



LAMINAR® NOVA Series™ UDF7200T DRY FILM PHOTORESIST

DESCRIPTION

LAMINAR® NOVA Series™ UDF7200T DRY FILM PHOTORESIST is a negative working aqueous resist specifically designed for UV laser direct imaging (365nm and 405nm) applications. LAMINAR® NOVA Series™ UDF7200T has been formulated for acid and alkaline etching applications and for plating applications in Copper, Tin, Tin/Lead, Nickel and Gold in the production for high density circuit boards.

SPECIFICATION

Film Type	UDF7230T	UDF7240T	UDF7250T	UDF7262T	UDF7275T
Thickness(μ m)	30 \pm 2	40 \pm 2	49 \pm 2	62 \pm 2	75 \pm 2
Color(unexposed)	Green	Green	Green	Green	Green
(exposed)	Blue	Blue	Blue	Blue	Blue
Recommended uses	Acid Plating Ni/Au Plating Print-and-Etch Tent-and-Etch	Acid Plating Ni/Au Plating Print-and-Etch Tent-and-Etch	Acid Plating Ni/Au Plating Print-and-Etch Tent-and-Etch	Acid Plating Ni/Au Plating Print-and-Etch Tent-and-Etch	Acid Plating Ni/Au Plating Print-and-Etch Tent-and-Etch

FEATURES

- ✚ Good adhesion to the substrate.
- ✚ Fast photo-speed.
- ✚ High resolution capability.
- ✚ Straight sidewalls.
- ✚ Clean developing characteristics.
- ✚ High chemical resistance to acidic etchants.

PROCESSING

SURFACE PREPARATION

For maximum dry film adhesion, surfaces to be coated must be clean, dry, and free of contaminants prior to lamination. Several cleaning methods work acceptably for the **LAMINAR® NOVA SERIES™ UDF7200T DRY FILM PHOTORESIST** such as jet pumice scrubbers, Scotch Brite, aluminum oxide spray, pumice brushing, and chemical cleaning.

LAMINATION

LAMINAR® NOVA SERIES™ UDF7200T DRY FILM PHOTORESIST 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 copper border around all four sides of the panels.

Recommended lamination parameters depend on the surface profile of the copper 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, copper and epoxy-glass slivers 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.

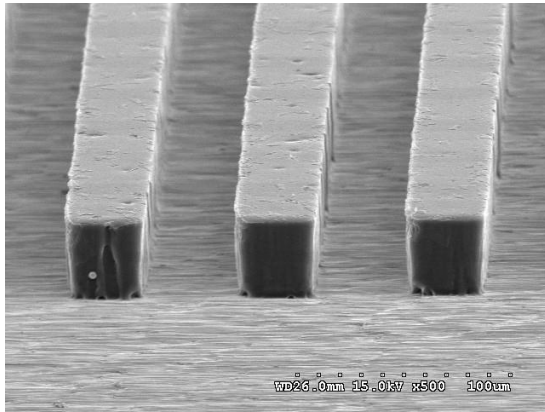
Conformation

In print-and-etch and tent-and-etch applications, surface defects such as pits, dents, scratches and weave dominance will cause defects such as opens, cuts and dishdowns. In pattern plating application, these same surface defects will cause shorts and copper residue. **LAMINAR® NOVA SERIES™ UDF7200T DRY FILM PHOTORESIST** has excellent conformation capabilities to overcome these surface defects and will help improve yields. Of course, conformation also can be improved by:

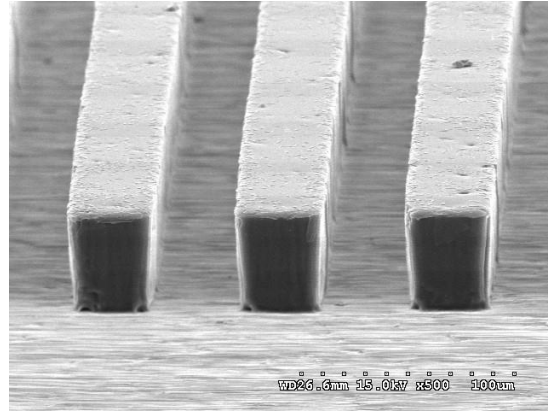
- preheating the panels
- increasing lamination pressure
- increasing lamination temperature
- slowing lamination speed
- using thicker film

Too much pressure, higher roll temperature and preheating can force dry film into holes thinning the resist at the rim of the hole and resulting in tent breakage. Lamination parameters should be carefully evaluated when the panels have large tent holes.

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UDF7240T 375nm/405nm=100/0
41ST=19 ,L/S=40um



UDF7250T 375nm/405nm=100/0
41ST=22 , L/S=40 um

EXPOSURE:

- **LAMINAR® NOVA SERIES™ UDF7200T DRY FILM PHOTORESIST** has a good response in the 365nm and 405 nm wavelength. Processing in yellow light area is required from lamination to development.

Exposure parameters

Resist type	UDF7230T	UDF7230T
Exposure energy set mode	375nm/405nm : 100/0	375nm/405nm : 0/100
Exposure energy (mj/cm ²) :	6~20 mj/cm ²	7~24 mj/cm ²
Stouffer 21 step tablet: resist	6 – 9	6 – 9
Copper	7 – 10	7 – 10
Stouffer 41 step tablet : resist	16 – 25	16 – 25
Copper	17 – 26	17 – 26

Resist type	UDF7240T	UDF7240T
Exposure energy set mode	375nm/405nm : 100/0	375nm/405nm : 0/100
Exposure energy (mj/cm ²) :	7~22 mj/cm ²	8~26 mj/cm ²
Stouffer 21 step tablet: resist	6 – 9	6 – 9
Copper	7 – 10	7 – 10
Stouffer 41 step tablet : resist	16 – 25	16 – 25
Copper	17 – 26	17 – 26

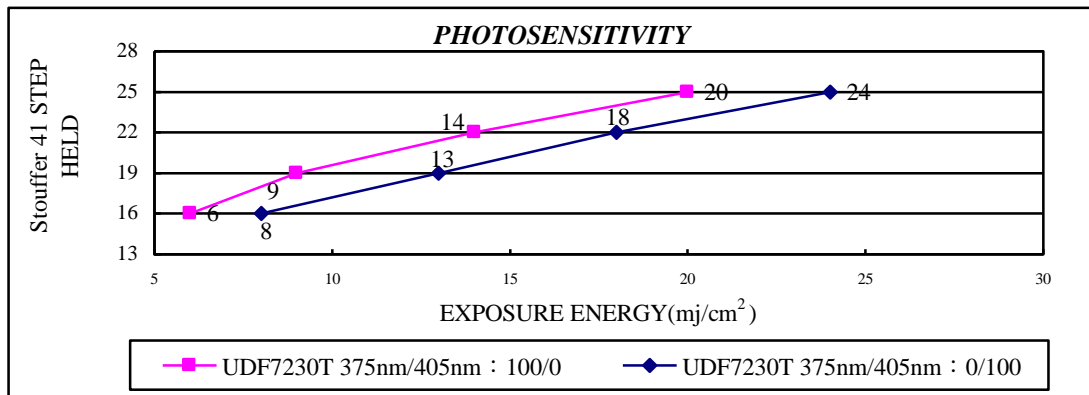
Resist type	UDF7250T	UDF7250T
Exposure energy set mode	375nm/405nm : 100/0	375nm/405nm : 0/100
Exposure energy (mj/cm ²) :	13~42 mj/cm ²	15~46 mj/cm ²
Stouffer 21 step tablet: resist	7 – 10	7 - 10
Copper	8 – 11	8 – 11
Stouffer 41 step tablet : resist	19 – 28	19 – 28
Copper	20 – 29	20 – 29

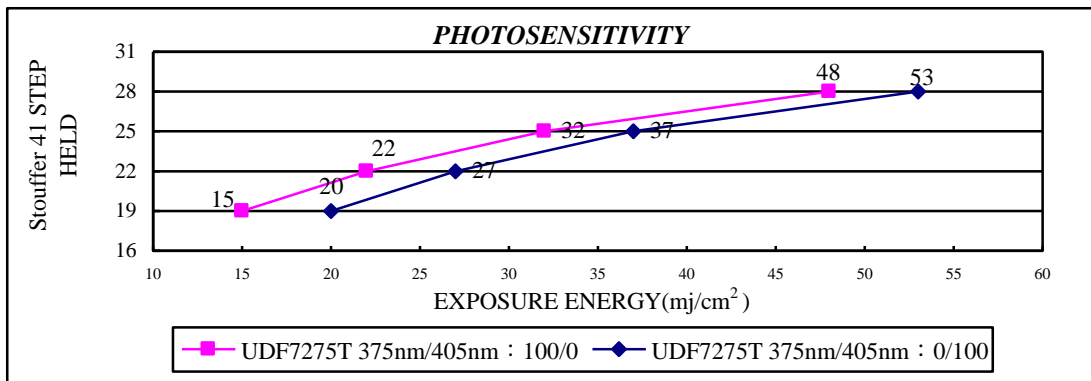
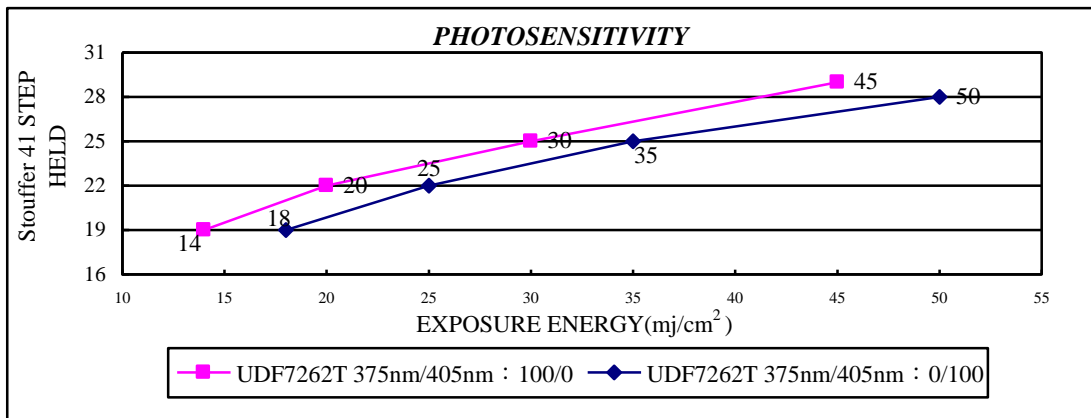
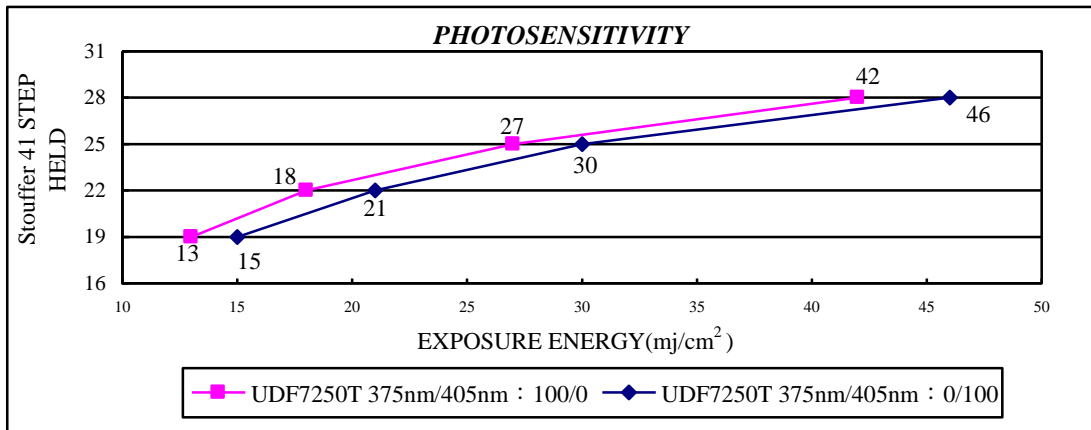
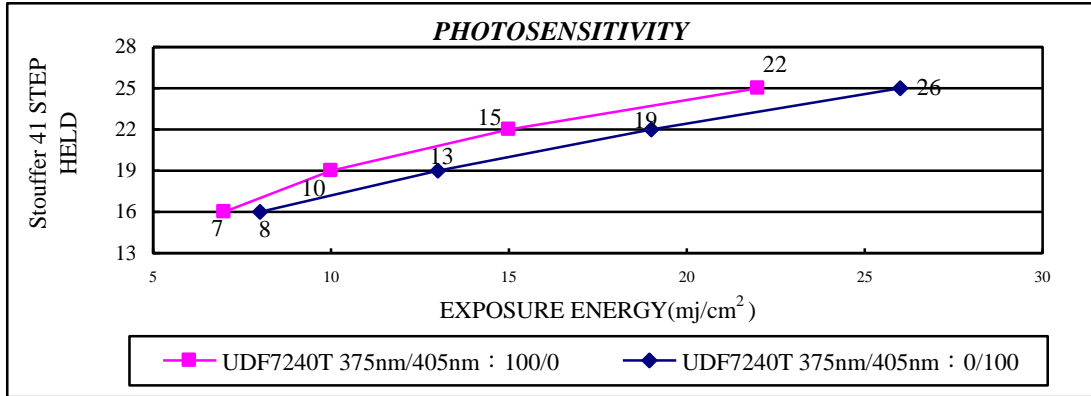
Resist type	UDF7262T	UDF7262T
Exposure energy set mode	375nm/405nm : 100/0	375nm/405nm : 0/100
Exposure energy (mj/cm ²) :	14~45 mj/cm ²	18~50 mj/cm ²
Stouffer 21 step tablet: resist	7 – 10	7 - 10
Copper	8 – 11	8 – 11
Stouffer 41 step tablet : resist	19 – 28	19 – 28
Copper	20 – 29	20 – 29

Resist type	UDF7275T	UDF7275T
Exposure energy set mode	375nm/405nm : 100/0	375nm/405nm : 0/100
Exposure energy (mj/cm ²) :	15~48 mj/cm ²	20~53 mj/cm ²
Stouffer 21 step tablet: resist	7 – 10	7 - 10
Copper	8 – 11	8 – 11
Stouffer 41 step tablet : resist	19 – 28	19 – 28
Copper	20 – 29	20 – 29

- A minimum 10 – 15 minutes hold time after exposure prior to development.

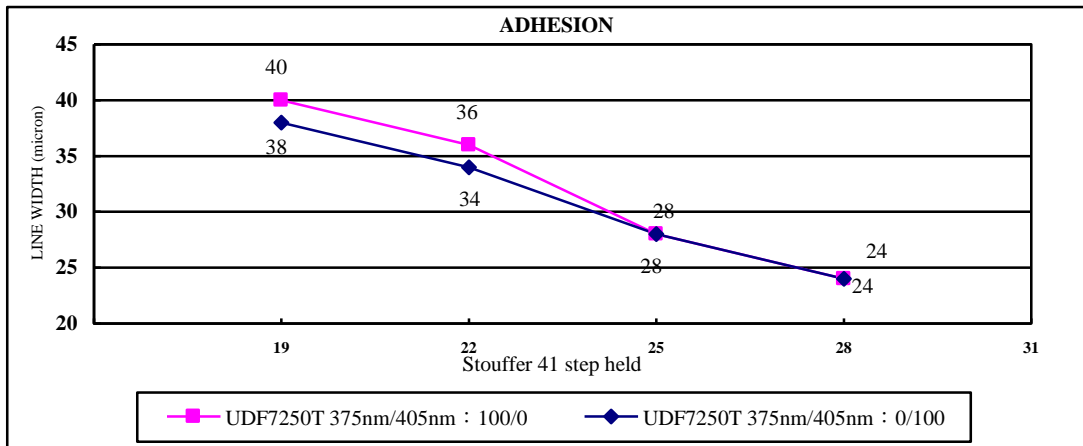
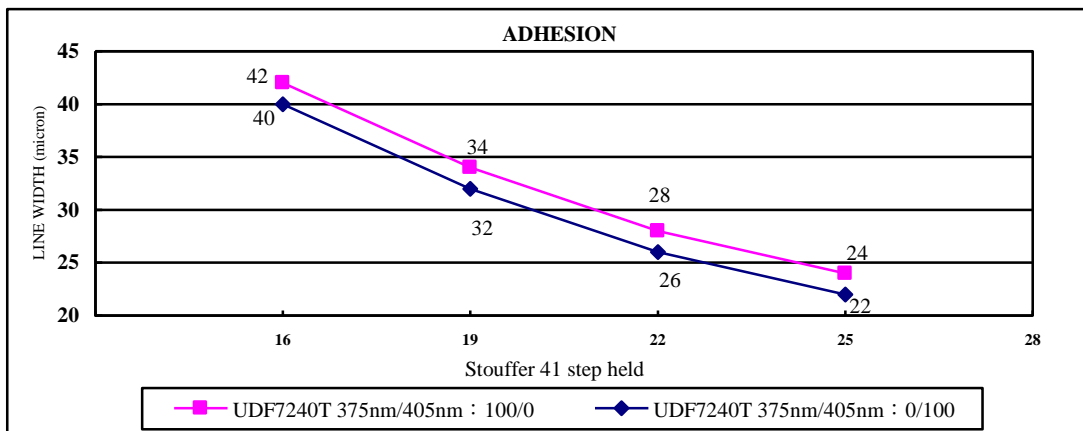
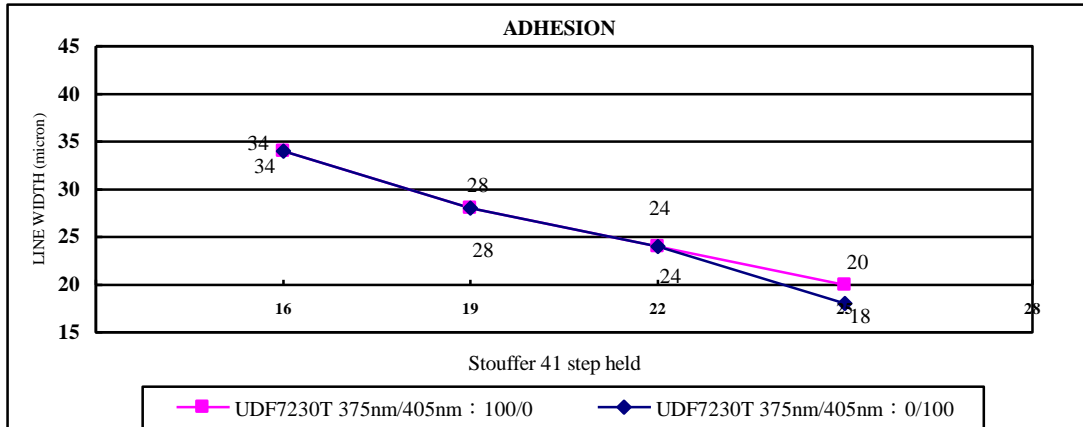
Figure 1. Photosensitivity

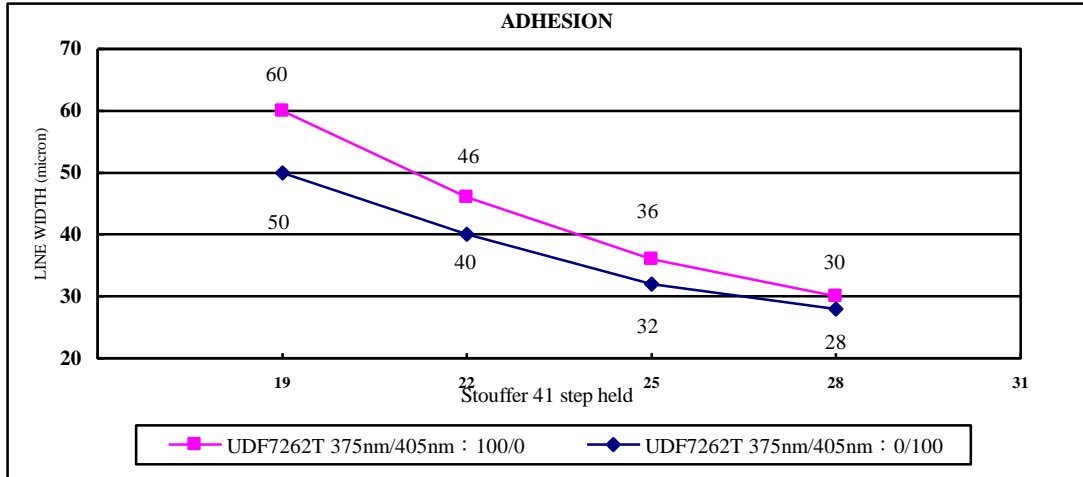




Printer : Nuvogo800

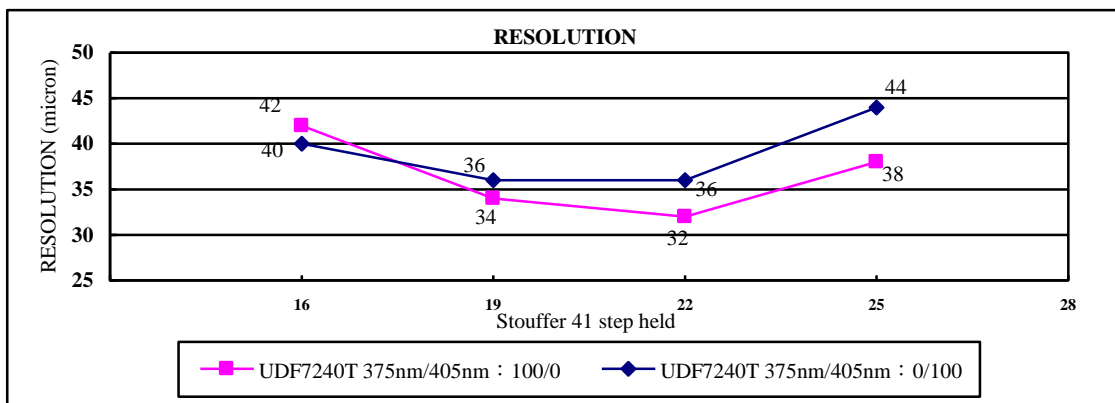
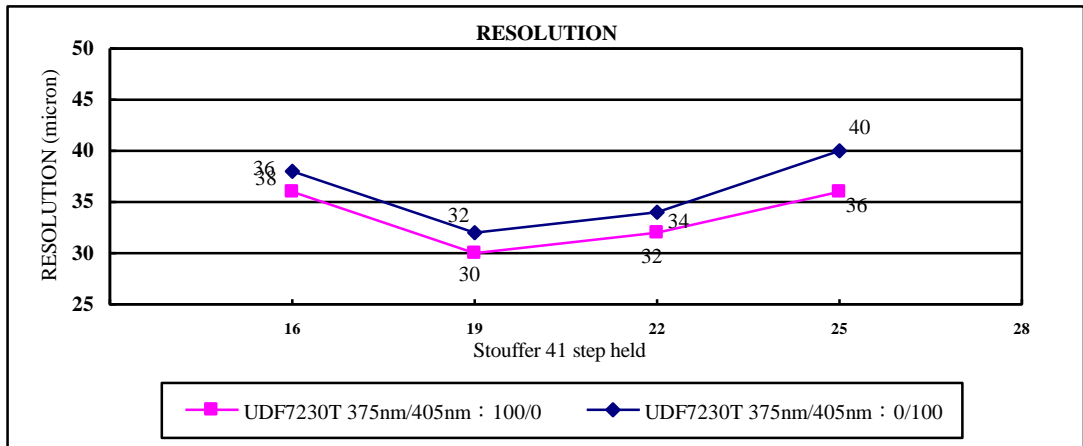
Figure 2. Fine line adhesion

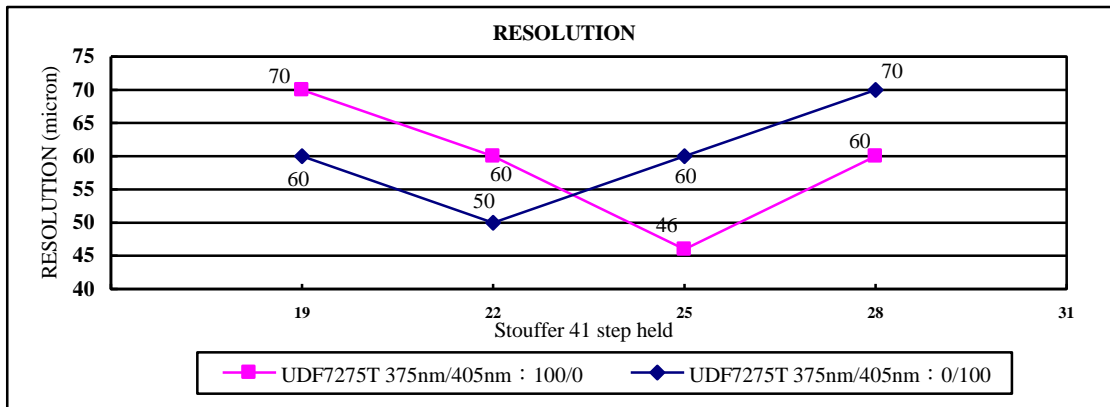
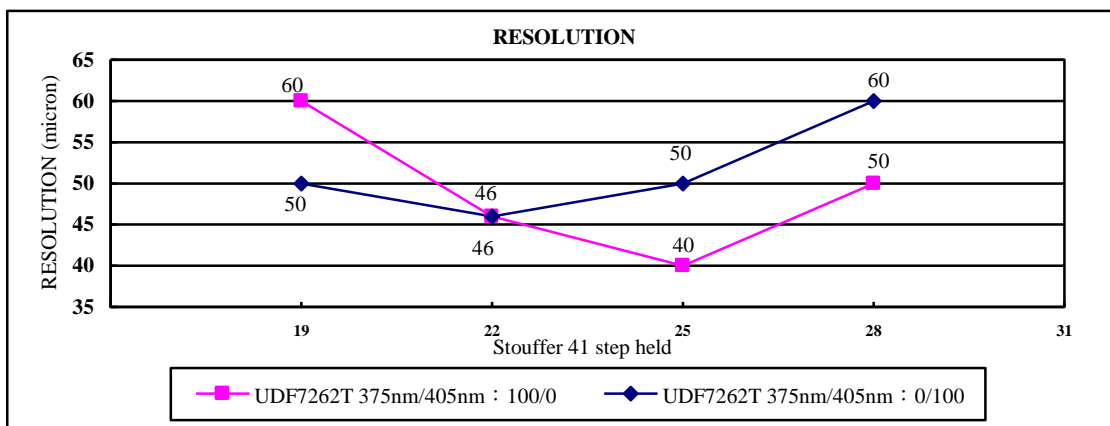
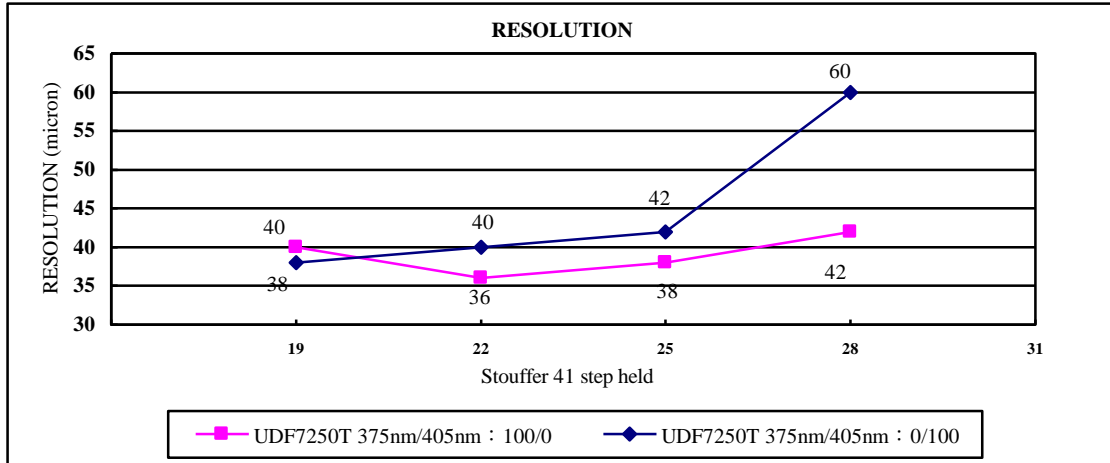




*Lines/Spaces = X/400 μ m Printer : Nuvogo800

Figure 3. Resolution





*Lines/Spaces = X/X Printer : Nuvogo800

DEVELOPMENT

LAMINAR® NOVA SERIES™ UDF7200T 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	UDF7230T: 25~35 seconds (28° C) UDF7240T: 49~57 seconds (28° C) UDF7250T: 62~70 seconds (28° C) UDF7262T: 70~78 seconds (28° C) UDF7275T: 84~92 seconds (28° C)	

Resist Loading:

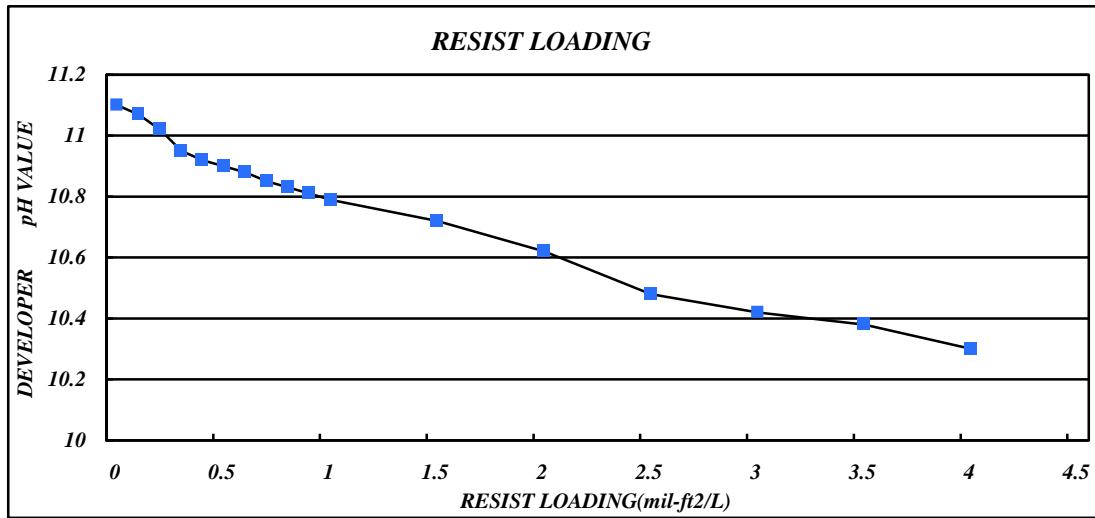
Figure 4. Shows the effect of resist loading on the fall off in the pH of the developer solution. The breakpoint will increase as the resist loading increase in the developer solution. This will cause incomplete developing resulting in resist scum and bad resolution.

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

LAMINAR® NOVA Series™ UDF7200T dry film photoresist can be performed well in acid and alkaline etchants.

PLATING

LAMINAR® NOVA Series™ UDF7200T dry film photoresist recommended for acid and Ni/Au plating

STRIPPING

LAMINAR® NOVA Series™ UDF7200T 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.

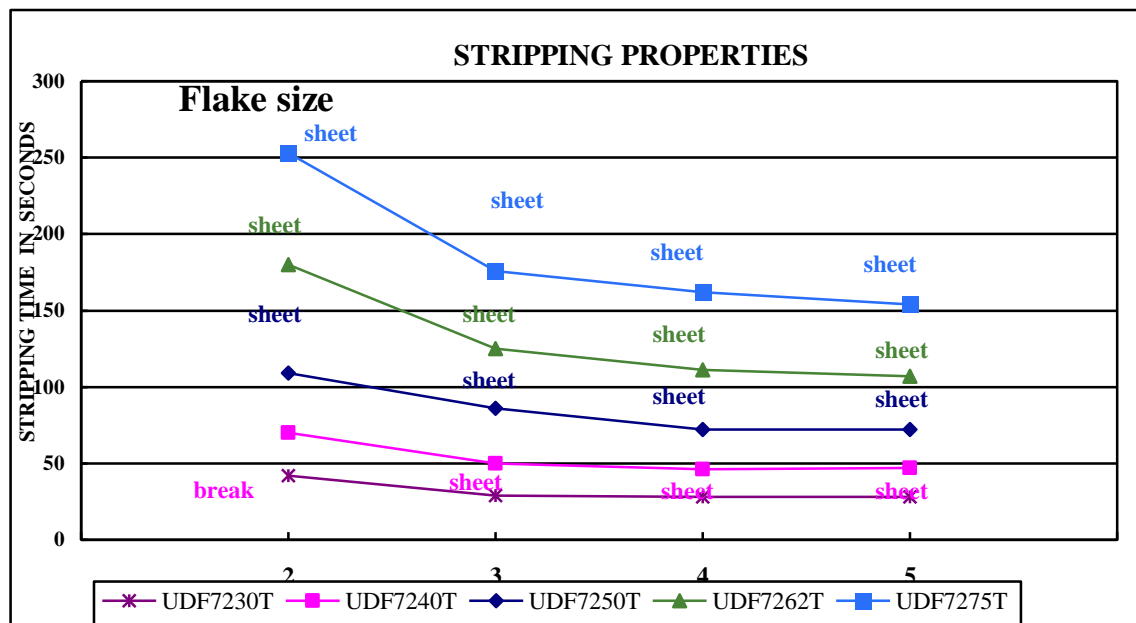
Stripping parameters

Type	UDF7230T	UDF7240T	UDF7250T	UDF7262T	UDF7275T
21 step tablet: resist copper	7 8	8 9	9 10	9 10	9 10
Time	25~45 sec	46~70 sec	71~109 sec	107~180 sec	154~253 sec
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)	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)	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	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[®] UDF7200T 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.