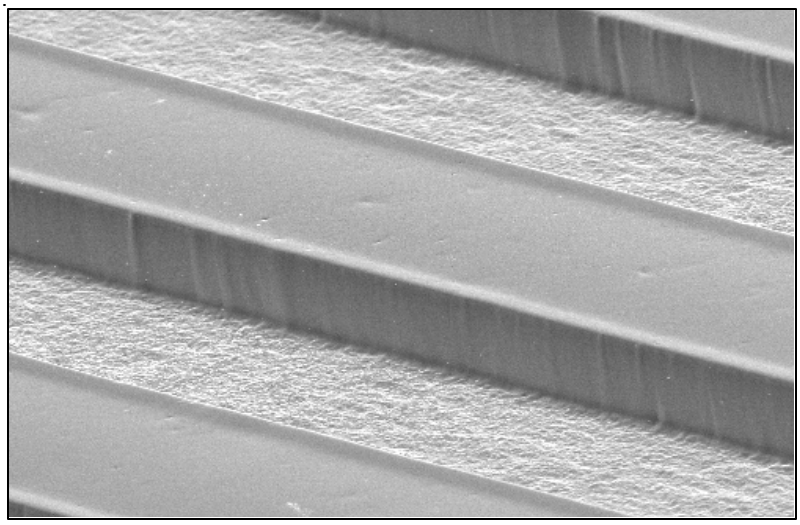
Technical Data

DuPont™ Riston® GoldMaster GM100 Series

Data Sheet & Processing Information

Photopolymer Dry Film for Nickel/ Gold and Specialty Plating Applications



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Product Features/ Applications

Riston® GoldMaster GM100 has very strong resistance to lifting on all surfaces. It has been formulated to be compatible with incoming copper clad surfaces, scrubbed and unscrubbed electroless, direct metalization processes and panel plated copper.

Riston® GoldMaster GM100 is designed to be used in Nickel/Gold and specialized plating applications such as thick copper plating or selective Sn/Pb strip. The thicker versions (eg. 75 and 100µm) are suitable for conformation over circuitry as secondary plating resists.

Processing Data

This Processing guide documents specific process information for Riston® GoldMaster GM100. 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 processing see the General Processing Guide.

Storage

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

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.

PART 1: Copper Surfaces and Surface Preparation

Riston® GoldMaster GM100 has very strong resistance to lifting on all surfaces. Riston® GoldMaster GM100 is compatible with the following surfaces and surface preparations:

- Electroless:
  - Unscrubbed with/without antitarnish
  - Pumice and Brush scrubbed
- Direct metallization surfaces
- Panel plated copper
  - Unscrubbed with/without antitarnish
  - Scrubbed

Antitarnish

The following antitarnishes have been used successfully per manufacturers' processing recommendations:

- Duratech PCL
- Enthone Entek Cu56

(Others may give equally acceptable results)

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

PART 2: Lamination

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

- Pre-Heat: Optional
- Lam. Roll Temp.: 110-120°C (230-245°F)
- Recommended : 115°C (239°F)

NOTE: Expected Board Exit Temperature:

50-55°C (120-130°F)

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

- 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
- Lamination Roll Temp.: 100-115°C

NOTE: Expected Board Exit Temperature:

50-55°C (120-130°F)

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

- 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)

PART 3: EXPOSURE

Riston® GoldMaster GM100 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® GoldMaster GM100 has better resolution and wider exposure latitude than other resists. It is also more resistant to off-contact exposure defects, which are common in glass/glass exposure frames.

Resolution down to 50 microns (2 mil) lines and spaces is possible with Riston® GoldMaster GM100 in optimized production environments.

Recommended Exposure Range

	GM120	GM130	GM140
Nominal Thickness	50µm	75µm	150µm
RST 25	10-18	10-18	10-18
SST 21	7-9	7-9	7-9
SST 41	19-28	19-28	19-28
mJ/cm^2	30-75	40-95	55-110

Suggestions:

- Start with RST 13-14 for fine line applications, (100 microns 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/cm^2) from International Light Radiometer model IL1400A with Super Slim UV Probe (SSL001A) on an Olec AP30-8000 exposure unit.

PART 4: DEVELOPMENT

Riston® GoldMaster GM100 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:**

Na_2CO_3	0.7-1.0 wt%; 0.85 wt% preferred
$Na_2CO_3.H_2O$	0.8-1.1 wt%; 1.0 wt% preferred
K_2CO_3	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 (approx.):**

  Riston® XG120 32-42 secs
  Riston® XG130 48-63 secs
  Riston® XG140 64-84 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 throughly; Hot air preferred

NOTE:

Dwell Time ranges were established in Chemcut 547 type developer equipment, using sodium carbonate and 2-10 mil-ft^2/gal (0.07-0.17 m^2/liter) loading, with all other variables set within the preferred ranges mentioned above.

Defoamers

Riston® GoldMaster GM100 could require the use of a defoamer. If required, add 0.8 ml/liter (3 ml/gallon) of one of these antifoams:

FoamFREE™ 940

Pluronic 31R1

Dexter DF1205

RBP BB

Others may work equally well.

PART 5: PLATING

(acid copper sulfate; tin/lead; tin; nickel; gold)

(Follow plating vendors' recommendations)

Riston® GoldMaster GM100 can be used for pattern plate processes with acid copper, tin/lead, tin, nickel and gold plating baths. Riston® GoldMaster GM100 has very strong resistance to lifting and underplating. The standard plating process conditions should not be altered for the GoldMaster GM100 test probe.

Recommendations: Preplate Cleaning Process Sequence

- Acid Cleaner : 38-50°C (100-120°F); 2-4 minutes
- Spray Rinse: 2 minutes
- Microetch to remove 0.15-0.25 µm (5-10µ") copper (time: as required)
- Spray Rinse: 2 minutes
- Sulfuric acid (5-10 vol%) dip; 1-2 minutes
- (Optional: spray rinse; 1-2 minutes)

Recommended Acid Hot Soak Cleaners:

VersaCLEAN® 425:

6-12 vol%; 40-50°C (100-120°F);2-4 min

Others may work equally well.

PART 6: ETCHING

- The chemical resistance of GoldMaster GM100 makes it compatible with most commonly used etchants in the PCB industry (eg. ammonical etch and acid etchants cupric chloride, H_2O_2/H_2SO_4, ferric chloride).

PART 7: STRIPPING

Riston® GoldMaster GM100 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	GM120	GM130	GM140
3.0 wt% NaOH	90-120	120-160	150-200
1.5wt% NaOH	150-180	190-240	250-300
3.0wt% KOH	90-120	120-160	150-200
1.5 wt% KOH	150-180	190-240	250-300

Defoamers:

Follow recommendations in Development Section.

Proprietary Strippers:

The following proprietary strippers have been used successfully for GoldMaster GM100.

- RBP ADF-30
- Dexter RS1624
- NTS402HV

Others may perform equally well.

Generic mixtures of 3% NaOH (or KOH) plus 3% MEA (monoethanolamine) have also been used successfully.

DuPont Electronic Technologies
14 TW Alexander Drive
Research Traingle Park, NC 27709
(919) 248-5000 Tel
(919) 248-5132 Fax

www.dupont.com/et