



MecEtchBond CZ-5480

SOLDER RESIST PRE-CLEANING

DESCRIPTION

MecEtchBond CZ-5480 is a nitric acid based micro-etching solution to process copper surfaces of PWB prior to solder resist printing in PWB processes.

Cleaning methods such as mechanical scrubbing or pumice nor traditional chemical cleaning processes such as persulphate can no longer meet the latest requirements for solder resist adhesion.

Our newly-developed MecEtchBond CZ-5480 provides a unique copper surface topography that is not possible to get with the conventional chemical cleaning. It enhances the adhesion force between copper surface and resin.

CZ-5480 can efficiently be used in current chemical cleaning systems because it is usable in stainless steel or titanium.

Our MecEtchBond CZ-5480 will contribute much to your solution of various problems as well as the improvement of the productivity with very simple process control.

USAGE

*Copper surface treatment prior to solder resist deposition to provide optimum resist adhesion.

*Copper surface treatment prior to HASL.

FEATURES

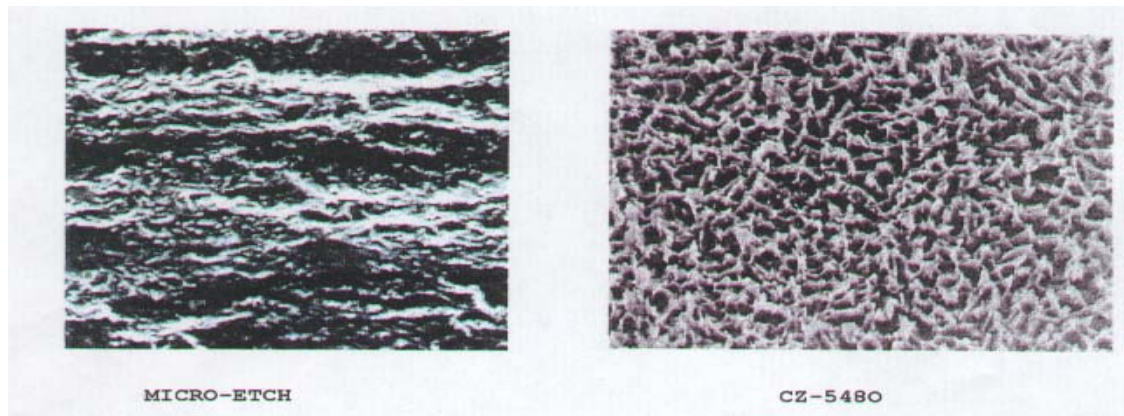
1. Provides a well roughened copper surface, ideal for the adhesion of solder resist.
2. Simple in control because it contains no oxidizers or volatiles.
3. CZ-5480 does not attack stainless steel.
4. Can be used with titanium metal parts in equipment.
5. Reduced cost in machine modification.
Anti-corrosiveness against SS and titanium, and applicability to standard spray process line save the cost in machine modification.
6. Simple waste treatment.
Can separate copper by standard neutralization coagulation method.

PHYSICAL PROPERTIES

Appearance : light yellowish green clear liquid
Specific gravity(20°C) : 1.13 ± 0.01

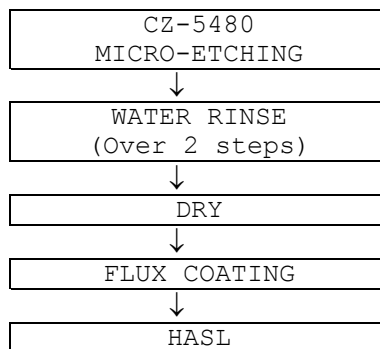
SURFACE TOPOGRAPHY AFTER TREATMENT (x 3500 - 45°)
(conditions)

	MICRO-ETCH	CZ-5480
Sample	Plated Copper	Plated Copper
Process	Spray	Spray
Temperature	30°C	30°C
Spray pressure	1.0kg/cm ²	1.0kg/cm ²
Contact time	10 sec.	10 sec.



PROCESS

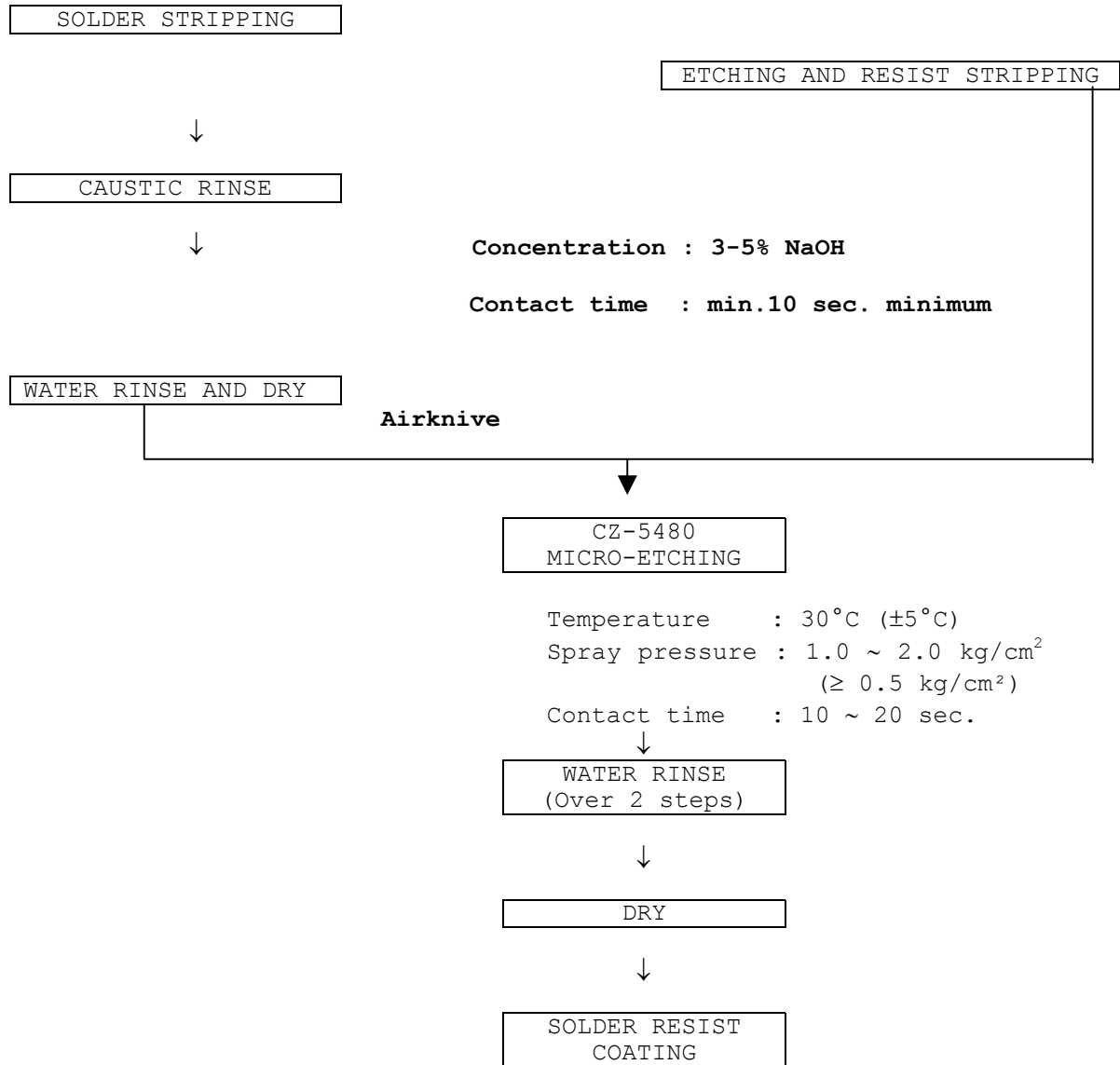
A. PRETREATMENT PROCESS FOR HASL



B. PRETREATMENT PROCESS FOR SOLDER RESIST COATING

BY SOLDER STRIP

BY TENTING



1. Bath make-up.

CZ-5480 is ready to use.

Use CZ-5480 as it is for both bath make-up and replenishment. In case of the whole bath make-up with new solution, it is necessary to resolve abt.5g/l copper in the solution. One can use dummy panels as copper source. Make sure that copper which is used for this purpose has no inhibitor or coating on the surface. When spent solution of CZ-5480 is available, mix it with fresh CZ-5480 solution to make-up solution (1/3 ~ 1/5 of the volume).

2. Process by spray Temperature : 30°C
 Spray pressure : 1.0 kg/cm² (over 0.5kgf/cm²)
 Time : Abt.10-20 seconds.
 (Set so that the etching rate be 0.8 ~ 2μ m.)

3. Replenishment

- Compensate volume loss by drag out with fresh CZ-5480.
- When the copper concentration reaches 40g/liter, take out 2/3 of the used solution in the bath and add fresh solution CZ-5480.
- Use a copper colorimeter system to constantly measure the copper content.
 At the used set point CZ-5480 can be replenished in a feed and bleed mode.

4. Bath control

Control limit

Copper concentration : 5 ~ 40g/liter

When the copper concentration and/or the SG are beyond the upper control limit : change the used solution according to " 3. Replenishment " mentioned above.

When the concentration/dilution is beyond the upper control limit:

correct the solution according to " Control of concentration and dilution " mentioned below.

COPPER CONCENTRATION : 5 ~ 40g/liter

SPECIFIC GRAVITY : 1.13 ~ 0.01

CONCENTRATION/DILUTION : optimum range : -10% < +10%

A. Control of concentration and dilution.

Read from the copper concentration mentioned above and SG Mentioned in the following page : (Be careful of the temperature when measuring)

- * Dilution > 10% : change all into fresh solution
- * Concentration & Dilution < 10% : use as it is.
- * Concentration 10-20% : correct by adding city water as mentioned below.

WATER NECESSARY TO REPLENISH(l) $\frac{\text{Current solution (kg)} \times 100}{(100 - \text{Current conc.(\%)})}$ - Current solution (kg)

- * Concentration > 20% : change all into fresh solution

Calculation in case of concentration or dilution.

Sample CZ-5480 and measure the specific gravity at 30°C + 1 with a 30 cm glass hydrometer. Compare the measured SG and the Cu-concentration calculated as afore-mentioned to the Graph showing " The Co-relation between Cu-concentration and SG. If there is a difference from the graph value, calculate the concentration/dilution according to the formulas as below :

When the measured SG at the analyzed Cu-concentration is beyond the graph values :

$$\text{CONCENTRATION (\%)} = \frac{\alpha - \beta}{\alpha (1 - \beta)} \times 100$$

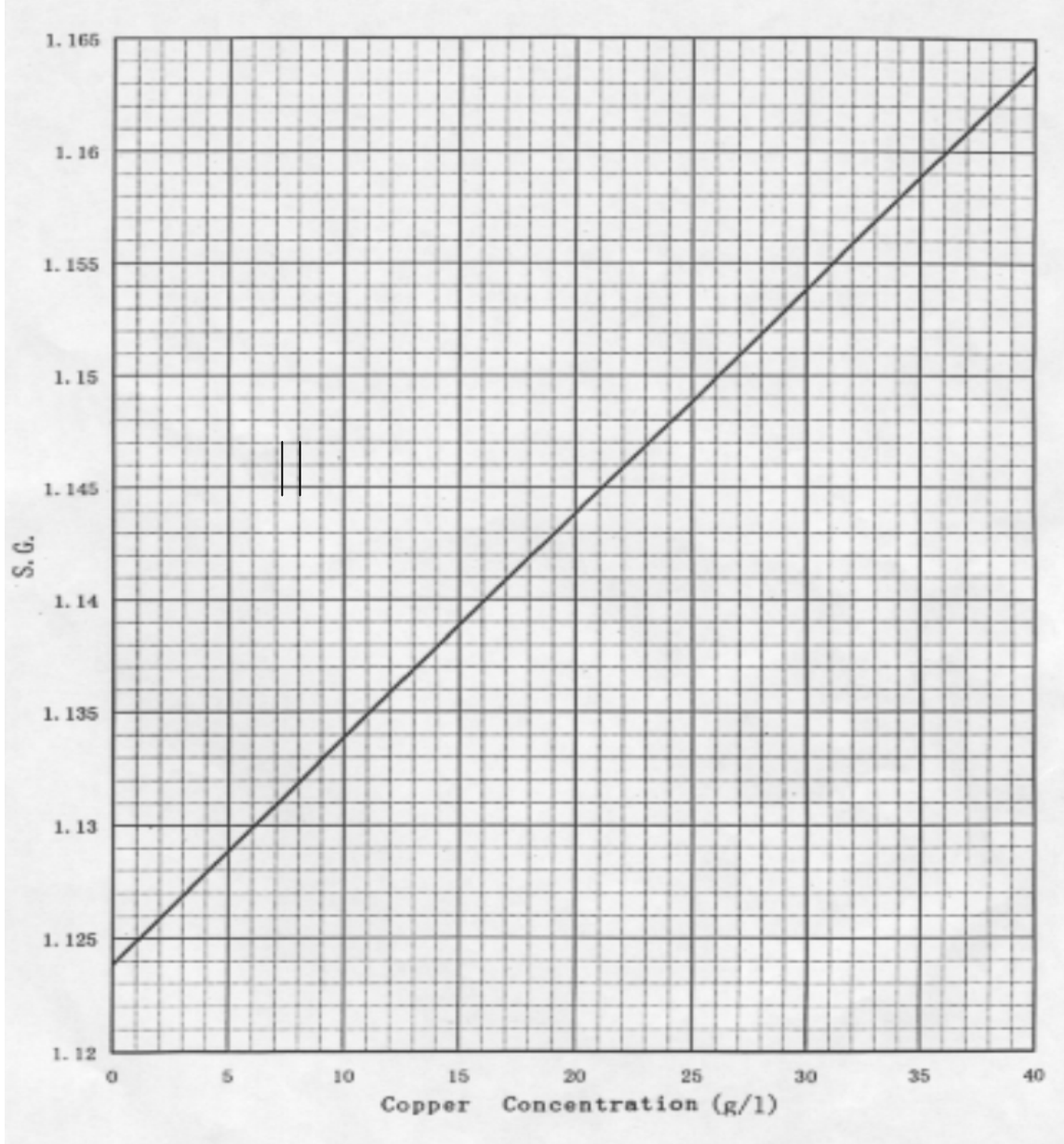
When the measured SG at the analyzed Cu-concentration is below the graph values :

$$\text{DILUTION (\%)} = \frac{\alpha - \beta \times 100}{\alpha (\beta - 1)}$$

α : Measured specific gravity (SG)

β : Graph value (SG) at the analyzed concentration.

GRAPH : CO-RELATION BETWEEN COPPER CONCENTRATION AND SPECIFIC GRAVITY (30°C)



B. Analysis method of determination.

Cu

1. Pipette 1 ml of CZ-5480 bath solution and add 1ml of 50% aqueous gluconic acid solution, and later add 50 ml of D.I.water.
2. Add 2-3 ml of aqueous ammonia.
3. Add 0,2g of 0,4%-Murexide reagent (diluted potassium sulfate).
4. Shake well and titrate with 0,025 M-EDTA 2Na from a brown to reddish brown endpoint. With the titrated value, calculate the Cu concentration according to the following formula :

$$\text{Cu (g/liter)} = 1.5885 \times f \times V$$

Where, f = the factor of 0,025 M-EDTA 2Na (should be = 1)

V = the titrated volume (ml)

Color change in Analysis.

CZ-5480 (1ml)

50% aqueous gluconic acid (1ml)

Yellow

D.I.water (50ml)

Aqueous ammonia (2~3ml)

Blue

0.4%-Murexide reagent (0.2g)

Mixing

Bluish Purple

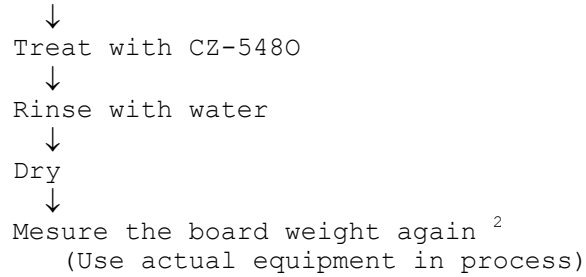
Start titrating with
0.025M-EDTA 2Na

Purple

Endpoint

Etch rate analysis (µm)

Board : Copper clad panel 10 x 10 cm.
When a panel is treated with chromate or has much smear, remove it by brushing before measurement.
Process : Measure the board weight to the third decimal point (0.001)¹

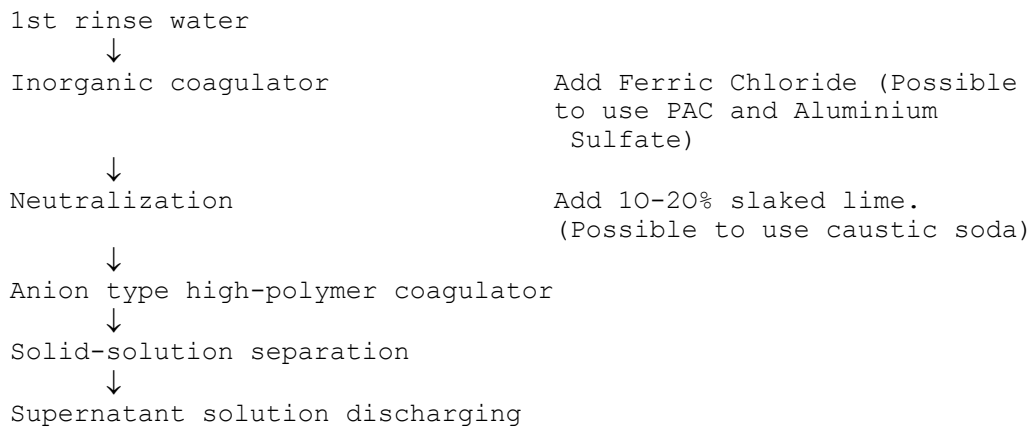


- a. Single-sided board
Etch rate (µm) = $\frac{\text{Initial weight}^1 - \text{Treated weight}^2}{8.92} \times 100$
- b. Double-sided board
Etch rate (µm) = $\frac{\text{Initial weight}^1 - \text{Treated weight}^2}{8.92} \times 50$

WASTE TREATMENT

Rely on disposal contractor to dispose of spent solution and rinsed water containing much solution.
For disposal of 1st rinse water, perform treatment according to neutralization coagulation method.

Example of 1st rinse water treatment



	Before treatment	After treatment
Copper concentration (ppm)	450	<1

HANDLING

1. Provide adequate local ventilation in the working area.
2. Handle not to leak the solution when it is taken out of the container or is taken into the container.
3. When handling, wear the protective clothing such as gloves and goggles to avoid contact with hands, legs, skin and specially eyes.
4. Wash hands and mouth after handling.
5. CZ-5480 is regarded as corrosive liquid. Handle with care.
6. Keep the containers tightly sealed in a cool and dark place where the direct sunlight is not received.
7. Absorb with sand, etc. and remove when leaked.
8. Rely on a disposal contractor to dispose of spent solution and much solution containing water rinse.
9. Be careful not to mix with solution (like H_2SO_4 - H_2O_2 type etchant, ect.) which contains H_2O_2 because CZ-5480 accelerates decomposition of H_2O_2 .

EQUIPMENT

1. Please contact MEC Europe regarding compatibility of processing equipment.
2. Use a ventilation by extraction on the processing equipment.

EQUIPMENT MATERIAL

No	MATERIALS			MATERIALS	
1	SS 304	O		Rigid PE	Δ
2	SS 316	O		Soft thermorun	Δ
3	Titanium	O		Viton (Fluorocarbon rubber)	Δ
4	Rigid PVC	O		Foamed PVC	Δ
5	Rigid PP	O		Soft EPT	X
6	Rigid PPE	O		Soft PVC	X
7	SS welded	O		EPDM	X
8	Titanium welded	O		Foamed PE	X
9	Rigid ulmoler / PE type resin	Δ			

O : Usable

Δ : partly usable

X : Not Usable

For mark O and Δ, contact our Research and Development Division for further information.

PERFORMANCE

SOLDER RESIST ADHESION (Test Method)

1. Copper surface treatment
 - Test Board : Plated copper board
 - Mechanical scrubbing : Buff scrubbing, pumice.
 - Chemical cleaning : CZ-5480, Micro-Etch type
2. SR printing
 - SR : PSR-4000 Z-26 (Taiyo Ink)
 - Exposure : 300 mj.
 - Precure : 80°C, 30 min.
 - Development : 1wt% N₂CO₃ at room temp. (spray 1 min.)
 - Postcure : 150°C, 40 min.
3. Deterioration
 - Crosshatch : Immersion in 10% HCl for 10 min.
 - Water rinse
 - Dry
4. Peel strength
 - Crosshatch : Put scotch tape on the crosshatch
 - Peel it off at a stretch.



RELIABILITY

1. ELECTRIC INSULATION.

Board : Comb type 2 (glass epoxy G-10)
Test Method : JIS Z 3197 6.8
Humidification : 40°C, 95% RH

Initial	Over 1×10^{13}	Ω
After 96 hours	Over 1×10^{12}	Ω

2. RESIDUAL IONIC CONTAMINATION

Board : Copper clad 25 x 12.5 cm
Solution temp. : 30°C
Spray pressure : 1.0 kg/cm²
Contact time : 10 sec.
Water rinse : Spray → Water rinse 3 steps.
Test method : MIL-STD-2000A
Measuring Instrument : Omega meter 600 SMD

Fresh solution	1.8µg NaCl/sq.inch	0,3µg/cm ²
Used solution	2.4µg NaCl/sq.inch	0,38µg/cm ²

SAFETY PRECAUTIONS

1. In case of skin contact, flush immediately with water and soap.
2. In case of eye contact, flush immediately with water for over 15 min. and obtain medical aids.
3. In case of inhalation, move to the place where the fresh air is obtained and get medical aids.
4. In case of ingestion, take much water and quickly obtain medical aids.

PACKAGING

Available in PE drums of 25 l, 200 l.

WARRANTY AND DISCLAIMER

THE INFORMATION PRESENTED HEREIN IS BELIEVED TO BE ACCURATE. ALL RECOMMENDATION AND SUGGESTION APPEARING IN THIS CATALOGUE ARE BASED UPON INFORMATION BELIEVED TO BE RELIABLE HOWEVER, USERS SHOULD MAKE THEIR OWN TESTS TO DETERMINE THE SUITABILITY OF THESE PRODUCTS FOR THEIR OWN PARTICULAR PURPOSES, SINCE THE COMPANY CAN NOT ASSUME ANY LIABILITY FOR ANY CLAIMS, DAMAGES OR LOSSES WHATEVER OR RISK INVOLVED IN THE USE OF ITS CHEMICAL PRODUCTS.

NO WARRANTIES, EXPRESSED OR IMPLIED, ARE MADE CONCERNING THE INFORMATION, PRODUCT, PROCESSES, RECOMMENDATIONS, DESCRIPTION AND SAFETY NOTATIONS CONTAINED HEREIN. NOTHING CONTAINED HEREIN SHALL BE CONSTRUED AS A LICENSE TO OPERATE UNDER, OR RECOMMENDATION TO INFRINGE, ANY PATENT.