

Technical Data No. 8601-1/2

Adhesive for chip mounting machines

Seal-glo NE3000S DATA ON SAFETY**I) COMPOSITION**

Seal-glo NE3000S is composed of the following materials and chemicals:

Epoxy resin oligomer
Epoxy reactive diluents
Hardener
Filler
Thixotropic agent

II) HEATING LOSS AND INGREDIENTS OF GENERATED GAS

Heating loss = 0.5 wt%

[Measuring method] Measured after keeping non-cured *Seal-glo NE3000S* in a 150°C hot air oven for 30 minutes.

III) DATA ON CORROSION TO COPPER

A test of *Seal-glo NE3000S* on its corrosion to copper was executed.

Result :No corrosion brought forth under the conditions of 40°C × 95%RH × 72hrs. n=3

[Testing method] A test piece was used, namely a piece of copper plate was polished with #500 abrasive paper, *Seal-glo NE3000S* was applied onto it, and curing was made.

IV) DATA ON SAFETY

1. *Seal-glo NE3000S* is registered as one of the standard chemical substances listed in "Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances" and does not contain any ingredient that belongs to "Specified Chemical Substances" prescribed in the said Law.
2. *Seal-glo NE3000S* does not belong to any dangerous substance specified in Fire Service Low.
3. The value of P.I.I. can be presumed to be Class II, which is of low irritation.
This product may cause skin irritation to sensitive personnel.
In case *Seal-glo NE3000S* gets in touch with skin, please wash thoroughly with soap and water.
In case of eye contact, please wash out with clean water and consult a medical doctor immediately.
4. For more specific information please refer to MSDS.

V) WARNING

1. Store adhesive in a refrigerator keeping the temperature form 2°C to 10°C.
In case *Seal-glo NE3000S* is exposed to higher temperature than 40°C, its properties are gradually degraded.
This adhesive also tends to dry and vary its viscosity in case it is exposed to high humidity.

VI) CLEANING SOLVENTS

Dibasic ester mixture (Trade name: DBE) is recommended to apply for *Seal-glo NE3000S* cleaning solvent.

Ketone type (ex. MEK) or Ester type (ex. Ethyl acetate) solvent is also available.

Care should be taken not to use other solvents such as alcohol, etc. in order not to cause consequent curing.

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***Seal-glo NE3000S* DATA ON CHARACTERISTICS**

1) DATA ON PRODUCT PROPERTIES

Items	Measured values
Specific gravity	1. 38
Viscosity(25°C.5rpm)	380 Pa.s (380,000cps)
Thixotropy index	5.0
Glass transition Temp.	148°C
Water absorbing degree	0.19 %
Coefficient of thermal expansion	4.9 × 10 ⁻⁵ (under Tg) 15.0 × 10 ⁻⁵ (over Tg)

II) DATA ON ELECTRIC CHARACTERISTICS

Data on electric property of *Seal-glo NE3000S*, attained under tests of JIS K6911 (General testing methods for thermo-setting plastics), are shown below.

Items	Measured values
Volume resistivity	1.8 × 10 ¹⁷ Ω·cm
Dielectric constant	30KHz 4.0
	100KHz 3.9
	1MHz 3.8
	10MHz 3.6
	30MHz 3.6
Dielectric loss tangent	30KHz 0.019
	100KHz 0.024
	1MHz 0.027
	10MHz 0.032
	30MHz 0.025

III) HUMIDITY AGING TEST

P.C.Board applied for test : Combs pattern electrode JIS Z3197 type II
(IPC-B-25 type B)

Curing conditions :Put the P.C.Board in a hot-air oven and kept it there for 60 seconds after the temperature of the PCB has gone up to 150°C.

Test conditions :

- Test I : For 2 hours under boiling
- Test II : 40°C × 95%RH × 100V × 96hrs.
- Test III : 85°C × 85%RH × 50V × 1000hrs.

	Test I	Test II	Test III
Primary Stage	3.7 × 10 ¹⁴ Ω	2.8 × 10 ¹⁴ Ω	3.2 × 10 ¹⁴ Ω
After Treating	3.9 × 10 ¹² Ω	2.4 × 10 ¹² Ω	2.1 × 10 ¹² Ω

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Seal-glo NE3000S DATA ON ADHESIVE STRENGTH

I)ADHESIVE STRENGTH

PCB applied for tests : CEM-3

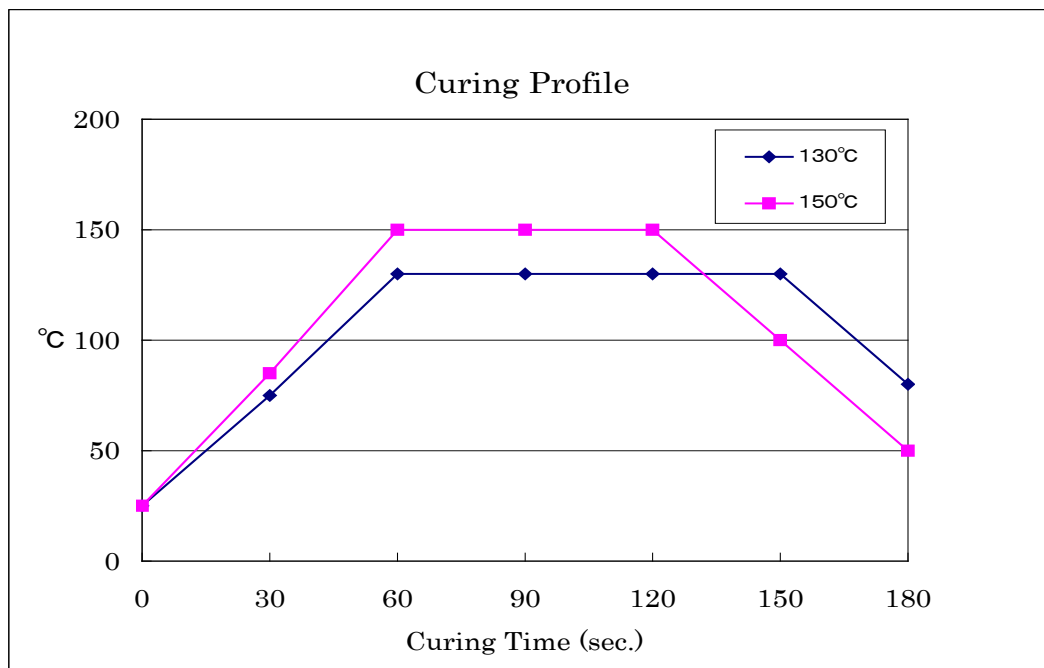
Applying method on PCB : Applied the adhesive onto PCB by screen-printing with a metal mask (t=0.2mm) .

Curing conditions : Put the PCB in a hot-air oven and kept it there for 60sec. after its temperature has gone up to 150°C.

Measurement of adhesive strength: Tensile strength along right angle direction with chip's shorter diam. was measured by means of push-pull gauge.

Kinds/sizes of chips	Area of a opening	Adhesive strength N (kgf)
0603C (1608C)	□0.3x1.0mm	25N (2.6kgf)
0603R (1608R)	□0.3x1.0mm	27 (2.8)
0805C (2012C)	□0.5x1.5mm	38 (3.9)
0805R (2012R)	□0.5x1.5mm	37 (3.8)
1206C (3216C)	□0.5x1.5mm	45 (4.6)
Mini-mold Tr 1206	□0.5x1.5mm	38 (3.9)
SOP·IC 8pins	□1.5x3.0mm	92 (9.4)

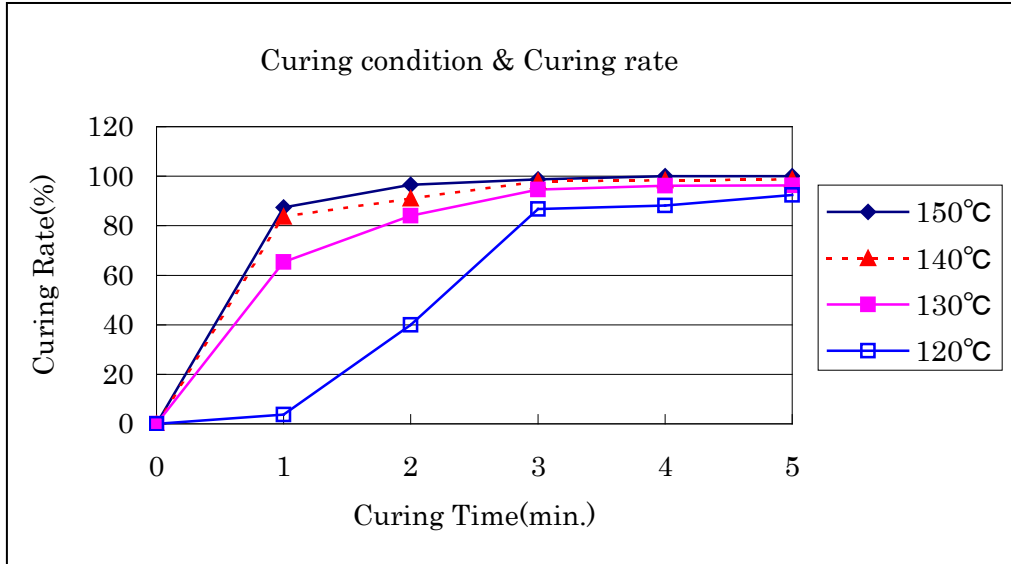
II)RECOMMENDED CURING PROFILE



In a case that large devices are laid near or on the back of the dispensed adhesive, the great calorific capacity of these devices would absorb heat to consequently give rise to phenomenon that additional longer curing time are needed.

III) CURING CONDITION AND CURING RATE

Thermal analysis : DSC (Differential Scanning Calorimetry)



IV) CURING CONDITION AND ADHESIVE STRENGTH

The following table shows the useable curing condition on the basis of adhesive strength developed with time at different temperature.

Applying method on PCB : Prepare the PCB on which the adhesive was printed with a metal mask having the opening of $\square 0.5 \times 1.5 \text{mm}$ and 0805C (2012C) chip parts were mounted .

Curing condition: Put the chip mounted PCB on the plate heater set at a fixed surface temperature of PCB.

After the surface temperature of PCB reached a fixed temperature, the curing time was counted. After the curing for a fixed time, left under the room temperature for 30 minutes and adhesive strength was measured.

Measurement of adhesive strength: Tensile strength along right angle direction with chip's shorter diam. was measured by means of push-pull gauge.

Useable Curing condition

	Curing Time (sec.)						
	30	60	90	120	150	180	210
100°C							
110°C							
120°C							
130°C							
140°C							
150°C							



Useable curing condition 25N of adhesive strength will be achieved.

V) TIME LEFT UNDER R.T. AFTER SCREEN PRINTING AND ADHESIVE STRENGTH

PCB used for tests: CEM-3

Curing condition: Kept the PCB on a plate-heater set at a PCB's surface temperature of 150 degrees C for 2 mins.

Test Method: 5 pcs. of the PCB, on which the adhesive was printed with a metal mask having the openings of □0.5x1.5mm, were prepared.

Each PCB left under the room temperature for a fixed time, loaded with 0805C (2012C) chips, and given the above mentioned curing condition, adhesive strength was measured one hour later from the completion of curing.

Measurement of strength: Measured tensile strength, by push-pull gauge, along right angle direction with chip's shorter diam.

Time (Left under R.T.)	Adhesive strength
1) Right after printing	37N (3.8kg)
2) 1 hour later	31N (3.2kg)
3) 3 hours later	33N (3.4kg)
4) 18 hours later	31N (3.2kg)
5) 24 hours later	36N (3.7kg)

VI) TIME LEFT UNDER R.T. AFTER CURING AND ADHESIVE STRENGTH

PCB used for tests : CEM-3

Curing condition : Kept the PCB on a plate-heater set at a PCB's surface temperature of 150 degrees C for 2mins.

Test Method: 5 pcs. of the PCB, on which the adhesive was printed with a metal mask having the openings of □0.5x1.5mm, were prepared.

Each PCB was loaded with 0805C (2012C) chips and given the above mentioned curing condition. After each PCB was left under R.T. for a fixed time, adhesive strength was measured.

Measurement of strength: Measured tensile strength, by push-pull gauge, along right angle direction with chip's shorter diam.

Time (Left under R.T.)	Adhesive strength
1) Right after printing	37N (3.8kg)
2) 1 hour later	33N (3.4kg)
3) 3 hours later	32N (3.3kg)
4) 18 hours later	34N (3.5kg)
5) 24 hours later	38N (3.9kg)

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Seal-glo NE3000S DATA ON HEATING AND ADHESION

I) PREPARATION FOR TEST PCB

PCB applied for tests:CEM-3

Chip applied for tests:0805C (2125C)

Preparation for test PCB: Applied the adhesive onto PCB by screen-printing with a metal mask (t=0.2mm) having the 5 openings of □0.5x1.5mm, loaded 0805C chip parts, and cured the PCB.

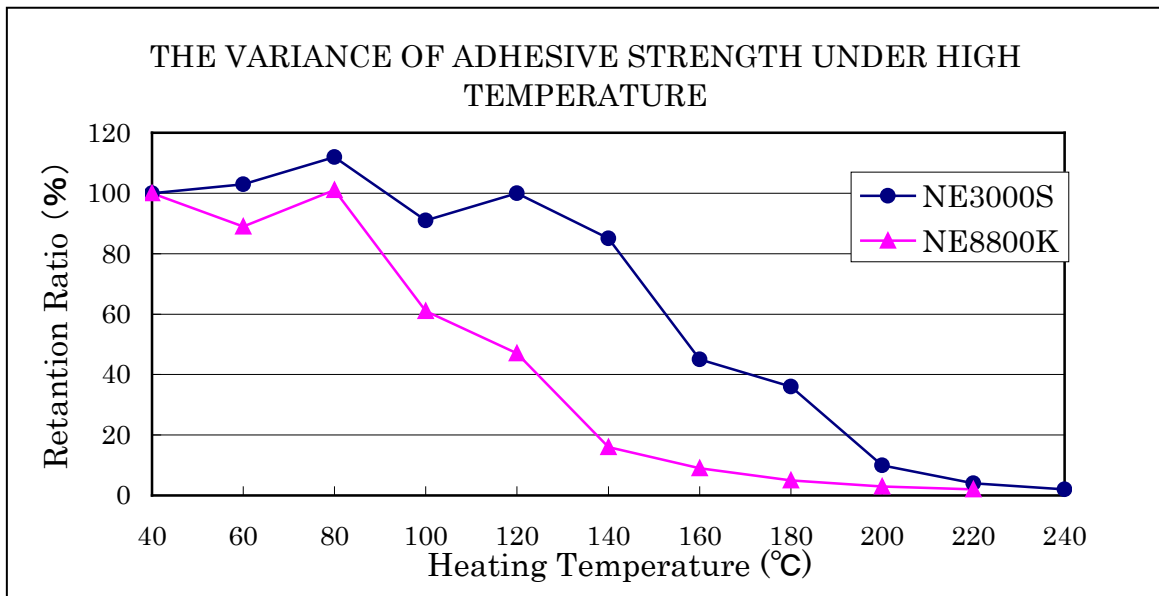
Curing condition: Put the chip mounting PCB in hot-air oven and kept it there for 60sec. after the temperature of PCB has gone up to 150°C.

II) THE VARIANCE OF ADHESIVE STRENGTH UNDER HIGH TEMPERATURE

Measuring method: Put the chip mounting and adhesive already cured above I) mentioned PCB on the plate heater set at fixed temperature and then adhesive strength is measured after 30sec.

Result of measurement: Retention ratio of adhesive strength at each temperature on the basis of it at 40 degree C is shown below.

Heating Temperature	Adhesive Strength N	Retention Ratio%
40°C	32 N	100%
60°C	35 N	103
80°C	36 N	112
100°C	30 N	91
120°C	32 N	100
140°C	27 N	85
160°C	15 N	45
180°C	12 N	36
200°C	3 N	10
220°C	1.3 N	4
240°C	0.8 N	2



III) SOLDER HEAT RESISTANCE TESTS

Measuring method: Prepare 5pcs. of above I) mentioned PCB.

Put each PCB for a fixed time on the plate heater set at 265 degree C (the reached surface temp. of PCB is 240 degree C), which was assumed the temperature of a solder bath, and left under the room temperature for 60 minutes and then adhesive strength was measured.

