



CUPURE™ Cyanide Free Alkaline Copper Plating

Regional Product Availability

- Europe, Middle East and Africa

Description

CUPURE™ Cyanide Free Alkaline Copper is a plating product that is easy to maintain and offers semi-bright ductile deposits with good throwing power. It is an excellent choice on steel as a stop-off for carburising or nitriding and as a pre-plate for nickel, acid copper or other finishes.

Operational Data

Parameter	Range	Optimum
Copper metal	11.2 - 18.7 g/L	15 g/L
Potassium Hydroxide	75 - 80 g/L	77.5 g/L
pH	10 - 10.5	10.3
S.G.	1.14 - 1.18	1.165
Temperature	60 - 70°C	65°C
Cathode current density	0.5 - 4 ASD	2 ASD
Anode/cathode ratio	2 : 1	
Agitation	Air sparging with filtered air plus cathode rod movement for rack operation. Solution and mechanical movement for barrel operation.	
Deposition rate *	at 2 ASD ca. 0.4 µm / minute	
	at 3 ASD ca. 0.6 µm / minute	

*These properties are typical, should not be construed as specifications.

Pretreatment

The CUPURE™ Cyanide Free Alkaline Copper Plating product can be used directly onto most steel substrates, however the use of a CUPURE Strike product is recommended for those applications where high levels of contaminants are introduced into the main CUPURE Bath or when ultimate adhesion properties are required.

Brass and leaded Brass substrates can also be plated directly in the CUPURE Cyanide Free Alkaline Copper Plating Bath.

For pre-treated Aluminium and Zinc based die castings the use of CUPRON™ Strike product is recommended.

In all cases a pre-treatment schedule should be developed by applications laboratory trials.

CUPURE Cyanide Free Alkaline Copper Plating product is designed to run with most cleaning cycles, but the following procedures are recommended to facilitate optimum performance.

Acid Dip after Alkaline Cleaning

Use a 10% solution of Phosphoric Acid or Sulfuric Acid.

Acid Neutralising Dip

For high drag-over operations, when significant quantities of Phosphoric Acid or Sulfuric Acid could enter the CUPURE Bath, a pre-dip solution of 30 - 100 ml/L CUPURE Complexor Liquid in deionised water is recommended. The pH should be adjusted to 10 – 13 as required using KOH Solution 500 g/L.

Contaminant Effects

A build up of Iron, chloride, fluoride and hard water salts may cause Copper metal precipitation in the CUPURE Bath. This problem can be somewhat alleviated by increasing the specific gravity of the process above optimum.

Bath Make Up for 1 Litre

Chemicals Required	Optimum
Deionised water	300 ml
CUPURE™ Make Up Concentrate	333 ml
KOH Solution 500 g/L	170 ml
CUPURE H501	10.0 ml
CUPURE L301	2.5 ml
CUPURE CD-1	40 ml
CUPURE Wetting Agent (ER)-1	2.5 ml

Make Up Procedure

1. Add ca. 30% of final volume deionised water to appropriately cleaned storage tank.
2. Add the required volume of CUPURE™ Make Up Concentrate.
3. With constant mixing and without allowing temperature to rise above 70°C, add KOH Solution 500 g/L in small increments until solution begins to precipitate. Then quickly add the remainder of the KOH Solution 500 g/L until pH is 9.6 at 60°C.
4. Add approximately 100 ml/L deionised water.
5. Add 1 g/L activated carbon and mix for 30 minutes. Let carbon settle.
6. Filter solution into plating tank through a 1 micron filter.
7. Add all the CUPURE additives.
8. Dilute to final volume with deionised water then switch on circulation pumps and heaters

Equipment	Tank	PVC, polyethylene, polypropylene, or plastic lined steel
	Anodes	Phosphorised deoxidised copper (0.02 - 0.08%P) slabs or nuggets in Titanium baskets. Ensure 2:1 anode to cathode area ratio. OFHC anodes should not be used
	Anode Bags	Dynel or polypropylene
	Heaters	PVDF-clad panel heaters with thermostatic control.
	Filtration	Preferably continuous using 5 microns woven polypropylene cartridges. Flow rate at least three times tank volume/hour. Periodic carbon filtration is beneficial.
	Extraction	Recommended

Solution
Maintenance

CUPURE™ Complexor Liquid

The specific gravity (S.G.) should be maintained at optimum in order to ensure that this component is at the correct concentration. The CUPURE Complexor Liquid is acidic, therefore, the pH must be checked and adjusted after each addition. To increase S.G. by 0.01, add 80 ml/L CUPURE Complexor Liquid and 40 ml/L KOH Solution 500 g/L.

CUPURE Make Up Concentrate

This material supplies 45 g/L Copper metal. If solution analysis indicates low copper content, add 17 ml/L to raise Copper metal by 0.75 g/L. CUPURE Make Up Concentrate is strongly acidic, therefore the pH should checked and adjusted after all additions.

CUPURE H501

The material supplies brightness and grain refinement, particularly in the high current density area, and the amount required depends upon the degree of brightness required. For most applications, replenish with 10 - 20 ml per 100 Ah. The brightener is best controlled by Hull cell tests.

CUPURE L301

This material supplies the low current density area brightness and grain refinement. For most applications, replenish with 10 - 20 ml per 100 Ah.

CUPURE CD-1

This material helps improve the corrosion of the Copper anodes and helps to maintain the Copper metal content of the bath during plating. The concentration can vary from 30 ml to 50 ml/L as required. The CUPURE CD-1 can be replenished based on dragout or by additions of 5 - 10 ml per 100 Ah. Too high a concentration of CUPURE CD-1 will lower the cathode efficiency.

CUPURE Wetting Agent (ER)-1

Adding 2.5 ml/L CUPURE Wetting Agent (ER) -1 to a CUPURE Bath will produce a smaller grain size and uniform deposit brightness.

CUPURE™ Working Solution

For new solution the use of CUPURE Working Solution 15 g/L or 8 g/L Copper (depending on application) is recommended. When using CUPURE Working Solution, activated carbon treatment is not required. **CAUTION** the as supplied CUPURE Working Solutions do not contain any wetting Agent. For new installations where CUPURE Working Solution is used an addition of 2.5 ml/L CUPURE Wetting Agent (ER)-1 is required.

pH Adjustment

Measure pH at room temperature. Use 50% Phosphoric Acid to lower pH and KOH Solution 500 g/L to increase pH

List of Products

CUPURE™ Working Solution
CUPURE Working Solution (8 g/L Cu)
CUPURE Make Up Concentrate
CUPURE H501
CUPURE L301
CUPURE CD-1
CUPURE Wetting Agent (ER)-1
CUPURE Complexor Liquid
KOH Solution 500 g/L

Handling Precautions

Before using this product, associated generic chemicals or the analytical reagents required for its control, consult the supplier's Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on material 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 Dow Electronic Materials Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

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