ONSTATIC TECHNOLOGY CO., LTD.
7F., No.1,Ren' ai Rd., Yingge Dist., New Taipei City 239,Taiwan(R.O.C.)
TEL: 886-226777481 FAX: 886-2-26777484

PHOTOIMAGEABLE SOLDER MASK

R-500 Z28(5) / HD-5

Sep , 2013

1. FEATURES

(1) For screen printing.

(2) Halogen-free type of environmental product.

R-500 Z28(5) Halogen content is following:

a) Free Halogen Ion Content：

F^- ：＜10 PPM
Br^- ：＜30 PPM
Cl^- ：＜50 PPM

b) Total Halogen Content （Free Halogen Ion Content＋Co-bonded Halogen Ion Content）：

F ：＜30 PPM
Br ：＜50 PPM
Cl ：＜800 PPM

2. SPECIFICATION

Main agent	**R-500 Z28(5)**
Hardener	**HD – 5**
Color	**Green**
Mixing ratio	**Main agent :750g / Hardener : 250g**
Viscosity (Main agent)	**230 ± 30 ps (R type viscometer at 25°C)**
Solid content	**75 ～ 80 wt%**
Specific gravity	**1.3 ± 0.2**
Tack- dry window	**75°C x 70 min (maximum)**
Exposure energy	**300 – 500 mJ / cm^2 (on the solder)**
*** Pot life**	**24 hours (stored at 25°C or below in dark place)**
Shelf life	**6 months after manufacturing (stored at 25°C or below in dark place)**

*After mixing with hardener.

3. PROCESS CONDITIONS

Surface treatment : Acid treatment → Brushing

Coating : Screen printing with 90 – 120 mesh screen

Hold time : 10 – 20 min.

Tack dry : A. One side each exposure
- 1st side; 70 – 75˚C / 15 – 20 min. (Hot air convention oven)
- 2nd side; 70 – 75˚C / 20 – 30 min. (Hot air convention oven)

B. Both sides simultaneous exposure
; 70 – 75˚C / 35 – 50 min. (Hot air convention oven)

Exposure : 300 – 500 mJ / cm^2 (on the solder)

Hold time : 10 – 30 min.

Development : Developer ; 1wt% Na_2CO_3
Temperature ; 29 – 31˚C
Spray pressure ; 2.5 – 3.0 kg / cm^2
Dwell time ; 70 – 100 sec.

Water rinse : Temp. 30˚C or below
Spray pressure ; 1 - 1.5 kg / cm^2
Dwell time ; 45 – 60 sec.

Post cure : Non plugging ;
150 – 160 ˚C / 60 min. (Hot air convention oven)

Plugging ;

80℃ x 60min→110℃ x 60 分→160℃ x 60min（Hot air convention oven）

4. CHARACTERISTIC

(1). TACK DRY WINDOW

Tack dry window (min. @75˚C)	40	50	60	70	80	90
Developability	○	○	○	○	△	×

(2). HOLD TIME

Hold time (hrs)	24	36	48	72
Developability	○	○	○	×

(Holding at 20˚C / 60%RH after drying at 75˚C / 25 mins.)

(3).PHOTOSENSITIVITY

Item	Thickness	Energy	Dwell time	Sensitivity
Sensitivity		300 mJ/cm^2		8 -10wedges
Stouffer	25 μ m	400 mJ/cm^2	60sec	9 -11wedges
(2lsteps tablet)		500 mJ/cm^2		10 -12wedges

Exposure energy is measured at under Mylar film.

5. PROPERTIES

Item	Test method	Result
Adhesion	Cross Cut Adhesion Tester (Simex Cat No.01-903-01)	100/100
Pencil hardness	Pencil Hardness Tester (Yasuda/NO.553-M)	≧6H
Solder heat resistance	Rosin flux 260˚C / 30sec, 1cyles	Pass
Solvent resistance	PGM-Ac, room temp./30min Cross hatch peeling	Pass
Acid resistance	10vo1% H_2SO_4, room temp./30min Cross hatch peeling	Pass
Alkaline resistance	10wt% NaOH, room temp./30min Cross hatch peeling	Pass
Electroless gold plate	NI; 125 μ inch Au; 3 μ inch	Pass

Note : The above-mentioned test data is only for reference, not to guarantee the same in your process.

6. R-500 Z28(5) COMPLY WITH IPC-SM-840C Class H

Property	Test Method	Requirement	Test Result
3.4.8. Visual	Magnifying lens rated between 1.75 to 10X magnification	No cracks No peeling and roughness. Free of foreign materials.	OK
3.5.2.1. Adhesion (tape method)	Determined in accordance with TM2.4.28.1 of IPC-TM-650. Differentiation of class shall be required.	Bare Copper ≦ 0% Gold or Nickel ≦ 5% Base Laminate ≦ 0% Melting Metals ≦ 10% (Tin-Lead plating)	PASSED PASSED PASSED PASSED
3.5.3. Mashinability	Subjected to drilling, routing, sawing or punching.	No cracks, No peeling and roughness.	PASSED
3.5.1.. Pencil Method	45degree angle, forward pressure in a 1/4 inch.	No softer than "F"	PASSED/6H
3.4.5. Curing	3.6.1.1.Resistance to Solvents and Cleaning Agents. 3.7.1.Solderability. 3.7.2.solder resistance.	Must meet requirements of 3.6.1., 3.7.2.and 3.7.3.	PASSED PASSED PASSED
3.6.1. Resistance to solvents, Cleaning Agents, Flux	・Isopropanol room temperature 2 minutes. ・75%Isopropanol/25%water 46±2˚c 15 minutes. room temperature. . D-Limonene room temperature 2 minutes. ・10% Alkaline detergent EXP. ≦40% alkanolamine ≦20% 2-butoxyethanol ≦20% glycol ether and the remaining 90% water (PH=13 or less) 57±2˚c 2 minutes. . Monoethanolamine 57±2˚c 2 minutes . Deionized water 60±2˚c 2 minutes	No surface roughness, blisters, delamination,swelling, and color change.	PASSED PASSED PASSED PASSED PASSED
3.6.3. Flammbility	UL-94 flammability.	UL-94 V number shall not be raised.	94 V-0
3.7.1. Solderbility	After flux coated, hold at ambient temperature for 5 minutes, preheat and solder float at 255±5˚C for 10±1 seconds.	Solderbility of boads shall not be diminished.	PASSED

3.7.2. Resistance to solder	After flux coated, hold at ambient temperature for 5 minutes, preheat and solder float at 255±5˚C for 10±1 seconds.	Solder shall not adhere to the solder mask.	PASSED
3.6.2. Hydrolytic Stability/Aging	97±2˚C 90-98%RH 28 days.	No irreversible change of state.	PASSED
3.8.1. Dielectric Strength	Detemined in accordance with TM2.5.6.1 of IPC-TM-650	Minimum value of 500 VDC per 0.025 mm [0.001 inch] of thickness.	PASSED 1.9KV/mil
3.8.2. Insulation Resistance	Minimum resistance of show before and after soldering.	Minimum $5\times10^{8}\Omega$ at 500 VDC. IPC-B-25 test pattern B.	Before Soldering $2.30\times10^{13}\Omega$ After Soldering $2.50\times10^{12}\Omega$
3.9.1. Moisture and Insulation Resistance	25-65˚c 85%RH Cycling 6 2/3 days Bias voltage 50 VDC and Test Voltage 100 VDC.	Minimum $5\times10^{8}\Omega$ at 500 VDC. IPC-B-25 test pattern B.	Initial $3.3\times10^{13}\Omega$ After Treatment $2.8\times10^{12}\Omega$
3.9.2. Electromigration	85±2˚c 90%RH 168 hours. Bias voltage 10VCD and Test Volatage 10VC	None allowed . Resistance ≧ 2MΩ	PASSED
3.9.3. Thermal Shock	-65˚c 15 min +125˚c 15 min, Transition should not exceed 2 minutes. 100 cycles.	No blistering, crazing , and delamination.	PASSED

Note :

All test data mentioned above in this technical data sheet and process conditions are based on our laboratory test result and only for reference, we suggest testing for suitability in your application.