ACTRONAL™ 660

For Electronic Finishing Applications

Regional Product Availability			
N. America	Japan/Korea	Asia	Europe
✔		✔	✔

DESCRIPTION

Actronal 660 is an acidic descaler designed to remove the oxides and heat scale from copper-based alloys.

ADVANTAGES

- Short immersion time
- Contains no halide ions
- Completely non-foaming solution
- Low acidity

BATH MAKE-UP

Chemicals Required	Metric	(U.S.)
Deionized Water	750 ml/l	(75% v/v)
Sulfuric Acid	50 ml/l	(5% v/v)
Actronal 660 Make-up Liquid	100 ml/l	(10% v/v)
Actronal 660 Make-up Salts	40 g/l	(5.3 oz./gal.)

MAKE-UP PROCEDURE

1. Add deionized water to tank.
2. SLOWLY, add sulfuric acid and mix thoroughly. CAUTION! Reaction is exothermic: heat is generated.
3. Allow solution to cool to below 45°C (110°F).
4. Add Actronal 660 Make-up Liquid and mix thoroughly.
5. Add Actronal 660 Make-up Salts and mix until completely dissolved.
6. Dilute to final volume with deionized water.

Bath Operation—Metric		
Parameter	**Range**	**Recommended**
Actronal 660 Make-up Liquid	50–150 ml/l	100 ml/l
Actronal 660 Make-up Salts	30–50 g/l	40 g/l
Sulfuric Acid	30–80 ml/l	50 ml/l
Temperature	20–50°C	40°C
Immersion Time	30 seconds–5 minutes, depending on severity of scale and solution temperature	

Bath Operation—U.S.		
Parameter	**Range**	**Recommended**
Actronal 660 Make-up Liquid	5–15% v/v	10% v/v
Actronal 660 Make-up Salts	4–6.7 oz./gal.	5.3 oz/gal.
Sulfuric Acid	3–8% v/v	5% v/v
Temperature	70–120°F	104°F
Immersion Time	30 seconds–5 minutes, depending on severity of scale and solution temperature	

Notes

1. Operating temperature should not exceed 50°C (123°F) to avoid premature bath decomposition.
2. Agitation should be implemented whenever solution heating is employed to prevent localized overheating of solution.
3. When a heavy oxide scale is encountered, it is recommended to process parts through an electrocleaner, such as Ronaclean GP-300 LF, prior to the Actronal 660.

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4. Concentration of Actronal 660 Make-up Liquid and sulfuric acid are determined by using the analytical procedure for total acidity (this page). Replenishment is based on analysis, which should be performed once per day.
5. Concentration of Actronal 660 Make-up Salt is determined by volumetric analysis (next page). Replenishment is best accomplished by utilizing additions of a stock solution containing 150 to 200 g/l Actronal 660 Make-up Salt in deionized water (without sulfuric acid). The stock solution should be kept for no longer than two (2) days. Analysis should be performed once per day.
6. The Actronal 660 working solution will become turbid after dissolving tin or tin-lead deposits from racks or previously plated packages. This turbidity will not affect the Actronal 660 performance if the contamination contents do not exceed the following levels:

   Tin: 500 ppm

   Lead: 200 ppm
7. Actronal 660 working solution will become blue from dissolved copper during usage. It is recommended that the copper content not exceed 5 g/l.

BATH MAINTAINANCE

Actronal 660 Make-up Salts and total acid concentrations are controlled by volumetric analysis as detailed in the next column.

DETERMINATION OF TOTAL ACID CONTENT

I. Equipment

a) 10 ml Transfer pipette

b) 250 ml Erlenmeyer flask

c) 100 ml Graduated cylinder

II. Reagents

Phenolphthalein indicator

III. Titrant

Sodium hydroxide solution, 1.0N (1.0M)

IV. Procedure

a) Pipette a 10.0 ml sample of the Actronal 660 working solution into a 250 ml Erlenmeyer flask.

b) Add 100 ml deionized water and mix thoroughly.

c) Add 10 drops Phenolphthalein Indicator and mix thoroughly.

d) Titrate with 1.0N sodium hydroxide to a pink end point.

V. Calculation

Total Acid Content (Normality) =

ml Titrant x Normality x 0.1

The total acid content in the Actronal 660 working solution should be maintained between 1.0 and 3.0N.

To increase acid normality by 0.5 units, add 12.5 ml/l sulfuric acid and 27.8 ml/l Actronal 660 Make-up Liquid.

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DETERMINATION OF ACTRONAL 660 MAKE-UP SALTS

I. Equipment

a) 10 ml Transfer pipette

b) three 20 ml Transfer pipettes

c) 100 ml Volumetric flask

d) 250 ml Erlenmeyer flask

II. Reagents

a) 0.1N Oxalic acid

b) 10 g/l Silver sulphate in a solution of 100 ml/l (10% v/v) sulfuric acid

III. Titrant

0.1N Potassium permanganate

IV. Procedure

a) Pipette 20.0 ml of Actronal 660 solution into a 100 ml volumetric flask and dilute to the mark with deionized water. Stopper flask and mix thoroughly.

b) Pipette 10.0 ml of the diluted solution into a 250 ml Erlenmeyer flask.

c) Pipette 20.0 ml of 0.1N oxalic acid into flask and mix thoroughly.

d) Pipette 20.0 ml of silver sulphate reagent into flask and mix thoroughly.

e) Heat to about 80°C (175°F) for 20 minutes until all the carbon dioxide is dissolved.

f) Titrate while solution remains hot with 0.1N potassium permanganate.

V. Calculation

Concentration of Actronal 660 Make-up Salts (g/l) =

(ml of Oxalic Acid x Normality -
ml of Potassium Permanganate x Normality) x 89.3

EQUIPMENT

Tanks: PVC or Polypropylene

Heaters: Silica sheathed or Teflon™ fluoropolymer coated immersion

Note: Stainless steel is not recommended.

PRODUCT DATA

For the specific Product Data values, please refer to the Certificate of Analysis provided with the shipment of the product(s).

ASSOCIATED PRODUCTS

Actronal 660 Make-up Liquid
Actronal 660 Make-up Salts

HANDLING PRECAUTIONS

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

CAUTION! Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

CAUTION! Failure to maintain proper volume level when using immersion heaters can expose tank and solution to excessive heat resulting in a possible combustion hazard, particularly when plastic tanks are used.

STORAGE

Store products in tightly closed original containers at temperatures recommended on the product label.

DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Rohm and Haas Electronic Materials Technical Representative for more information.

ELECTRONIC MATERIALS

Circuit Board Technologies

CMP Technologies

Flat Panel Display Technologies

Microelectronic Technologies

Packaging and Finishing Technologies

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