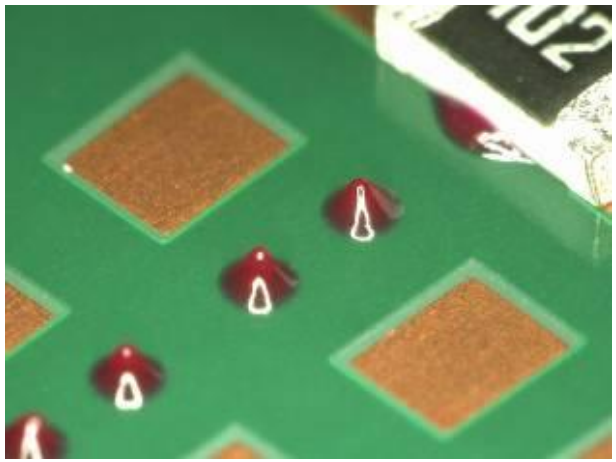
SMT Adhesive

Contents

SMT Adhesive – Heat Curable / Dispensing
JU-110

Product Information



Note:

This technical data sheet contains product performance assessed strictly under our own test procedures and may not be compatible with the results at end users.

Product features

Contents

- SMT adhesive designed for **DISPENSE USE**.
- DOES NOT CONTAIN environmentally hazardous substances restricted by UN3077, UN3082, classified as Class 9 and packing group III, and allows transportation as **NON-HAZARDOUS** material.
- Ensures consistent **HIGH DOT PROFILE** in continual dispensing.
- Superior **HEAT SLUMP RESISTANCE** in the curing process.

Specifications

Contents

Application			Dispensing
Product			JU-110
Item		Condition・Reference・Unit	Result
Before curing	Composition	--	Epoxy
	Appearance・Color	Visual inspection	Paste・Brown
	Specific gravity	25ºC, specific gravity cup method	1.25
	Viscosity	E type viscometer, 10rpm at 20ºC for 2min. (Pa·s)	55±10
	Non volatile	105ºC, 180min (%)	> 99.0
	Shelf life	Below (10 ºC)	6 months
	Copper plate corrosion	40ºC, 95%RH, 96hrs	No abnormality
After curing	Appearance, Color	Visual inspection	Polymerized・Brown
	Copper plate corrosion	40 ºC, 90%RH, 96hrs*1	No abnormality
	Solder resistivity	SAC305 solder bath at 250ºC x 10sec. dipping 3216R*1	No abnormality
	Solvent resistivity	IPA, acetone x 1hr 3216R*1	No abnormality
	Surface insulation resistance	Initial room temp., JIS Z 3197, comb electrode, 200μm application*2 (Ω)	>1.0X10^{13}
		85ºC, 85%RH, 1000hrs inside chamber*2	>1.0X10^{9}
		85ºC, 85%RH,1000hrs outside chamber*2	>1.0X10^{12}
	Glass transition temperature	DSC 10ºC /min. room temp. ~200ºC 2nd run (ºC)	95
	Boiled water absorption	1hr, JISK6911*3 (%)	<1.0

The measured values indicated above are not to be guaranteed.
*1: Curing condition 130ºC x 60sec *2: Curing condition 130ºC x 10min. *3: Curing condition 120ºC x 10min.

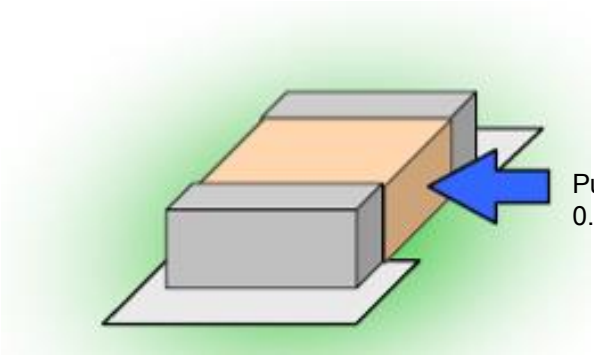
Curing conditions vs. bonding strength

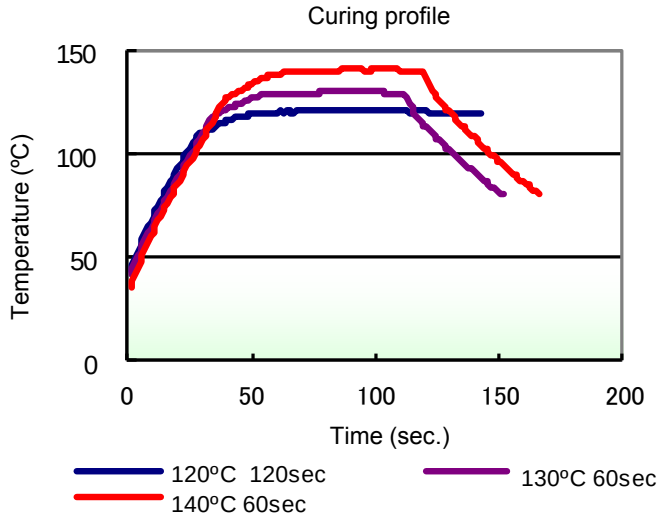
< Test method >

Print JU-110 using 150μm thick stencil with 0.8mmΦ aperture on a glass-epoxy board and place a 3216 (1206) chip resistor.
Cure JU-110 and measure bonding strength with a bond tester after 30min. of curing.

< Test conditions >

Conditions : 5mm/sec. of push speed, room temperature
PC board : FR-4 material
Equipment : Reflow simulator SMT SCOPE SK-5000 (Sanyo Seiko)
Bond strength tester (Seishin Kogyo)
Test point : 10 chips for each curing profile



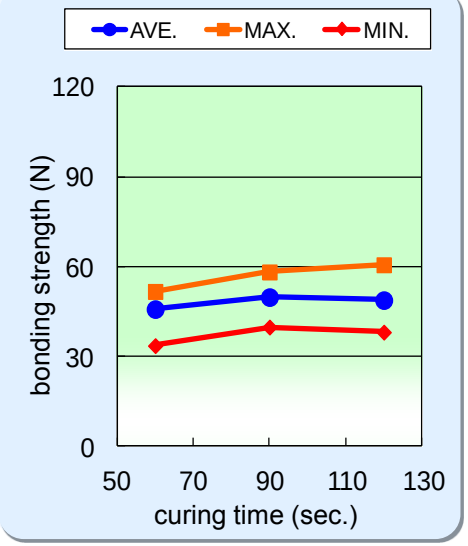


Curing conditions vs. bonding strength

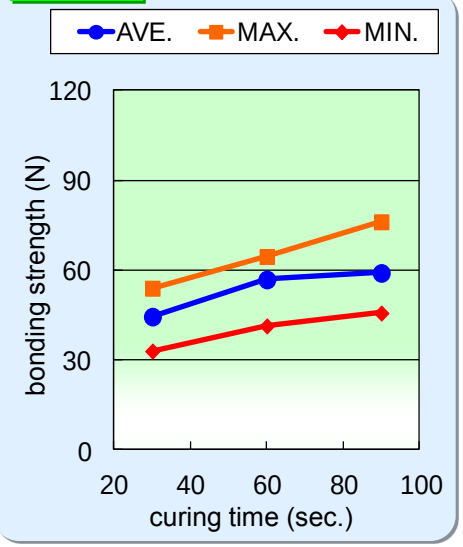
Unit: Newton

Temp.	120 ºC			130 ºC			140 ºC		
Time (sec.)	60	90	120	30	60	90	30	45	60
Average	45.8	49.8	48.8	44.4	56.8	59.0	62.5	82.6	89.3
Maximum	51.7	58.2	60.6	53.9	64.5	76.1	82.4	100.6	106.6
Minimum	33.6	39.8	38.1	32.9	41.3	45.6	43.4	69.8	72.3

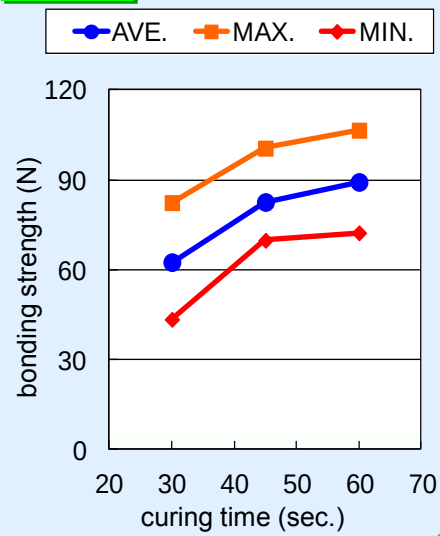
120 ºC



130 ºC



140 ºC



Recommended curing conditions: 1) At120 ºC for ≥90sec. 2) At 130 ºC ≥60sec. 3) At 140ºC ≥90sec.

Continual dispensability

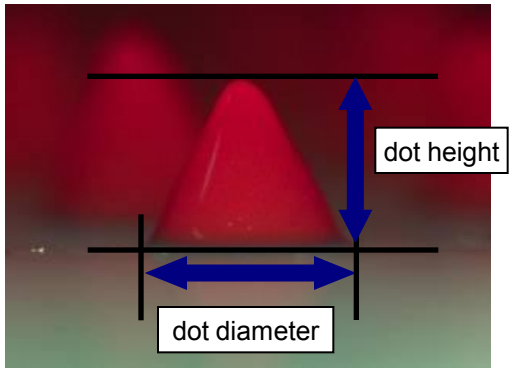
< Test method >

Measure dot diameter and height of each 5 deposits by microscope from 90° angle at around initial and every 2500 shots per a PC board and indicate the average figure in the graph.

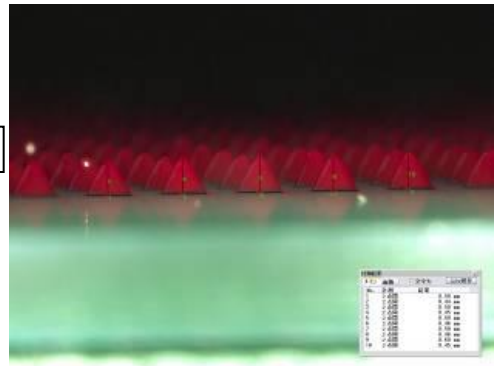
< Equipments >

Microscope	: DIGITAL MICROSCOPE VHX-600 (KEYENCE)
Dispensing machine	: 350PC,ML-808FX com-CE (Air pulse method Musashi Engineering)
Temp. controller	: Processmate 6500 (Nordson EFD)
PC board	: Glass-epoxy GE-4
Syringe type	: PSY 10E (Musashi Engineering)
Nozzle type	: 1. 22G single nozzle (needle length 15mm, internal dia. 0.41mmΦ) 2. 0.30mm dia. Precision-solid nozzle (Taper rolling)

< Test item >



< e.g. measurement from 90° x 50 >

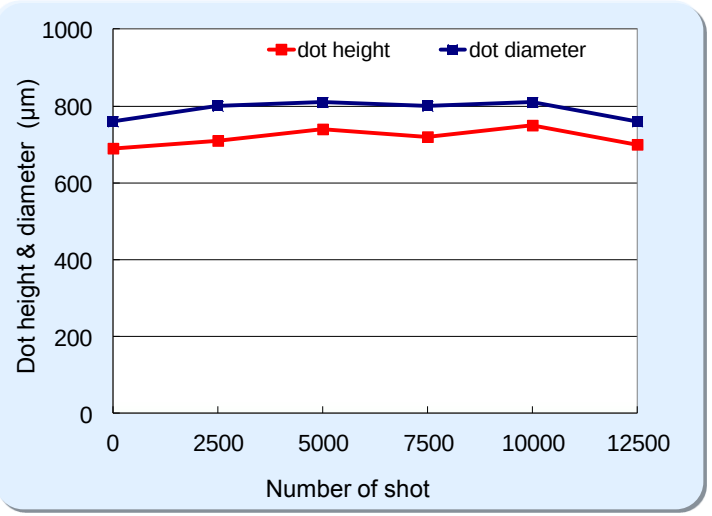


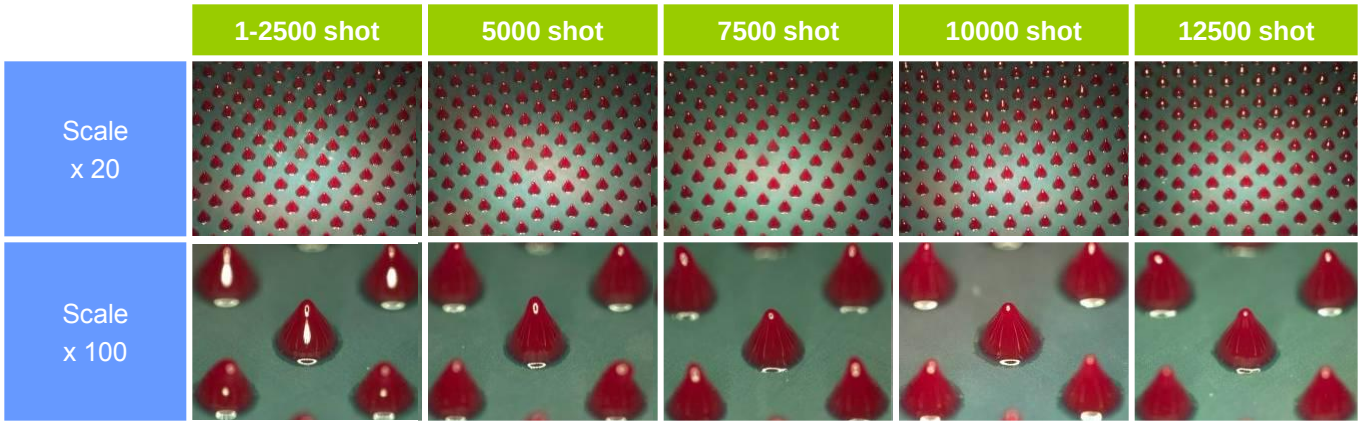
Continual dispensability – 22G single nozzle

< Equipment parameter >

Nozzle type	: 22G single (needle length =15mm, internal dia.=0.41mmΦ)
Dispense pressure	: 350kPa
Dispense time	: 100msec.
Clearance	: 200μm
Syringe temperature	: 30 ºC

Dispense pitch size: X,Y 1.5mm each
(2500 dots per a board)

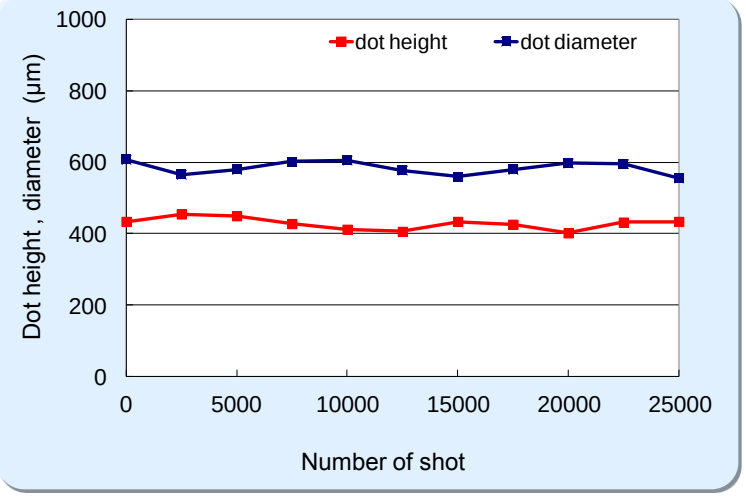


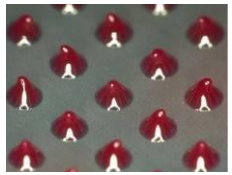
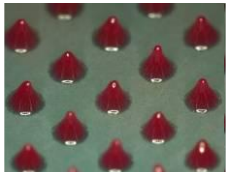
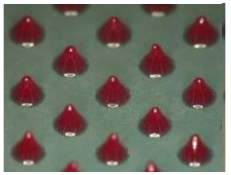
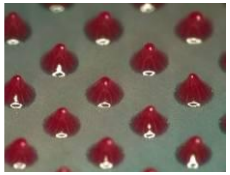


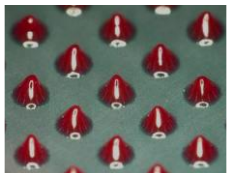
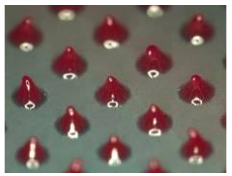
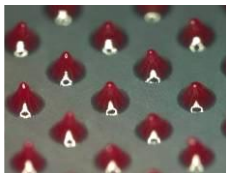
Continual dispensability – 0.30mm dia. Precision-solid nozzle

< Equipment parameter >

Nozzle type	: 0.30mm Φ Precision-solid nozzle (Taper rolling, internal dia.= 0.30mm)
Dispense pressure	: 130kPa
Dispense time	: 100msec.
Dispense idle time	: 100msec.
Clearance	: 230μm
Syringe temp.	: 30 ºC
Dispense pitch size	: X,Y 1.0mm each (5000 dots per a board)



	1-2500 shot	5000 shot	7500 shot	10000 shot	12500 shot
Scale x 75					

	-15000 shot	17500 shot	20000 shot	22500 shot	25000 shot
Scale x 75					

Temperature vs. Viscosity, Thixotropy

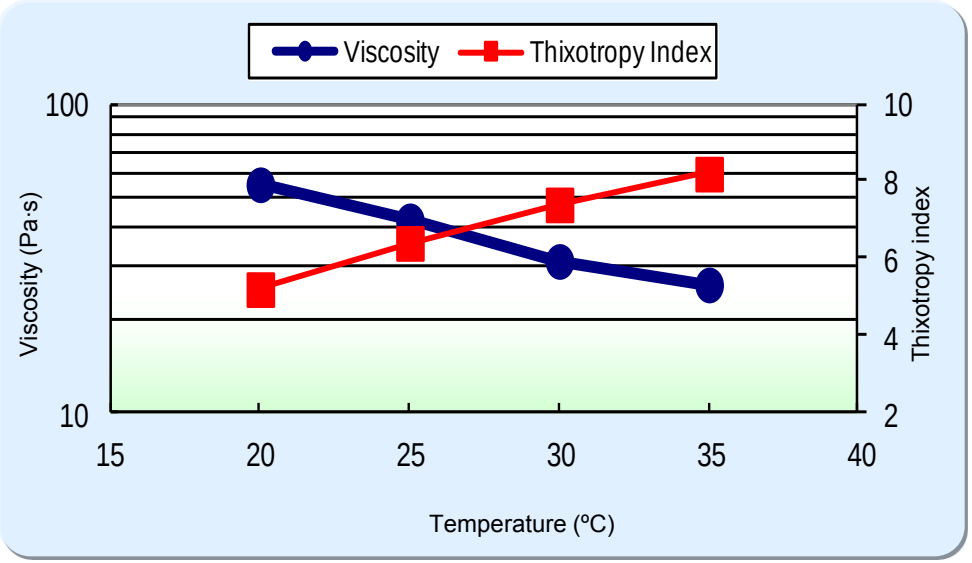
< Test method >

Measure viscosity and Ti value of JU-110 at each temperature indicated below.

< Test condition >

Equipment : E-type viscometer RE-100U (Toki Sangyo)
Condition : 10rpm after 2min. and 1rpm after 2min.
Rotor used : 3º X R7.7(CORD-7)
Definition of Thixotropy : Thixotropy index = Viscosity at 1rpm / Viscosity at 10rpm
Evaluation method : Take an average of viscosities measured twice (Pa.s)

Temp. (ºC)	Viscosity (Pa·s)	Thixotropy index
20	55	5.2
25	42	6.4
30	31	7.4
35	26	8.2



As temperature increases, viscosity decreases and Thixotropy index increases.

Voltage applied surface insulation resistance

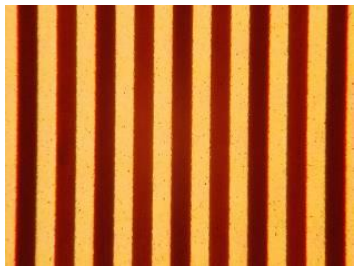
< Test method >

Print JU-110 on the electrode of comb-shaped board (test coupon) and cure it. Confirm whether no evidence of electromigration and any other abnormalities are observed in the test coupon after leaving 1000hrs in a heat cycle test chamber with voltage of 50V applied. Also, measure SIR every certain hour as listed below.

< Test condition >

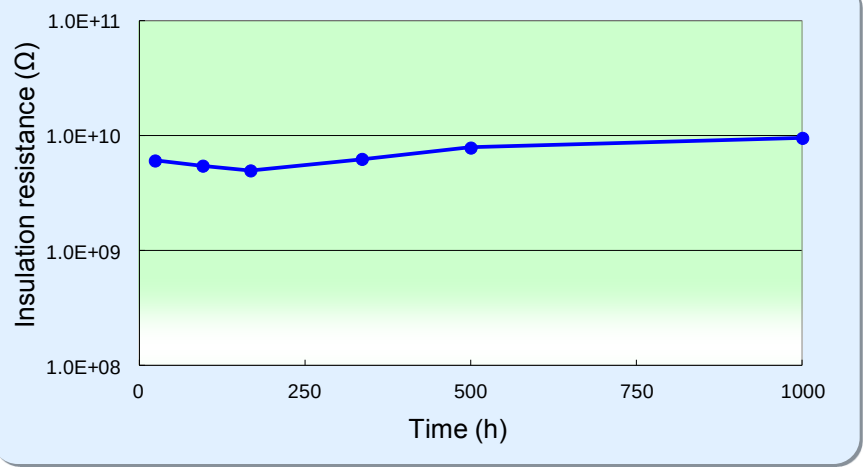
Stencil thickness	: 200um
Test coupon	: JIS type-‖
Print formulation	: Print JU-110 on the electrode of comb coupon.
Curing condition	: 130 ºC for 10min.
Voltage applied	: 50V
Measurement voltage	: 100V
Condition of chamber	: 85ºC, 85%RH

Image of test coupon with backlight after the test (x 50)



No evidence of electromigration and other abnormalities

Time	Atmosphere	Average (Ω)
Initial	Out of chamber	$1.4X10^{14}$
24hr	In chamber	$6.1X10^{9}$
96hr	In chamber	$5.5X10^{9}$
168hr	In chamber	$5.0X10^{9}$
336hr	In chamber	$6.3X10^{9}$
500hr	In chamber	$7.9X10^{9}$
1000hr	In chamber	$9.6X10^{9}$
1000hr	Out of chamber	$1.6X10^{13}$



JU-110 secures excellent SIR properties.

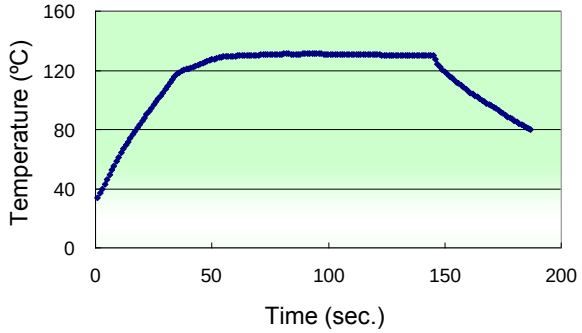
Heat slump

< Test method >

Measure diameter of deposits before and after curing.

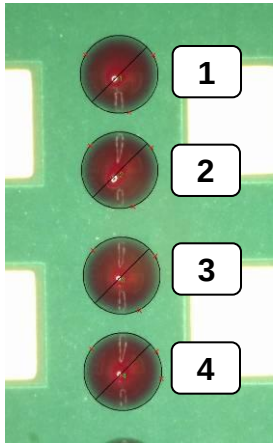
< Test condition >

Heat equipment : Hot air reflow (Eightec)
Reflow profile : 130ºC for 90sec. (see graph on the right)
Measuring equipment : DIGITAL MICROSCOPE VHX-600(KEYENCE)
PC board : FR-4
Dispense condition : Refer to slide 7,8 (22G single nozzle)
Target dispense diameter : Around 0.8mm

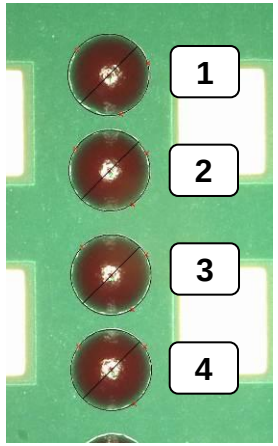


No. of shot	Diameter before curing (mm)	Diameter after curing (mm)	Change rate (%)
1st	0.82	0.86	5
2nd	0.81	0.86	6
3rd	0.82	0.85	4
4th	0.82	0.86	5
Ave.	0.82	0.86	5

< Before curing >



< After curing >



Change in diameter of the deposits after curing was only 5% in average and excellent heat slump resistance is secured.

Component misalignment

< Test method >

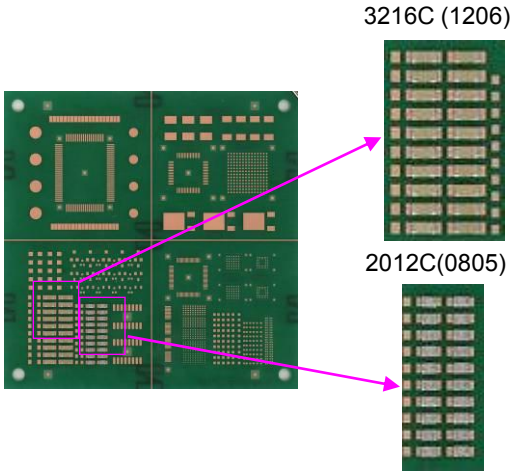
Observe the number of misalignment of chip component after dispensing, placing chip component and curing JU-110.

< Test condition >

Heat equipment	: Hot air reflow oven (Eightec)
Reflow profile	: Refer to slide 11
PC board	: FR-4 (shown on the right)
Dispense condition	: Two dots for one chip at 0.9 mm pitch
Target dispense diameter	: Around 0.6mm
Components	: 3216 (1206)& 2012(0805) chip capacitors for 20 pcs. each per PC board

< Judgment criteria >

Whether obvious misalignment described in “Example of misalignment” is observed by visual inspection.

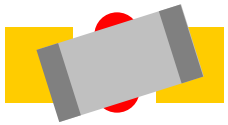


Number of misalignment observed

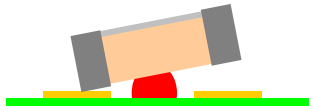
	3216C	2012C
PCB1	0	0
PCB2	0	0
PCB3	0	0
Total	0/60	0/60

< Example of alignment >


Misplaced to long axis direction

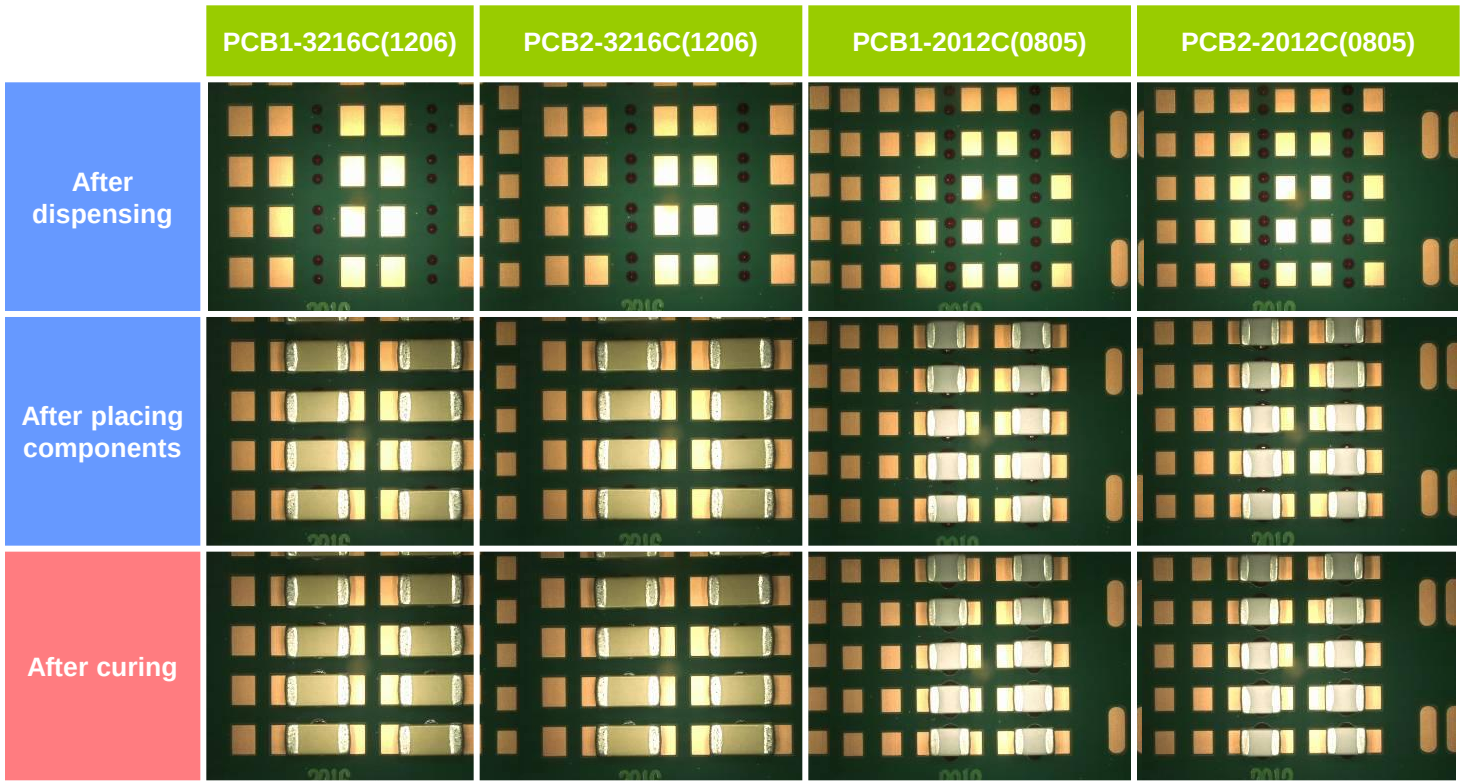

Misplaced to rotational direction


Misplaced to short axis direction


Component lifting

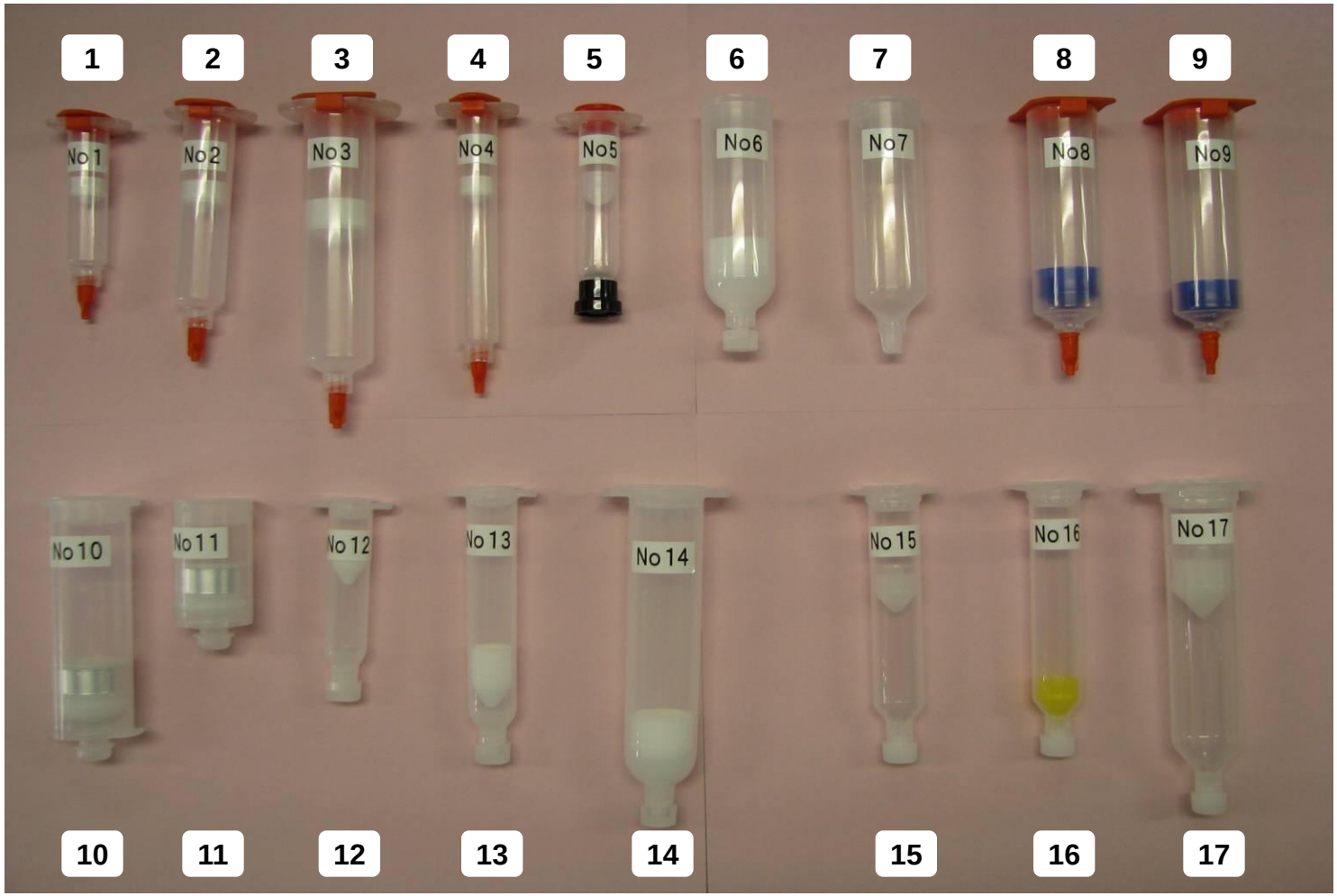
No shifting of components occurred.

Component misalignment

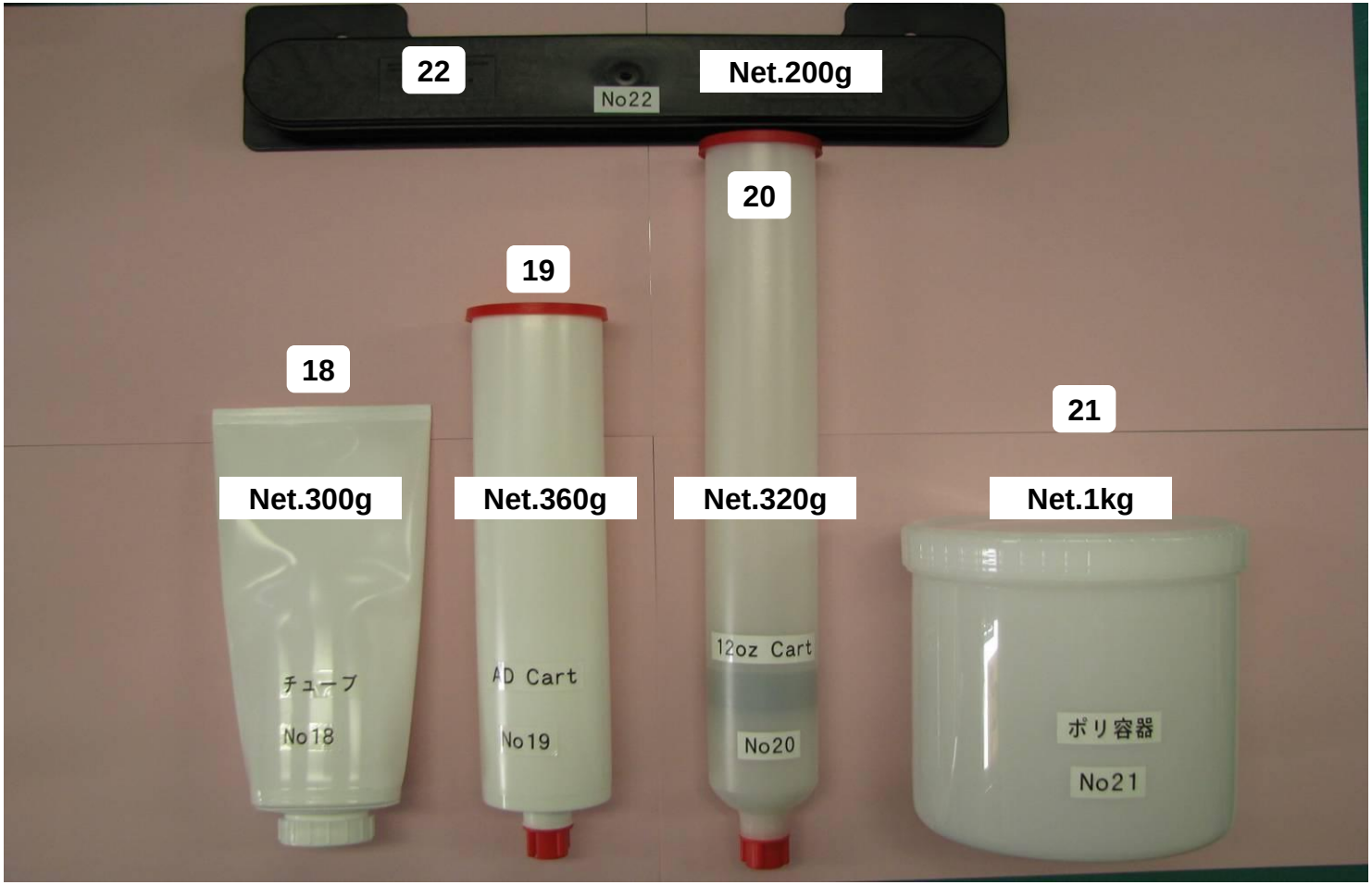


No component misalignment occurred.

Syringe & container type – Typical syringes available



Syringe & container type – Other containers



Syringe & container type

No	KOKI container code / Manufacturer	Volume (ml)	No	KOKI container code / Manufacturer	Volume (ml)
1	S1 / EFD	5	12	PS 05S / Iwashita Engineering	5
2	S1 / EFD	10	13	PS 10S / Iwashita Engineering	10
3	S1 / EFD	30	14	PS 30S / Iwashita Engineering	30
4	S2 for solder paste	10	15	PSY 10E / Musashi Engineering	10
5	Hybrid Barrels / Semco	5	16	PSY 10E(Yellow plunger) / Musashi	10
6	M1	20, 25, 30	17	PSY 30E / Musashi Engineering	30
7	M1 without plunger	20, 25, 30	18	Tube	300g
8	M1- S / EFD	20, 25, 30	19	AD cartridge / Semco	360g
9	M1-SG (Magnet plunger) / EFD	20, 25	20	12oz cartridge / Semco	320g
10	F1 / Fuji Machine Manufacturing	30	21	Jar	1000g
11	XPF / Fuji Machine Manufacturing	10	22	ProFlow	200g

* No.1 - 17 are classified as syringes and No.18 – 22 are classified as other containers.
* Please contact us availability of syringes and containers other than the above listed.

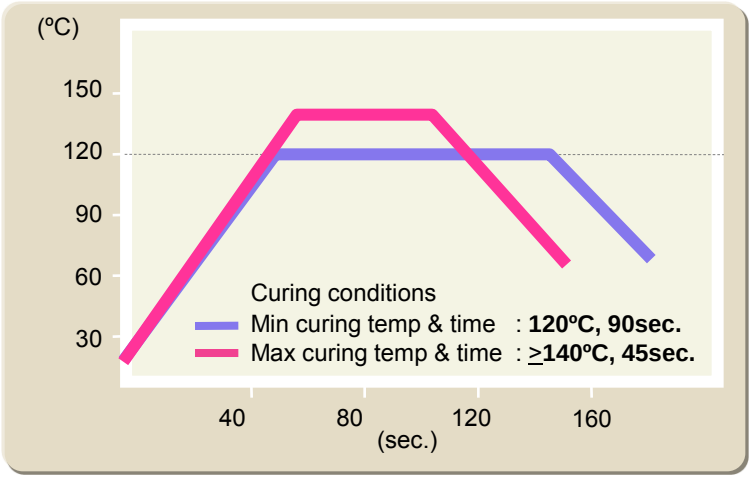
Handling guide

1) Recommended dispensing parameters
   (1) Temperature of nozzle : 30~33ºC
   (2) Temperature of syringe : 28~35ºC
   (3) Ambiance
      1. Temperature : 22~27ºC
      2. Humidity : 40~60%RH

2) Recommended curing conditions:
   120 ºC x ≥ 90sec.
   130 ºC x ≥ 60sec.
   140 ºC x ≥ 45sec.

3) Shelf life : 6 months (0 ~ 10ºC)

< Recommended Curing Conditions >



4) Note:
   (1) Please keep 0~10ºC when storing JU-110 in the refrigerator.
   (2) Please recover JU-110 to room temperature before use.
   Abrupt heating from refrigerated condition may cause unstable dispensability due to the expansion inside syringe.
   (3) More than 180ºC of heating is recommended for repairing.
   (4) Please refer to MSDS for other detailed notes for handling JU-110.

* Manufacturing date can be obtained from the lot number.

e.g. **Lot No. 2 08 31 2**

- **No of lot : 2nd**
- **Date : 31th**
- **Month : Aug**
- **Year : 2012**