TECHNICAL INFORMATION

Dispensing Use
NO-CLEAN SOLDER PASTE

SE5 - M953*i*D
SS5 - M953*i*D

[Content]

KOKI COMPANY LIMITED

1. FEATURES

1) Designed for dispense application.
2) Carefully selected thixotropic materials ensure excellent slump resistivity and significantly reduce occurrence of bridging and solder beading.
3) Specially developed flux system ensures both extremely high reliability and superior solder wettability.

2. SPECIFICATION

1) Alloy

Item	Unit	**SE5-M953*i*D**	**SS5-M953*i*D**	Remarks
Composition	%	Sn63, Pb37	Sn62, Pb36, Ag2	JIS S grade
Shape	--	Spherical	←	Microscope × 50
Particle size	μm	20 – 38	←	

2) Flux

Halogen content		%	0.0	0.0	Potentiometer
SIR*[1]	Initial value	Ω	$> 1 \times 10^{12}$	←	JIS comb type electrode type Ⅱ
	After humidification		$> 1 \times 10^{11}$	←	
Aqueous solution resistivity*[2]		Ωcm	$> 1 \times 10^{5}$	←	Conductivity
Flux type		–	ROL0	ROL0	ANSI/J-STD-004

3) Solder paste

Flux content	%	13	13	By weight
Viscosity*[3]	Ps	800 ± 10%	←	Malcom PCU-2
Copper plate corrosion*[4]	--	Passed	←	--
Solder spreadability	%	90	←	Copper plate
Tack time	hour	24	←	Malcom FG-1
Shelf life	month	6	←	Below 10°C

1. SIR ..... 40°C × 90%RH × 96Hr
2. Aqueous solution resistivity. ..... In accordance with MIL specifications.
3. Viscosity ..... Malcom spiral type viscometer, PCU-2 at 25°C ×10rpm
4. Copper plate corrosion ..... In accordance with JIS

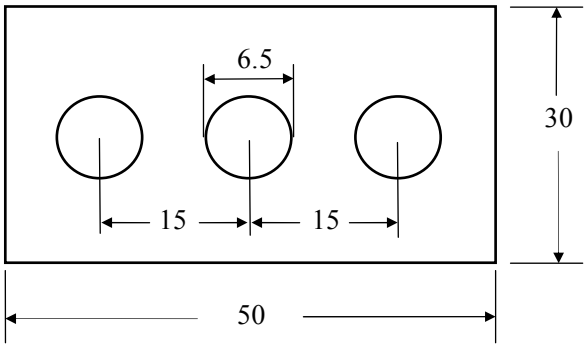
3. SOLDER BALL

• Test method

Prepare two test pieces by printing the paste on each alumina plate (50×50×0.8tmm) with a 0.2mm thick stencil provided with three 6.5mm diameter apertures with a distance between centers of 15mm.

Reflow one of them in 1 hour after printing and the other after storing it at 25 ± 2°C 60 ± 20%RH for 24 hours, on a hot plate at 250°C. Remove the test pieces from the hot plate after 5 seconds since the solder paste melted completely and cool them down to room temperature.

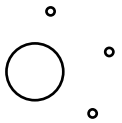
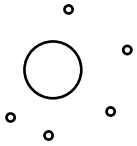
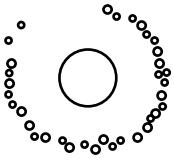
Inspect the degree of reflowing referring to 'Solder balling evaluation standard' using the ×10 magnifying glass.



Unit : mm

Stencil used.

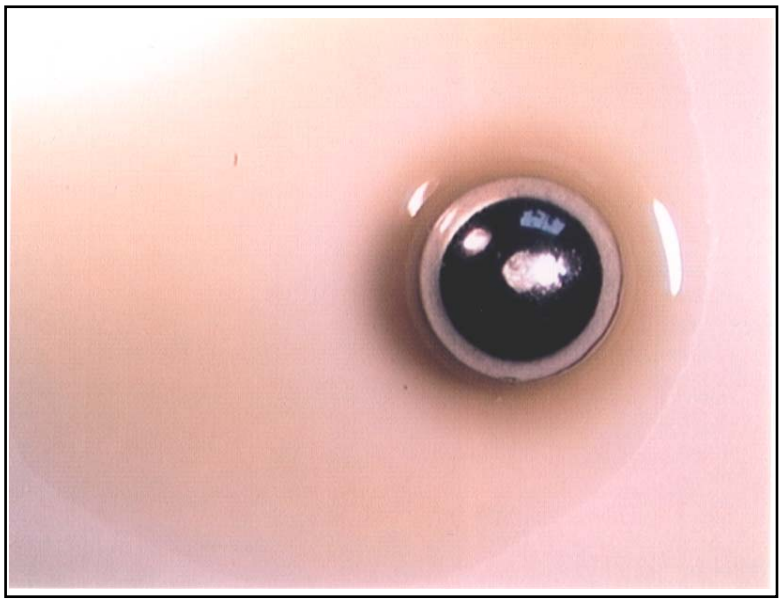
• Solder balling evaluation standard

Category	Status of coalescence of solder	Illustration (ex.)
1	The molten solder from the paste has melted in to one solder ball.	
2	The molten solder from the paste has melted into one large solder ball with no more than three isolated small solder balls with diameter less than 75μm.	
3	The molten solder from the paste has melted into one large solder ball surrounded by more than three solder balls with diameters less than 75μm which do not form a semi-continuous halo.	
4	The molten solder from the paste has melted into one ball accompanied by a large number of smaller solder balls which may form a semi-continuous halo, or has melted to form a number of similarly sized balls.	

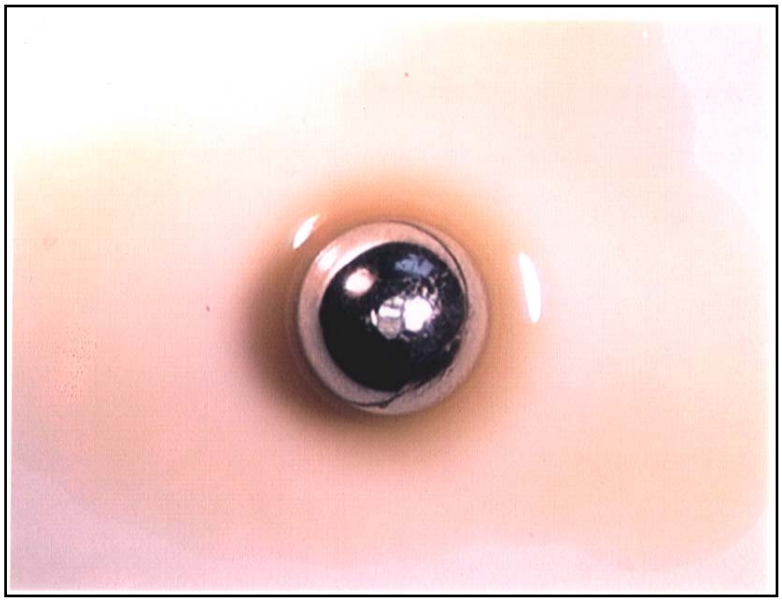
• Test result

Test piece	1 hour after print	24 hours after print
a	Category 2	Category 2
b	2	3
c	2	2

[1 hour after printing]



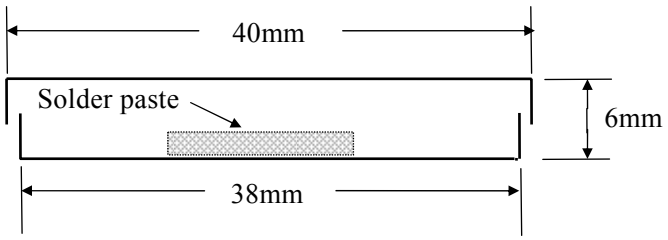
[24 hour after printing]



4. COPPER PLATE CORROSION

• Test method

Prepare 6 pcs. of phosphorus deoxidized copper plate of 50×50×0.5tmm in size (JIS-H-3100). Bend 3 of them at right angle at 5mm (copper plate A), and the rest at 6mm (copper plate B) from the both edges to form three open ended boxes.



After removing grease from the both copper plate A and B with acetone, soak them in 5% sulfuric acid for 1 minute and in ammonium persulfate solution (solution which contains 25% of ammonium persulfate in 0.5% of sulfuric acid) in 1 minute to etch the surface uniformly. After washing them with running water , soak in 5% sulfuric acid for 1 minute and rinse thoroughly with running tap water and demineralized water. Then, finally, rinse them with acetone and dry.

Obtain test pieces by printing solder paste on the copper plate B with a 0.2mm thick stencil provided with 6.5mm diameter aperture.

Place all three copper plate A over the copper plate B and lower each box in a horizontal position on to the surface of the solder bath at the temperature of 235±2°C and maintain the test pieces in this position for 5 seconds.

Remove each test piece from the solder bath and allow it to cool in a horizontal position down to room temperature. Place all three boxes in the thermohygrostat under the condition of 40±2°C 90~95%RH for 72 hours.

Remove the boxes from the thermohygrostat and inspect the inside surfaces of the boxes (including the lid) for possible corrosion.

• Test result

n	Copper plate A	Copper plate B
1	No corrosion	No corrosion
2	No corrosion	No corrosion
3	No corrosion	No corrosion

5. SURFACE INSULATION RESISTANCE

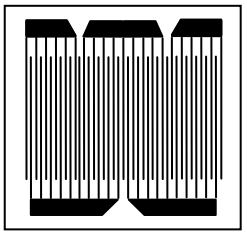
• Print the solder paste with a 0.2mm thick stencil on comb type electrode type-II specified in JIS-Z-3197 6.8. and reflow them to obtain test piece.

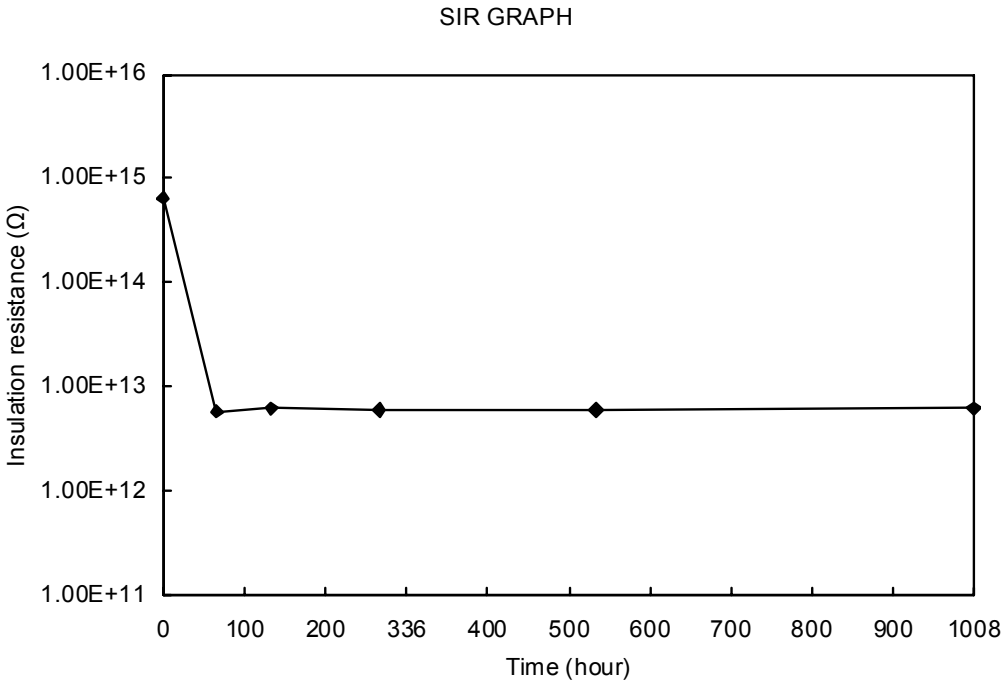
Put the test piece in a thermohygrostat under the conditions of 85±2°C and 85±2%RH.

Measure the insulation resistance at every specific time taking the test pieces out of the thermohygrostat. DC100V for the measurement.

• Test result

Time (hour)	S.I.R. Value (Ω)
Initial value	6.6×10^{14}
96	5.8×10^{12}
168	6.2×10^{13}
300	6.0×10^{13}
504	6.0×10^{12}
1008	6.2×10^{12}

Comb type electrode Type-II	
	
Width of conductor	0.318
Conductor spacing	0.318
Overlap length	15.75



6. VOLTAGE APPLIED SIR
(Electromigration Test)

• Test method

Print the solder paste with a 0.2mm thick stencil on comb type electrode Type-II specified in JIS-Z-3196 6.8. and reflow them to obtain test pieces.

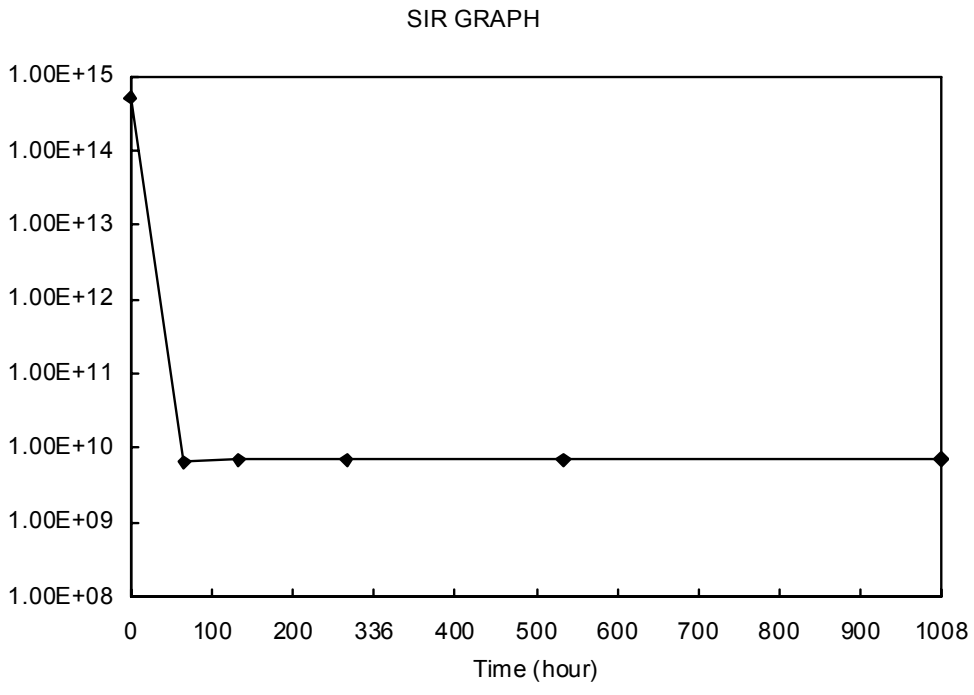
Put the test pieces in a thermogygrostat under the conditions of 85 ± 2°C and 85 ± 2%RH.

Measure the insulation resistance at every specific time keeping the test pieces in the thermohygrostat and apply DC50V. Apply 100V for the measurement.

• Test result

Time (hour)	Place measured	Average (Ω)
Initial value	Out thermohygrostat	5.2×10^{14}
96	In thermohygrostat	6.4×10^{9}
168	In thermohygrostat	6.8×10^{9}
300	In thermohygrostat	6.8×10^{9}
504	In thermohygrostat	7.0×10^{9}
1008	In thermohygrostat	7.1×10^{9}

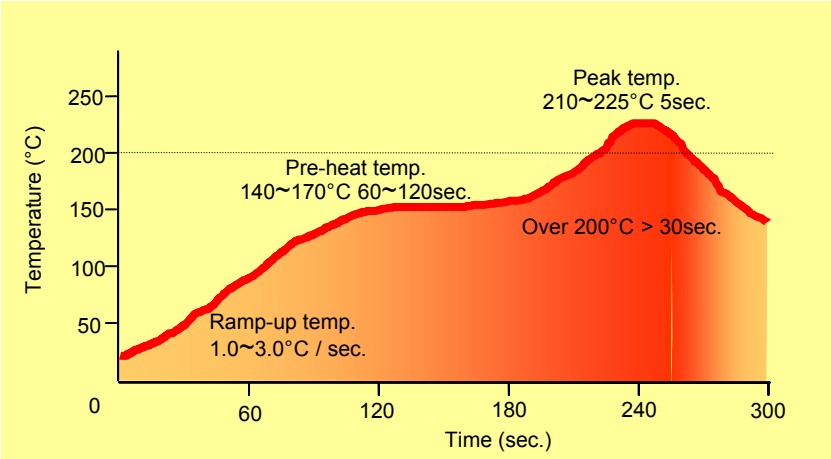
* There was no evidence of electromigration.



7. USE OF KOKI SOLDER PASTE

In order to make the paste use of KOKI SOLDER PASTE, please refer to the following guideline carefully before use.

1. Reflowing



4. Storage

Store in a refrigerator at 10°C.

DO NOT FREEZE!

5. Shelf life

1) 5 ~ 10°C : 6 months from manufacturing date

2) At 20°C : 1 month from manufacturing date

3) At 30°C : 1 month from manufacturing date

* Manufacturing date can be obtained from the lot number

ex. **Lot No. 8 07 21 2**

No. of lot : 2nd

Date : 21st

Month : July

Year : 2008