

PHOTEC H-N 650

Fully aqueous dry film photoresist

GENERAL

Hitachi Chemical Photosensitive resist - H-N 650 - is a negative working fully aqueous resist. The resist has been developed for all electroplating processes including acid gold.

FEATURES

- * Excellent Electroplating resistance.
- * Excellent resist profile.
- * Flexible, tough photoresist giving reduced defects.
- * Good image contrast.
- * Excellent stability after lamination.

PHYSICAL CHARACTERISTICS

	Thickness (μm)	Length (m)
H-N 650	50	150 or 300

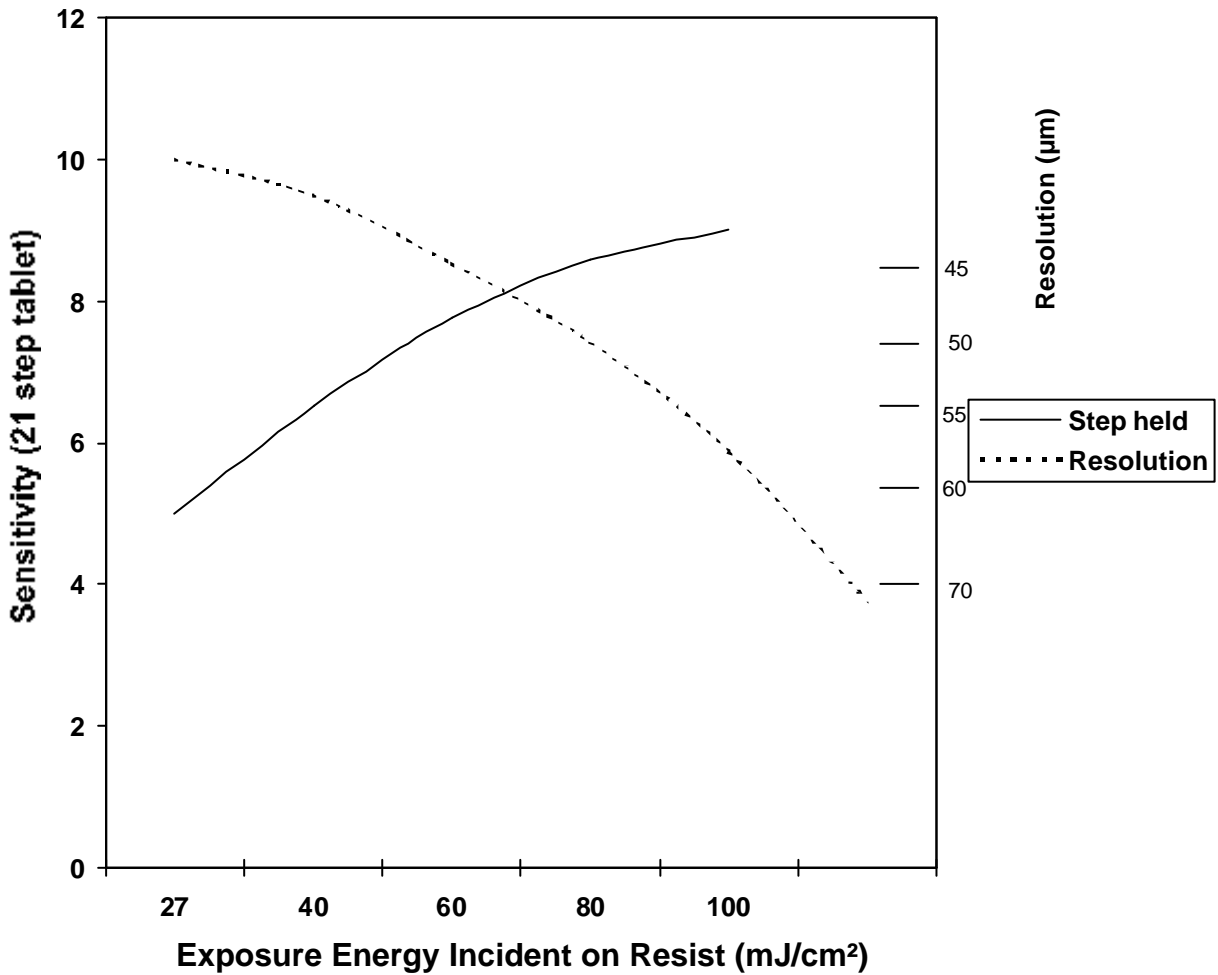
PHOTEC H-N 650
 Technical data sheet
 Page 2 of 5

PROCESS	PROCESS DESCRIPTION		TYPICAL PROCESS CONDITIONS H-N 650		REMARKS					
Substrate Pre-treatment	Brushing or pumice slurry		Buffing polish (e.g. Scotchbrite → VF-SF)		To remove dusts, oxidised films and water from the substrate surface Surface roughness R_a 0,2 - 0,4 microns R_{max} 2,5 - 3,0 microns					
	Water spray Water temp (°C)		Room temp (10-30°C)							
	Water spray time (sec)		5-10							
	Water spray pressure (kgf/cm ²)		1.5-2.5							
	Air shower (sec)		5-10							
	Drying		80°C/10 min							
Lamination	Suitable temperature range (°C)		110 +/- 10		Substrate exit temperature from laminator 40-50°C desirable Pressure 3-4 kgf/cm ²					
	Lamination speed (m/min)		1-2							
Holding	Room temp. (15-30°C)/min		over 5		Ensure substrate is at room temperature before proceeding.					
Exposure	21 step tablet (steps)		7-9		1. Exposure light source by high voltage mercury lam Exposure 2. Obtained by Hitachi 21 step tablet 3. Film changes its colour from green to dark bluish green on exposure					
	mJ/cm ²		70							
Holding	Room temp (15-30°C)/min		Over 5							
Development	Developer spray	Developer		Na ₂ CO ₃ aqueous solution		1. Change developer in the light of the following guide <table border="1" style="width: 100%;"><tr><td>Thickness</td><td>50 µm</td></tr><tr><td>Area (m²) developed by 1 litre of developer</td><td>0.20</td></tr></table> 2. Addition of defoaming agent is desirable 3. To avoid lifting of resists from substrate edges, it is essential to leave unexposed areas at edges MDT = Minimum development time	Thickness	50 µm	Area (m ²) developed by 1 litre of developer	0.20
		Thickness	50 µm							
		Area (m ²) developed by 1 litre of developer	0.20							
		Developer concentration (Wt%)		1.0(+0.3 - 0.1) Anhydrous Na ₂ CO ₃						
		Developer temp (°C)		30±2						
	Developer time (sec)		42							
	Spray pressure (kgf/cm ²)		1.0-1.5							
	Water spray 1	Water temp (°C)		Room temp. (10-30)						
		Water spray time sec		15-40						
		Spray pressure (kgf/cm ²)		1.0-1.5						
	Water spray 2	Water temp (°C)		Room temp (10-30)						
		Spray time (sec)		30-60						
Spray pressure (kgf/cm ²)		1.0-1.5								
Air shower (sec)		10-20								
Stripping	Stripper spray	Stripper		Sodium Hydroxide Aqueous solution or Potassium Hydroxide Aqueous solution		<table border="1" style="width: 100%;"><tr><td>Thickness</td><td>50 µm</td></tr><tr><td>Area (m²) developed by 1 litre of developer</td><td>0.4</td></tr></table>	Thickness	50 µm	Area (m ²) developed by 1 litre of developer	0.4
		Thickness	50 µm							
		Area (m ²) developed by 1 litre of developer	0.4							
		Stripper concentration (Wt%)		2.5+0.5						
	Stripper temp (°C)		45 – 65							
	Stripper time (sec)		50 – 80							
	Water spray 1	Spray pressure (kgf/cm ²)		over 1		Addition of defoaming agent may be required.				
		Water temp (°C)		Room temp (10-30)						
		Water spray time (sec)		10 - 20						
		Spray pressure (kgf/cm ²)		2 - 5						
	Brushing		Nylon brush							
	Water spray 2	Temp (°C)		Room temp (10-30)						
Spray time (sec)		10-20								
Spray pressure (kgf/cm ²)		2-5								

EXPOSURE

The determination of the correct exposure should be made with the HITACHI CHEMICAL 21 Step PHOTEC exposure tablet.
PHOTEC has a peak spectral response in the 360-380 nanometer range. High pressure mercury vapour lamps with this peak spectral output are recommended.
Exposure time will depend on the equipment, intensity of illumination, age of lamps, temperature etc.

H-N 650 PHOTSENSITIVITY PROPERTIES



DEVELOPMENT

The development rate of the resist depends upon, developer concentration, temperature and the spray equipment used.

H-N 650 can be developed over a wide range of temperatures, 28-32°C. It is essential to determine the correct development time for the resist at the temperature used.

The concentration of anhydrous Sodium Carbonate used for development is within the range 1,0 (+0.3, -0.1) weight percent.

To determine the correct development time for the resist proceed as follows:

Establish the minimum development time taken in the spray equipment, at the operation temperature, for a laminated but unexposed board to have the resist completely removed as it exits the development chamber. The correct development time is 1,3 - 1,7 times this minimum development time.

The correct development time is when all unexposed polymer has been removed from the board when it is two-thirds (66%) through the developer spray chamber.

An addition of Antifoam may be required. ENPLATE Antifoam NS is recommended. Antifoams containing water miscible organic solvents are NOT recommended.

Development should be followed by at least two water rinse chambers to ensure complete removal of developer solution from the substrate surface. Correct development can be proved by immersing the developed board in a solution of 50 gm/litre cupric chloride in 5% v/v hydrochloric acid. The copper substrate will darken in the fully developed areas but remain bright if polymer residues remain on the surface.

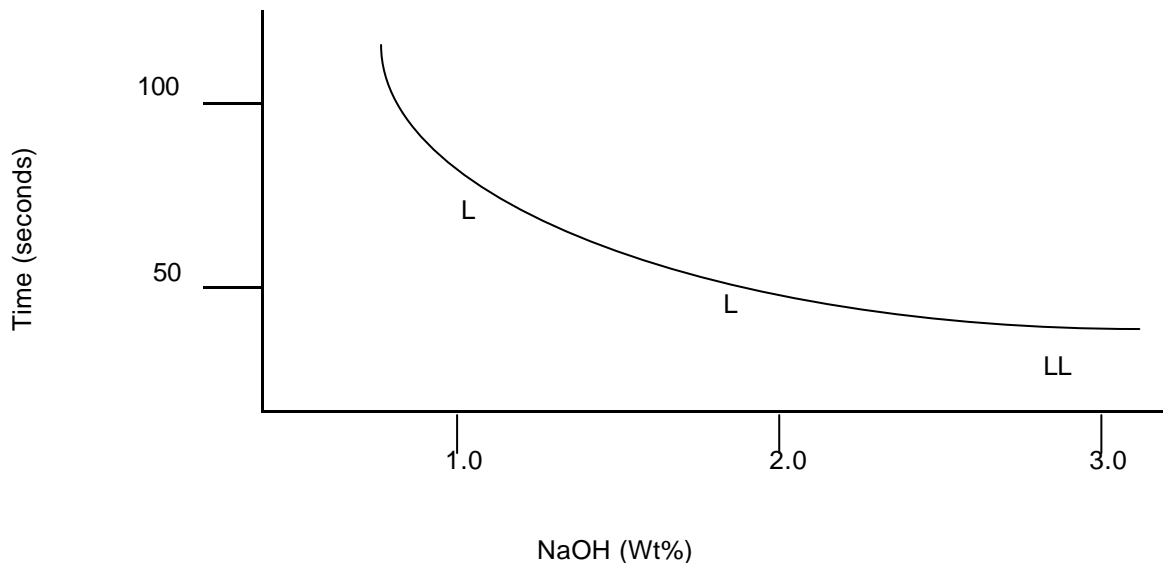
PREPLATE CLEANING

H-N 650 dry film resists can be used as an electroplating resist. When used as an electroplating resist the following preplate cleaning sequence is recommended.

Acid Cleaner	ENPLATE AD 482
Cold water rinse	
Copper Activation	ENPLATE AD 485
Cold water rinse	
Sulphuric acid	10% v/v
Cold water rinse	
Acid copper	CUPROSTAR LP-1 or CUPROSTAR ST

STRIPPING

The H-N 650 resist can be stripped in either dilute alkali metal hydroxide solutions or proprietary strippers.



L Flake size 10-30 mm square
 LL Large flakes

HANDLING AND SAFETY INSTRUCTIONS

For detailed information consult the material safety data sheets for this product.
Please read material safety data sheets carefully before using this product.

DISCLAIMER

All recommendations and suggestions in this bulletin concerning the use of our products are based upon tests and data believed to be reliable. Since the actual use by others is beyond our control, no guarantee expressed or implied, is made by Enthone, its subsidiaries or distributors, as to the effects of such use or results to be obtained, nor is any information to be construed as a recommendation to infringe any patent.

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