

DuPont™ Riston® EtchMaster EM830

DATA SHEET & PROCESSING INFORMATION

Photopolymer Dry Film for Acid and Alkaline Etch

Product Features/ Applications

- Negative working, aqueous processable dry film photoresist
- Suitable for alkaline and acid print & etch applications.
- Fine Line capability with wider exposure latitude, and reduced sensitivity to off-contact.
- Wide processing latitude.

Processing Data

This Data Sheet documents specific process information for Riston® EtchMaster EM830. Data quoted in this guide have been generated using production equipment as well as laboratory test methods, and are offered as a guideline. Actual production parameters will depend upon the equipment, chemistries, and process controls in use, and should be selected for best performance. For more background on general Riston® processing see the General Processing Guide (DS98-41).



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PART 1: Copper Surfaces and Surface Preparation

Riston® EtchMaster EM830 has very strong adhesion on all surfaces. Riston® EM830 is compatible with the following surfaces and surface preparations:

- Copper type
 - Standard copper foil
 - RTF
 - Doubletreat
- I/L copper preparation
 - Pumice
 - Chemical Clean
 - One step cleaners
- Panel plated copper
 - Unscrubbed
 - Scrubbed

For prelamination cleaning suggestions, see General Processing Guide and its references.

Double-Treated Copper Surfaces

Normally, no prelamination cleaning is required; vapor degreasing or chemical cleaning to remove organics is optional. Tacky roller cleaning is recommended to remove particles.

One Step Cleaners

The following one step cleaners have been used successfully per manufacturers' processing recommendations:

- Chembond 300
- Duratech SP1000
- Dexter 2116, 2021
- Chromeclean AC-1

(Others may give equally acceptable results)

PART 2: Lamination

Lamination Conditions for DuPont HRL-24/Yieldmaster® Film Laminator

- Pre-Heat: Optional
- Lam. Roll Temp.: 105-120°C (223-245°F)
- Roll Speed: 0.6-1.5 m/min (2-5 ft/min)
- Air Assist Pressure: 0-2.8 bar (0-40 psig)

Note: for ≥ 1.4 bar use heavy-duty rolls)

Lamination Conditions for Automatic Sheet Laminators

- Pre-heat: Optional
- Seal Bar Temp.: 50-80°C
- Lam. Roll Temp.: 100-120°C
- Seal Bar Pressure: 3.5-4.5 bar (50-65 psig)
- Lam. Roll Pressure: 3.0-5.0 bar (43-72 psig)
- Seal Time: 1-4 seconds
- Lamination Speed: 1.5-3 m/min (5-10 ft/min)

Note: Expected Board Exit Temperature:

Innerlayers: 60-70°C (140-160°F)

(For information on how to use Board Exit Temperature for process control, see General Processing Guide)

General Suggestions

- Start with Roll temperatures of 110 to 115°C and adjust as necessary.
- Resist wrinkling can be caused by high temperatures. Decrease roll temperature or eliminate preheat.
- Reduced lamination roll pressure and/or temperature may be required in tenting applications to avoid tent breakage and resist flow into through-holes.
- Panels may be exposed immediately after lamination; however, allow enough time for panels to cool to room temperature before exposure.
- Note comments under Safe Handling with respect to exceeding highest recommended lamination roll temperature.

PART 3: Exposure

Riston® EtchMaster EM830 can be exposed on all standard equipment used in the printed circuit board industry. Choose lamps that compliment the peak resist response of 350 to 380 nm.

Riston® EM830 has excellent resolution and wider exposure latitude than many other resists. It is also more resistant to off-contact exposure defects, which are common in glass/glass exposure frames.

Resolution below 50 microns (2 mil) lines and spaces is possible with Riston® EM830 in optimized production environments.

Recommended Exposure Range

	EM830
	40µm
RST 25	10-20
SST 21	7-10
SST 41	19-29
mJ/cm ²	20-60

Suggestions:

- Start with RST 12-14 ≥ 100 micron L/S.
- Start with RST 15-16 for ≥ 125 microns L/S

Note:

- RST = DuPont Riston® 25-Step Density Tablet (read as highest resist step)
- SST 41 = Stouffer 41-Step Sensitivity Guide (read as highest resist step)
- SST = Stouffer 21-Step Sensitivity Guide (read as highest resist step)
- Exposure energy (mJ/cm²) from International Light Radiometer model IL1400A with Super Slim UV Probe (SSL001A) on an Olec AP30-8000 exposure unit.

PART 4: Development

Riston® EtchMaster EM830 can be developed in sodium or potassium carbonate with good productivity. It has wide development latitude.

Development Recommendations

- **Spray Pressure:** 1.4-2.2 bar (25-30 psig)
High impact direct-fan or cone nozzles preferred
- **Chemistry:**
 - Na₂CO₃ 0.7-1.0 wt%; 0.85 wt% preferred
 - Na₂CO₃·H₂O 0.8-1.1 wt%; 1.0 wt% preferred
 - K₂CO₃ 0.8-1.1 wt%; 1.0 wt% preferred
- **Temperature:** 27-35°C (80-95°F); 30°C (85F) preferred
- **Breakpoint:** 50-65% (60% preferred)
- **Dwell Times:** EM830 22-30 secs
- **Resist Loading:**
 - Feed & Bleed - 4-8 mil-ft²/gal; 0.07-0.14 m²/liter
 - Batch - To 12 mil-ft²/gal; to 0.20 m²/liter
- **Rinse Water:** Hard water (150-250 ppm CaCO₃ equivalent), or soft water are acceptable
- **Rinse Spray Nozzles** : High Impact, direct fan nozzles preferred
- **Drying:** Blow dry thoroughly; Hot air preferred

Note:

Dwell Time ranges were established in Chemcut CS2000 type developer equipment, using potassium carbonate and 2-10 mil-ft²/gal (0.07-0.17 m²/liter) loading, with all other variables set within the preferred ranges mentioned above.

Defoamers

Riston® EM830 could require the use of a defoamer. If required, add 0.5 ml/liter (2 ml/gallon) of one of these antifoams:

Dexter DF1205
Pluronic 31R1

Others may work equally well.

PART 5: Etching

- Riston® EM830 is compatible and strongly resistant to most alkaline ammonical etch processes.
- Riston® EtchMaster EM830 is compatible with most acid etchants, e.g. cupric chloride (free HCl normality ≤3.0 N), H₂O₂/H₂SO₄, and ferric chloride.

PART 6: Stripping

Riston® EtchMaster EM830 is formulated to dissolve slowly in stripping solution after breaking up into pieces. This can greatly increase the life of the stripping solution and reduce costs, if the resist can be removed before dissolving. Filtration is strongly recommended.

Stripping Recommendations

- **Chemistry:**
 - NaOH: 1.5-3 wt%; faster stripping at 3 wt%
 - KOH: 1.5-3 wt%; faster stripping at 3 wt%
 - Proprietary Strippers: Concentration per vendor recommendation
 - Spray Pressures: 1.4-2.4 bar (20-35 psig)
 - Spray Nozzles: High impact direct fan
 - Breakpoint: 50% or lower
- **Stripper Dwell Times** (seconds) at 55°C (130°F).
Dwell time is the total time spent in the stripper, given a 50% breakpoint:

Chemistry	EM830
3.0 wt% NaOH	50-70
1.5wt% NaOH	60-90
Proprietary Strippers	30-60

Defoamers:

Follow recommendations in Development Section.

Proprietary Strippers:

The following proprietary strippers have been used successfully for EtchMaster EM830.

- RBP ADF-30
- Dexter 2210
- Dexter RS1607, RS1609
- Alphametals PC4046,4089
- Durastrip ARS-40

Others may perform equally well.

Safe Handling

Consult the Material Safety Data Sheet (MSDS) for Riston® dry film photoresist vapors. The vapor MSDS for this film was prepared using the highest lamination roll temperature recommended for use. If you choose to exceed this temperature, be aware that the amount of vapor may increase and that the identity of the materials vaporized may vary from those in the MSDS. For more Safe Handling information, see publication Technical Bulletin TB-9944 "Handling Procedure for DuPont Photopolymer Films".

Waste Disposal

For questions concerning disposal of photoresist waste refer to the latest DuPont literature and Federal, State, and Local Regulations.

Storage & Safe Lighting

See recommendations in the General Processing Guide (DS98-41).

For further information, please contact your local representative.

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