



ETERTEC[®] TPR2600R DRY FILM PHOTORESIST

DESCRIPTION

ETERTEC[®] TPR2600R dry film photoresist is an aqueous processable, negative acting photoresist imaging on high density circuit boards. It is design for *ITO/Metal etching applications*.

SPECIFICATION

Film Type	ETERTEC [®] TPR2606R	ETERTEC [®] TPR2608R	ETERTEC [®] TPR2610R
Thickness(μ m)	15 \pm 2	20 \pm 2	25 \pm 2
Color (unexposed)	Green	Green	Green
(exposed)	Deep Blue	Deep Blue	Deep Blue
Recommended uses	Print-and-etch Plating	Print-and-etch Plating	Print-and-etch Plating

FEATURES

- * Excellent adhesion and excellent chemical resistance to etch
- * Excellent resolution
- * Easily stripping and filterable
- * Low developing solution forming and sludge
- * Good acidic plating behavior characteristic

PROCESSING

SURFACE PREPARATION

For maximum dry film adhesion, surfaces to be coated must be clean, dry, and free of contaminates prior to lamination. Several cleaning methods work acceptably for the ETERTEC[®] TPR2600R SERIES PHOTORESIST such as UV ozone, and chemical cleaning.

LAMINATION

ETERTEC[®] TPR2600R series resists can be applied with all types of commercially available laminators. The automatic cut sheet laminator is preferred, because it eliminates trim waste and provides an exposed ITO/Metal around all four sides of the panels. Recommended lamination parameters depend on the surface profile of the ITO/Metal and imaging requirements. For examples, preheating, slow laminating speed and higher pressure may be needed for fine line applications. Although specific lamination parameters should be established based on experience for each application, the recommendations in Table 1 provide general guidelines.

Table 1.

Recommended parameters

MANUAL LAMINATOR	
Roll temperature	90~120° C (194~248° F)
Roll speed	1.0~3.0m/min (3~10feet/min)
Air assist pressure	35~50psi
Exit temperature	40~65° C (105~149° F)
AUTOMATIC CUT- SHEET LAMINATOR	
Roll temperature	90~130° C (194~266° F)
Roll speed	1.0~3.0m/min (3~10feet/min)
Air assist pressure	35~50psi
Exit temperature	40~65° C (105~149° F)
Seal temperature	60~80° C (140~176° F)
Seal pressure	3.0~5.0 kg/cm²
Seal time	1~4 sec

Cleanliness

The panels and the lamination rolls must be clean to prevent pinholes caused by dirt, ITO/Metal and resists chips.

Handling and Hold Times

After lamination, panels should be racked with spaces between each panel. Allow the panels to cool to room temperature prior to exposure. Panels should never be stacked

on top of each other, as this will cause trapped dirt particles to imprint the resist from one board to the next. Stacking also traps heat and interferes with resist performance during exposure or development.

EXPOSURE:

ETERTEC[®] TPR2600R SERIES PHOTORESIST has a good response in the 320-380 nm wavelength range. Processing in yellow light area is required from lamination to development. To assure the optimum line resolution, sidewall quality and phototool reproduction, the following general guidelines are recommended:

- Keep exposure unit clean and free from dust and dirt.
- High quality phototool.
- Use high intensity UV lamp.
- Allow panels to cool prior to exposure.
- Expose to appropriate recommended step on Stouffer scale.

Exposure parameters

Resist type	TPR2606R	TPR2608R	TPR2610R
Exposure energy (mj/cm²) :	83 -167	83 - 167	96 - 181
Stouffer 21 step tablet: resist	4 - 6	4 - 6	4 - 6
Stouffer 41 step tablet : resist	10 - 16	10 - 16	10 - 16

Notes: All measurements were made through the phototool. Millijoule measurements were obtained with ORC UV-351 radiometer.

- Use bleeder strips to assure good vacuum contact by checking immovable Newton's Rings.
- A minimum 10 – 15 minutes hold time after exposure prior to development.

Figure 1. Photosensitivity

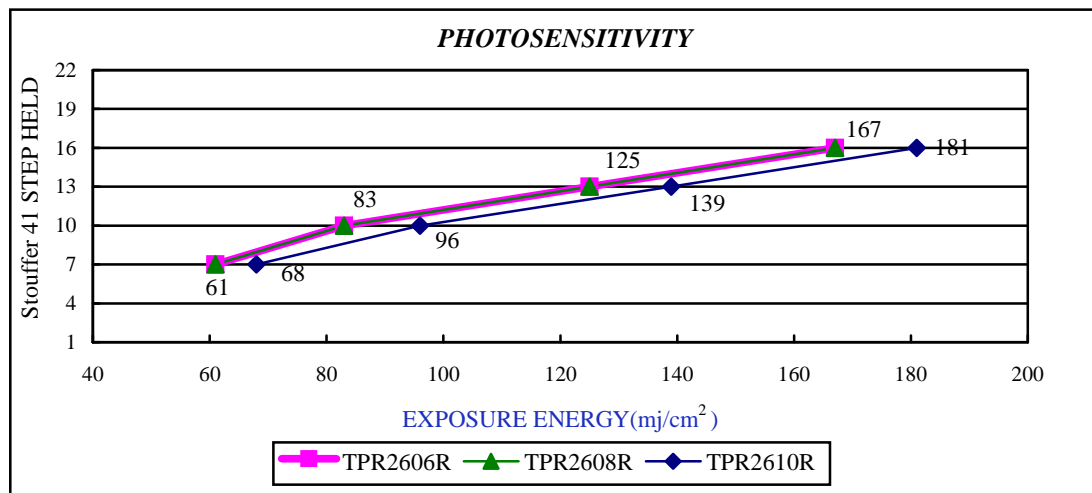
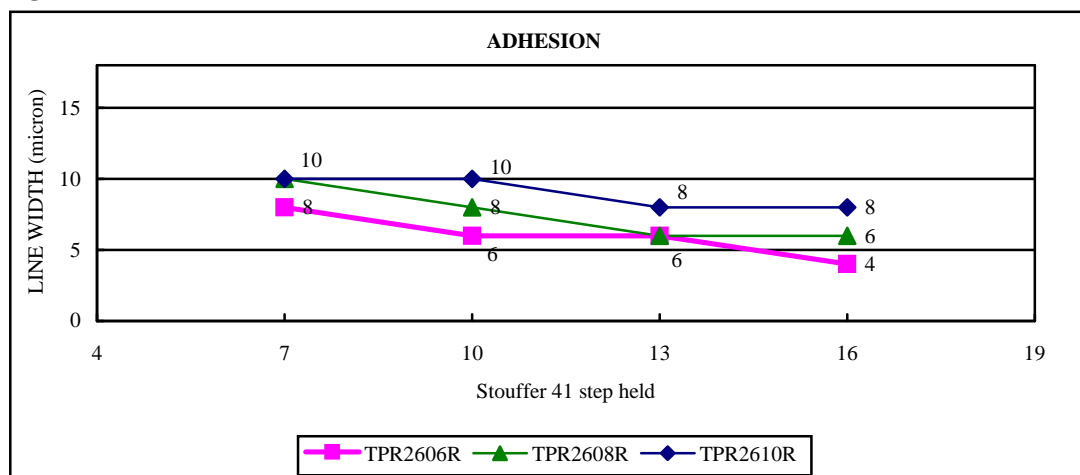
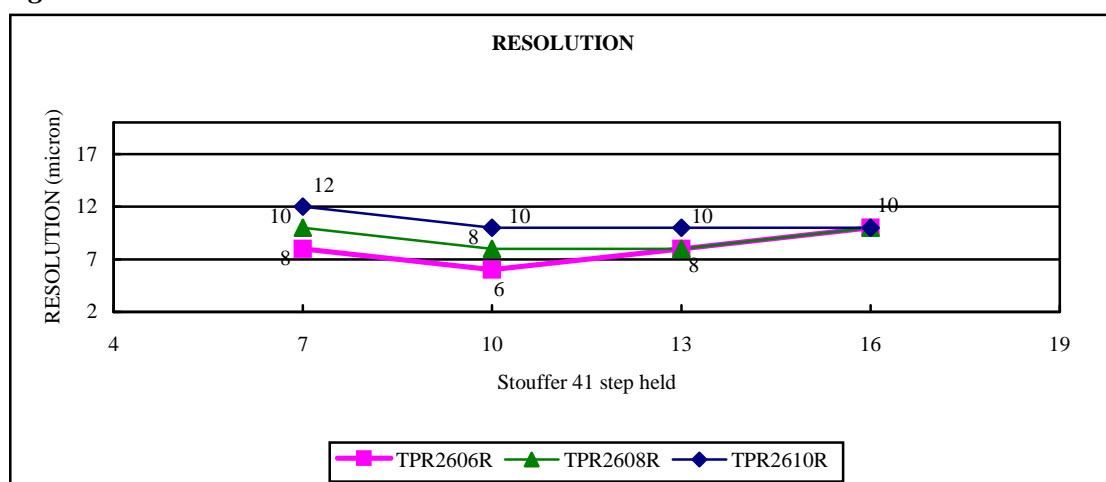


Figure 2. Fine line adhesion



***ETERTEC® No.RN Glass pattern**

Figure 3. Resolution



*** ETERTEC® No.RN Glass pattern**

DEVELOPMENT

ETERTEC[®] TPR2600R dry film can be developed in carbonated based solution.

Developing operation conditions

	optimum	range
Developer solution:		
Sodium Carbonate	0.85%	0.7~1.0%
Potassium Carbonate	1.0%	0.8~1.2%
Temperature	28~30°C (82~86°F)	25~34°C (77~93°F)
Breakpoint	55%	50~70% of the chamber length
Pressure	1.5~1.7 kg/cm²	1.5~2.0 kg/cm² (22~30 psi)
Nozzles	high impact direct fan or cone	
Rinse water	hard water (150 – 300 ppm CaCO₃ equivalent)	
Rinse spray pressure	2.0 kg/cm²	1.2~2.5 kg/cm²
Rinse temperature	20~25 °C	15~30 °C
Drying	hot air blow preferred	
Developing time	TPR2606R: 9~17 seconds (28° C) TPR2608R: 15~23 seconds (28° C) TPR2610R : 20~28 seconds (28° C)	

Resist Loading:

Figure 4. Shows the effect of resist loading on the fall off in the pH of the developer solution. The breakpoint will increase as the resist loading increase in the developer solution. This will cause incomplete developing resulting in resist scum and bad resolution.

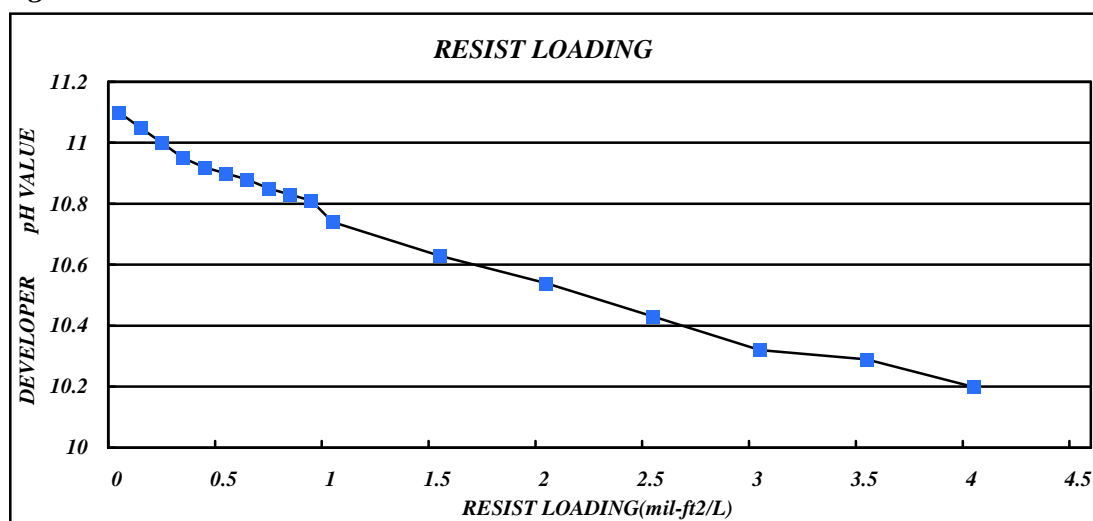
In a batch solution, the resist loading is 3.2 ~ 4.0 mil·ft²/ L (12 ~ 14 mil·ft²/ gal). Developer solution should be replaced as resist loading up to this high level. Use flowing guidelines to change solution.

- pH falls to 10.3.
- Developing time becomes 30% longer than that for fresh solution.

In a feed-and-bleed system, the resist loading is held constant by feeding fresh developer to developer sump. The recommended loading limit in automatic

replenishment system is 1 ~ 2 mil·ft²/ L. And the pH value of the developer solution will be controlled at the range of 10.8 to 10.6.

Figure 4.



Antifoam

If it is required, suitable antifoam can be added at a ratio of 0.1 – 0.5 ml per liter.

Maintenance

The developer chambers should be cleaned periodically. Resist residue can be removed by 3 – 5% NaOH solutions. Scale can be cleaned with dilute acid.

ETCHING

ETERTEC[®] TPR2600R dry film photoresist can be performed well in acid etchants.

STRIPPING

ETERTEC[®] TPR2600R dry film photoresist can be stripped in conventional immersion or conveyORIZED process. Stripper can be 2.0% ~ 5.0% caustic solutions (sodium hydroxide or potassium hydroxide) or proprietary stripping solutions.

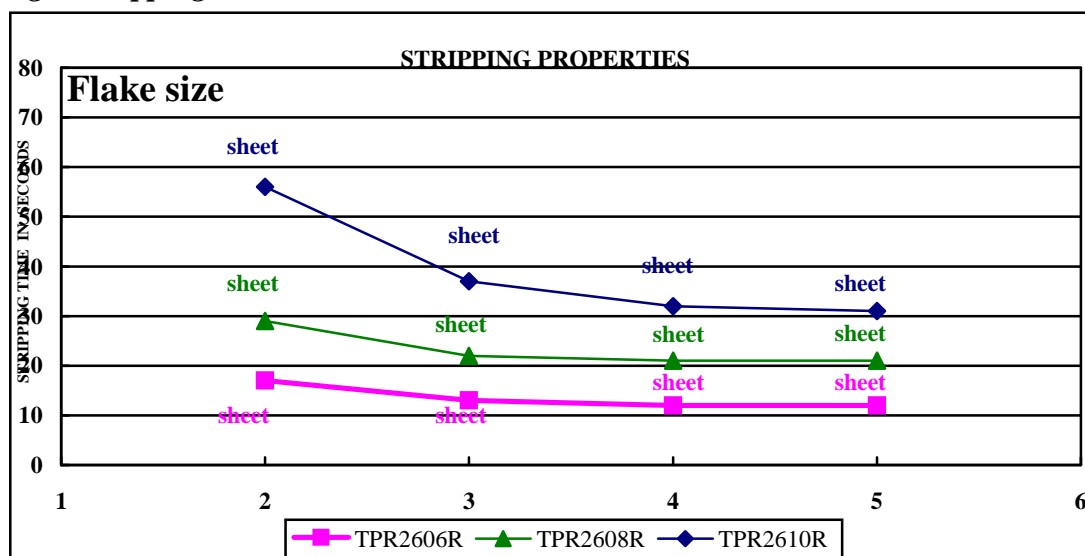
Stripping parameters

Type	TPR2606R	TPR2608R	TPR2610R
Time	12~17 sec	21~29sec	31~56sec
Temperature	40~60 ⁰ C (104~140 ⁰ F)	40~60 ⁰ C (104~140 ⁰ F)	40~60 ⁰ C (104~140 ⁰ F)
Pressure	1.0~3.0 kg/cm ² (15~45 psi)	1.0~3.0 kg/cm ² (15~45 psi)	1.0~3.0 kg/cm ² (15~45 psi)
Concentration	2~5% NaOH solution	2~5% NaOH solution	2~5% NaOH solution

Actual stripping times are influenced by:

- Concentrations of caustic solution
- Stripping temperature
- The height of plating overhang
- Spray pressure
- Exposure level
- Hold time prior to stripping

Fig 5. Stripping time



SAFETY AND HANDLING:

1. Avoid skin contact with unexposed resist and wash thoroughly with soap and water if contact is made.
2. Dry film lamination may cause vapors to be generated. A well-ventilated room is necessary.
3. Open resist only in a controlled yellow light area.
4. Do not reuse the dry film release sheets or cover sheets.
5. Read MSDS prior to using and handling ETERTEC® TPR2600R series dry film photoresist.

STORAGE:

Store in a cool, dry location 5°C to 20°C (41°F to 68°F) and 50 % relative humidity $\pm 10\%$ to assure maximum shelf life and product performance.

WARRANTY

The information contained herein is correct to the best of our knowledge. The recommendations or suggestions contained in this bulletin are made without guarantee or representation as to results. We suggest that you evaluate these recommendations and suggestions in your laboratory prior to use. Our responsibility for claims arising from defects in material or workmanship or any other breach of warranty, negligence or otherwise is limited to the purchase price of the material.