-115 solution to come in contact with acids or strong oxidising agents as such contact may produce toxic fumes. Avoid contact of the EBONOL C-115 liquid concentrate and its solutions with the skin or eyes. Protective clothing, gloves and face shield should be worn by the operator. In case of contact, flush skin or eyes with plenty of cold water for 15 minutes and obtain medical attention. EBONOL C-115 liquid concentrate and its solutions are poisonous; do not take internally. The finish produced by this product contains toxic selenium compounds. Gloves, protective clothing and respirators approved for selenium compounds must be worn by those engaged in finishing operations and handling of work so treated.

Exhaust ventilation should be provided to remove toxic dust when the EBONOL C-115 coating is being mechanically relieved. The EBONOL C-115 coating should be kept wet during relieving operations.

HANDLING AND SAFETY INSTRUCTIONS

For detailed information consult the material safety data sheets for this product.
Please read material safety data sheets carefully before using this product.

DISCLAIMER

All recommendations and suggestions in this bulletin concerning the use of our products are based upon tests and data believed to be reliable. Since the actual use by others is beyond our control, no guarantee expressed or implied, is made by Enthone, its subsidiaries or distributors, as to the effects of such use or results to be obtained, nor is any information to be construed as a recommendation to infringe any patent.

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