



M-Coat DS1

Organic Solderability Preservative

Product Code No. 79808

DESCRIPTION: **M-Coat DS1** is a water-based organic solderability preservative (OSP) used to protect solderability of printed circuit board copper surfaces. The active ingredient in M-Coat DS1 is designed to react selectively with copper, forming a thin uniform coating on circuitry only. M-Coat DS1 prevents moisture and air from coming in contact with copper, even after multiple thermal excursions during the assembly process. M-Coat DS1 is readily displaced by flux immediately prior to soldering. M-Coat DS1 is compatible with R, RMA, OA, No-Residue, and No-Clean solder pastes and fluxes.

FEATURES & BENEFITS:

Fabrication Features

HASL Replacement
 No thermal stress
 Acetic acid base
 Higher functionality
 Equipment package

Fabrication Benefits

Lower cost. Reduced safety and environmental concerns.
 No board warp or twist. Higher yields.
 Process/thickness control. Higher yields.
 Applicable to a wide range of assembly requirements.
 Fast, economical installation.
 Multiple Final Finish capability in single line.

Assembly Features

Multilayer coating
 Acetic acid base
 Planarity
 Proprietary heat resistant formula
 Compatible with no clean fluxes

Assembly Benefits

Greater solderability, improved yields.
 Uniformly reliable solderability.
 Reliable paste stenciling and SMD Placement.
 Solderability through multiple thermal cycles.
 Production reliability, flexibility.

PHYSICAL & CHEMICAL PROPERTIES:

Appearance	Clear blue liquid
Specific Gravity	1.004
PH	3.0
Odor	Slight acetic acid
Freezing Point	-1C (30F)

EQUIPMENT:

Tanks	PVC, polypropylene, or polyethylene
Heaters	PTFE, quartz, titanium, or Teflon coated steel
Ventilation	Ventilation is required
Agitation	Solution movement and work-rod agitation is required. Do not use air agitation.
Filtration	10 micron wound polypropylene. Remove sizing from filter cartridge prior to use. One to three solution turnovers per hour is ideal.
Racks	All materials to be in contact with the M-Coat DS1 Solution should be coated with inert material.

**OPERATING
CONDITIONS:**

	<u>Range</u>	<u>Optimum</u>
Active Ingredient Concentration	80-120%	100%
Acid Normality	0.40-0.80 N	0.55 N
Copper Concentration	500-800 ppm	700 ppm
Temperature	40-45°C (104 - 113°F)	43°C (109°F)
	<i>When not in use maintain circulation, filtration and temperature at 20°C (70°F).</i>	
Contact time	50 - 70 sec	60 sec

**SOLUTION
MAKE-UP:**

- A. Use full strength, without dilution
- B. Start filtration through 10 micron filter cartridge

**PROCESSING
CYCLES:**

Vertical Immersion - Typical Processing Cycle

<u>Product</u>	<u>Time</u>	<u>Temperature</u>
FF Acid cleaner (#75039)	4 - 6 min.	60°C (140°F)
2-stage rinses	2 - 3 min. each	
MACuPrep Etch G-4 Microetch (#19257)	1 - 2 min.	35°C (90°F)
2-stage rinses	1 - 2 min. each	
5% Sulfuric Acid	10 - 15 sec.	
De-ionized water rinse	10 - 15 sec.	
M-Coat DS1 *	50 - 70 sec.	43°C (109°F)
2-stage rinses	1 - 2 min. each	
De-ionized water rinse	1 - 2 min.	
Horizontal Forced Air Dry	High velocity air	70°C (159°F) max

Horizontal Flood - Typical Processing Cycle

<u>Product</u>	<u>Time</u>	<u>Temperature</u>
FF Spray Cleaner (#75040)	50 - 70 sec.	60°C (140°F)
3-stage rinse	60 sec. total	
MACuPrep Etch G-4 Microetch (#19257)	50 - 70 sec.	35°C (90°F)
2-stage rinse	40 sec. total	
5% Sulfuric Acid	10 - 15 sec.	30°C (86°F)
De-ionized water rinse	10 - 15 sec.	
Air knife		
M-Coat DS1 *	50 - 70 sec.	43°C (109°F)
3-stage DI rinse	60 sec. total	
Forced Air Dry	High velocity air	70°C (159°F) max

* Can enter into M-Coat wet or dry.

**SOLUTION
CONTROL:**

I. Active Ingredient Determination

The active ingredients in M-Coat DS1 gradually concentrate during operation, and should be diluted with DI water. The concentration can be determined with a UV-VIS spectrophotometer.

- A. Dilute a 1mL sample from the operating bath with methanol into a 250mL volumetric flask.
- B. Measure the UV-VIS absorbance at 276nm.
 1. Set the ultra-violet/visible (UV-VIS) spectrophotometer to 276nm.
 2. Zero the instrument with DI water in 10mm quartz cuvettes.
 3. Measure the absorbance of the sample with methanol as reference solvent.
- C. Active ingredient (%) = Absorbance@276nm x 257.5
- D. Add DI water to the working bath if the active ingredient concentration is 120% or higher.
- E. Following any liquid adds, reanalyze the bath's active ingredient content and its acidity.

II. Acid Normality Determination

- A. Pipette 10 mL of the working bath into a 250 mL Erlenmeyer flask.
- B. Add 20 mL of Deionized water.
- C. Add 5 drops of phenolphthalein indicator.
- D. Titrate with 1.0N sodium hydroxide to a pink/purple endpoint.

$$\text{Acid normality} = \frac{(\text{mL of NaOH used}) \times (\text{N of NaOH})}{\text{mL of bath sample}}$$

- E. Acid normality should self-maintain with above chemical additions. To raise normality by 0.1N, add 5.7 mL of glacial acetic acid for each 1L of working bath.

III. Determination of M-Coat DS1 Film Thickness

- A. Prepare carefully a 4 x 4cm sample of thin copper clad laminate. Clean, microetch, and process through M-Coat DS1 at 40°C for 1 minute, rinse and dry. This test should be run in duplicate to insure accuracy.
- B. Prepare a UV-VIS Spectrophotometer by adjusting to 276nm in the absorbance mode. Zero the instrument using DI water in 10mm quartz cuvettes.
- C. Place the coated sample into a 250mL beaker. Add 25mL of stripper solution (0.5% by weight HCl + 95.5% by weight methanol).
- D. Dissolve the M-Coat DS1 film in the stripper solution for 5 minutes. Swirl the beaker to completely remove the coating and remove the test piece from the beaker after 5 minutes.
- E. Measure the absorbency of the above solution (step D) with fresh stripper solution as reference solvent
- F. Proper absorbency is 0.6 or higher; if below 0.6 replace the working bath.

STORAGE & HANDLING:

Circuit boards coated with M-Coat DS1 should be handled with white cotton gloves when packaging. Groups of finished parts should be allowed to stabilize in climate controlled, low humidity environment prior to packaging in vacuum-sealed plastic wrap. When board design requires it, slip-sheets must be used to prevent copper-to-copper scratching.

To rework boards, strip the coating in a mixture of 5% vol. Hydrochloric Acid + 15% vol. Glacial Acetic Acid in water at a temperature of 43°C (110°F) before re-applying. This solution is also used to clean tanks and racks.

SAFETY & WARNING:

MacDermid, Inc. recommends that the company/operator read and review the MacDermid Material Safety Data Sheets for the appropriate health and safety warnings before use.

Solutions and concentrate of the M-Coat DS1 system are acidic. Avoid skin, eye and oral contact. Wear goggles and protective clothing. Flush exposed areas immediately with clean, cold water. Consult a doctor promptly in case of injury.

Material Safety Data Sheets are available from MacDermid, Inc.

WASTE TREATMENT:

Prior to using any recommendations or suggestions by MacDermid, Inc. for waste treatment, the user is required to know the appropriate local/state/federal regulations for on-site or off-site treatment, which may require permits. If there is any conflict regarding our recommendations, local/state/federal regulations take precedence.

Spent M-Coat DS1 contains organic materials and metals and must be characterized for appropriate permitted waste disposal.

ORDER INFORMATION:

<u>Product</u>	<u>Product Code</u>	<u>Container</u>
M-Coat DS1	79808	5 & 55 gal

Also read carefully warning and safety information on the Material Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE. **Emergency directory assistance Chemtrec 1-800-424-9300.**

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