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## Koki no-clean **LEAD FREE** solder paste



Koki no-clean **LEAD FREE** solder paste

Low Melting Point Lead Free Solder Paste

**TB48-M742 & T4AB58-M742**

Product information

This Product Information contains product performance assessed strictly according to our own test procedures and may not be compatible with results at end-users.

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## Product Features

- **Low melting point (138 °C )**
- **PERFECT MELTING** and wetting at super fine pitch (>0.4mm pitch) and micro components (>0.3mm dia CSP, 0603 chip).
- Specially formulated flux chemistry ensures extremely **LOW VOIDING** with CSPs and broad contact area components.



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## Specifications

Application		Printing - Stencil	
Product		<b>T4AB58-M742</b>	<b>TB48-M742</b>
Alloy	Alloy Composition (%)	Sn-Ag0.4-Bi57.6	Sn-Bi58
	Melting Point (°C)	138	138
	Shape	Spherical	
	Particle size (um)	20 - 38	20 - 45
Flux	Halide Content (%)	0	
	Flux Type	ROL0*3	
Product	Flux Content (%)	10.0±1.0	
	Viscosity*1 (Pa.s)	190±30	
	Copper plate corrosion*2	Passed	
	Tack Time	> 16 hours	
	Shelf Life(below 10°C)	6 months	

1. Viscosity : Malcom spiral type viscometer, PCU-205 at 25°C 10rpm
2. Flux type : According to IPC J-STD-004A
3. Copper plate corrosion : In accordance with IPC J-STD-004A



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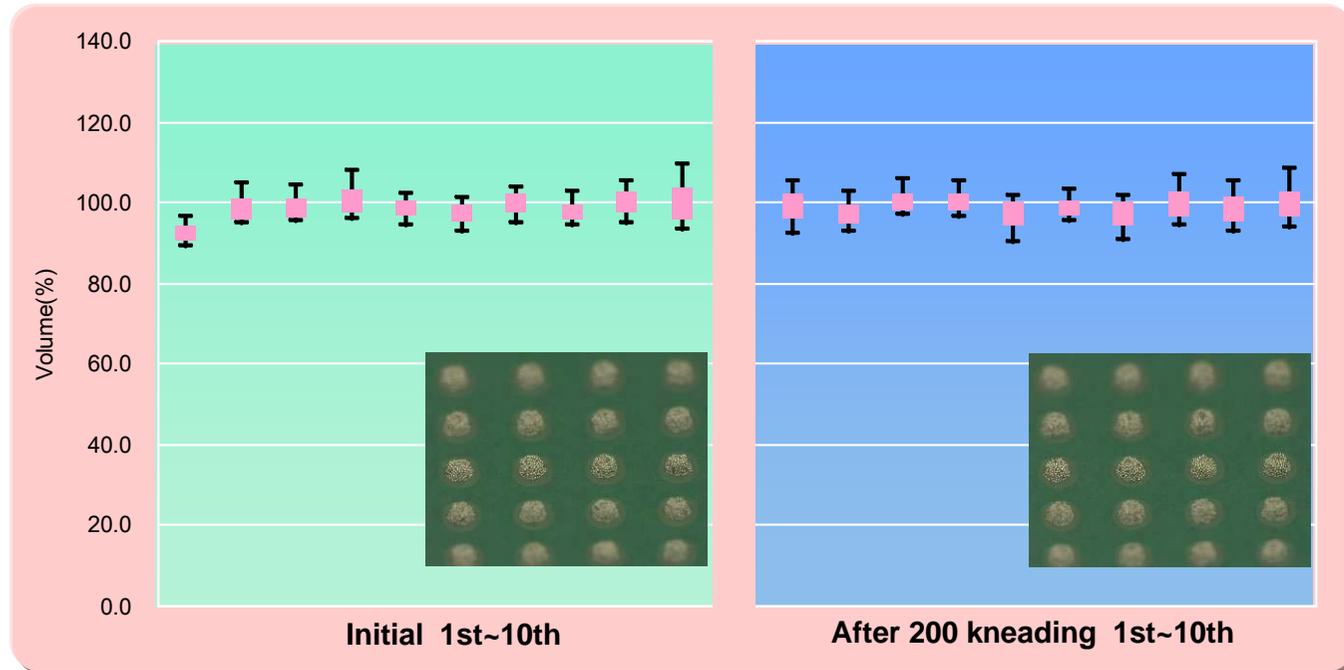
## Continual printability

### Print parameters

Stencil : 0.12mm thickness, laser cut stencil  
 Printer : Model YVP-Xg YAMAHA Motor  
 Squeegee : Metal blade, Angle - 60°  
 Print speed : 40 mm/sec  
 Atmosphere : 24.5~25.5° C (50~60%RH)  
 Test pattern : MBGA pad pattern - Diameter 0.30 mm



SPI : KOHYOUNG aSPire



Stable printability at 0.3mm $\Phi$  CSP.



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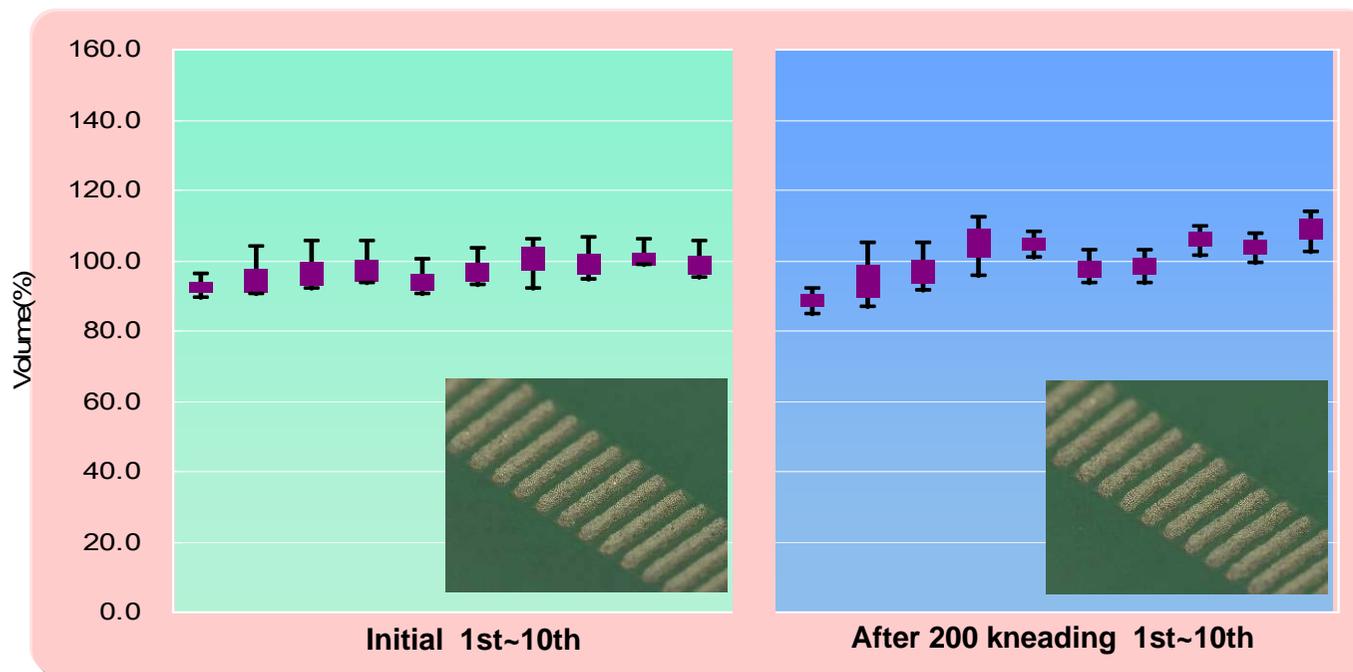
## Continual printability

### Print parameters

Stencil : 0.12mm thickness, laser cut stencil  
 Printer : Model YVP-Xg YAMAHA Motor  
 Squeegee : Metal blade, Angle - 60°  
 Print speed : 40 mm/sec  
 Atmosphere : 24.5~25.5° C (50~60%RH)  
 Test pattern : QFP pad pattern - Width 0.20 mm Length 1.5 mm Distance 0.2 mm



SPI : KOHYOUNG aSPire



Stabile printability at 0.4mm pitch QFP.



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**Intermittent printability (Stencil idle time)**

- Print solder paste continuously and stop to idle the paste for 60,min. intervals, and resume the printing and observe the 1st print result to verify intermittent printability.
- Squeegee : Metal blades
- Squeegee angle : 60°
- Squeegee speed : 40mm/sec.
- Print stroke : 300mm
- Printing environment : 25+/-1°C, 50+/-10%RH
- Test pattern : QFP pad pattern - Width 0.20 mm Length 1.5 mm Distance 0.2 mm  
MBGA pad pattern - Diameter 0.25 0.30 mm

Test pattern	Initial	After 15min	After 30min. 1 <sup>st</sup> print	After 30min. 2 <sup>nd</sup> print
0.3mm dia.				
0.4mm pitch				

When printing interval are 15 min or more, please do temporary printing.



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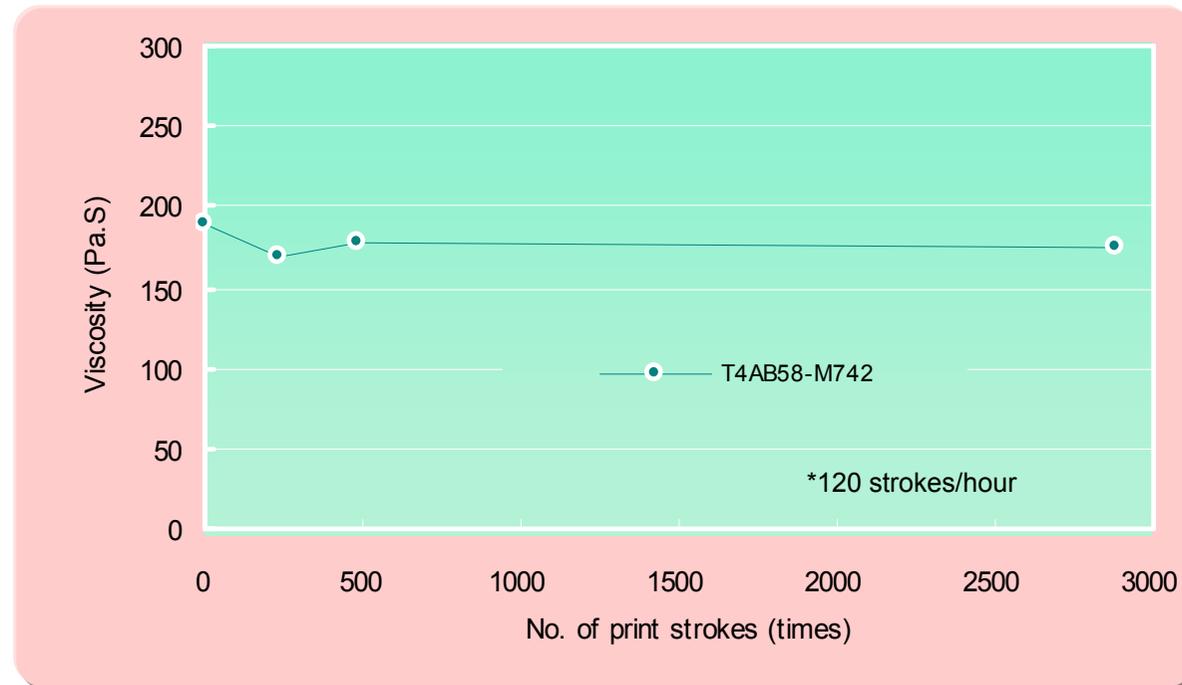
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## Viscosity variation

- Print (knead) solder paste on the sealed-up stencil continually up for 24 hours to observe viscosity variation.
- Squeegee : Metal blades
- Squeegee angle : 60°
- Squeegee speed : 30mm/sec.
- Print stroke : 300mm
- Printing environment : 25+/-1°C, 60+/-10%RH



A newly developed flux formula has succeeded to realize consistent long term printability by preventing excess viscosity drop due to shear thinning and excess increase due to chemical reaction between solder powder and flux during print rolling.

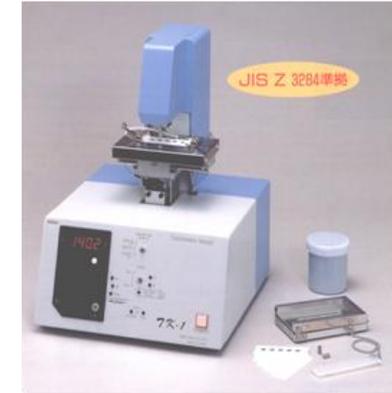


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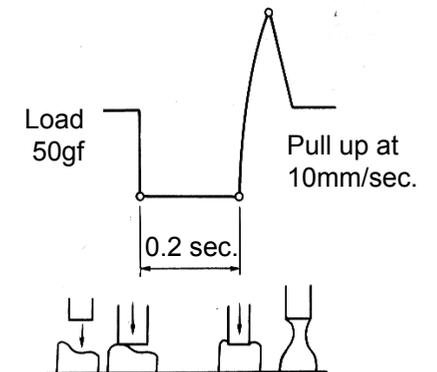
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## Tack time

- Stencil : 0.2mm thick, 6.5mm dia. aperture
- Measurement instrument : Malcom tackimeter TK-1
- Probe pressure : 50gf
- Pressurizing time : 0.2sec
- Pull speed : 10mm/sec.
- Test method : In accordance with JIS Z 3284
- Test environment : 25+/-1°C, 50+/-10%RH



Tensile strength = Tack force



Unique solvent system successfully assures sufficient tack time.



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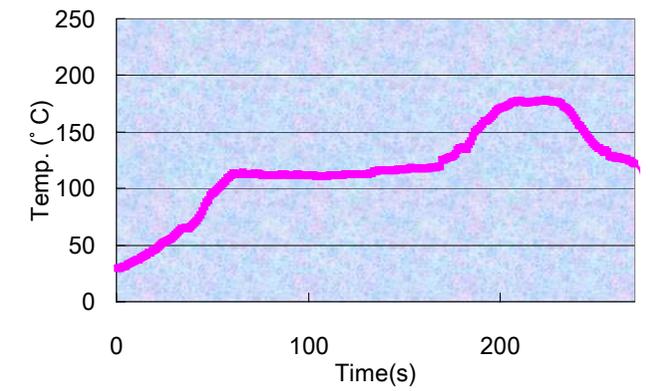
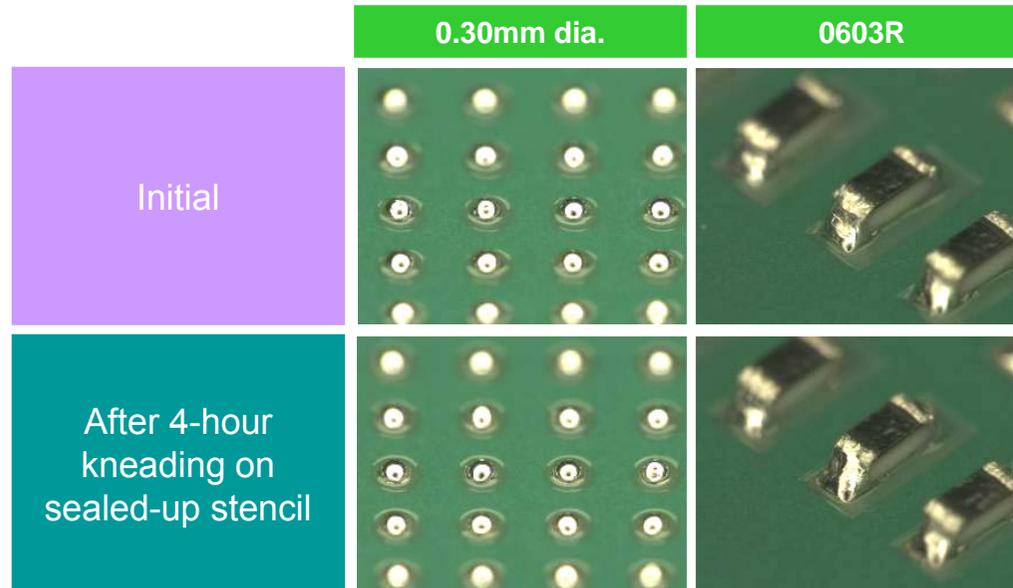
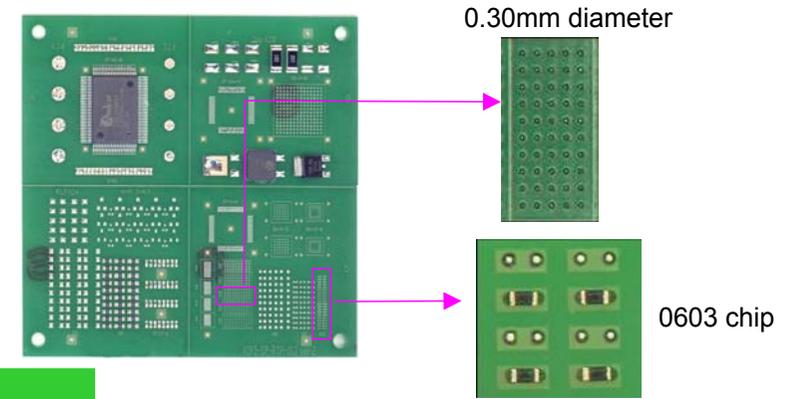
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## Super fine pattern wetting

- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.12mm (laser cut)
- Pad size : 0.30mm diameter
- Component: 0603 chip,
- Stencil aperture : 100% aperture opening to pad
- Heat source : Hot air convection
- Zone structure : 5 pre-heat zones +2 peak zones
- Atmosphere : Air
- Reflow profile : See below



Larger relative surface areas of solder paste exposed due to miniaturization of components (CSP, 0603 chips), often cause incomplete melting due to excess oxidation during the reflow. An improved flux formula ensures complete coalescence by minimum deterioration of barrier performances .



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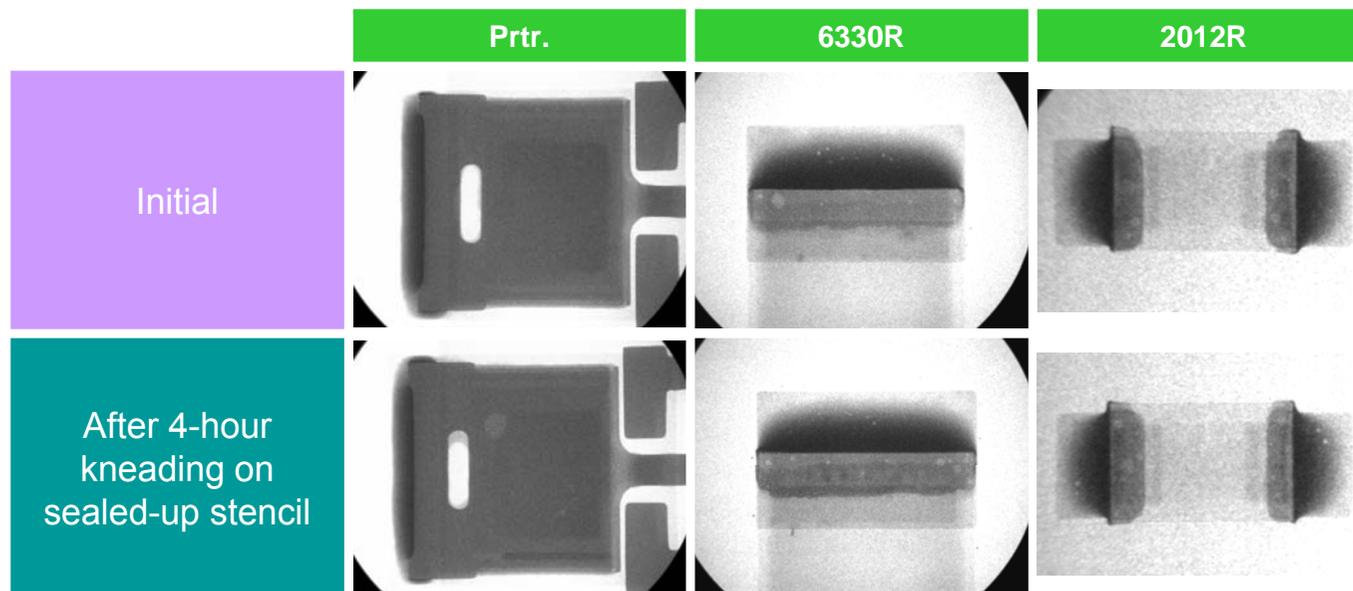
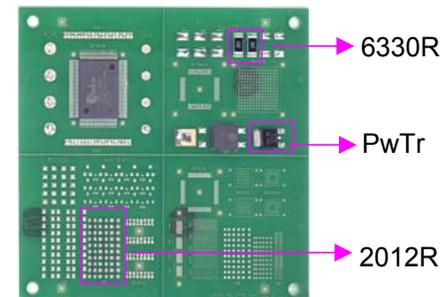
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## Voiding

- Material : Glass epoxy FR-4
- Surface treatment : OSP
- Stencil thickness : 0.12mm (laser cut)
- Stencil aperture : 100% aperture opening to pad
- Components : PwTr, 6330R, 2012R, 100% Sn plated SAC305
- Heat source : Hot air convection
- Zone structure : 5 pre-heat zones +2 peak zones
- Atmosphere : Air
- Reflow profile : Same as "Super fine pattern wetting"



Voiding with various components has been drastically reduced and offers consistently low voiding even after continual kneading (mechanical stress) of 4 hours.



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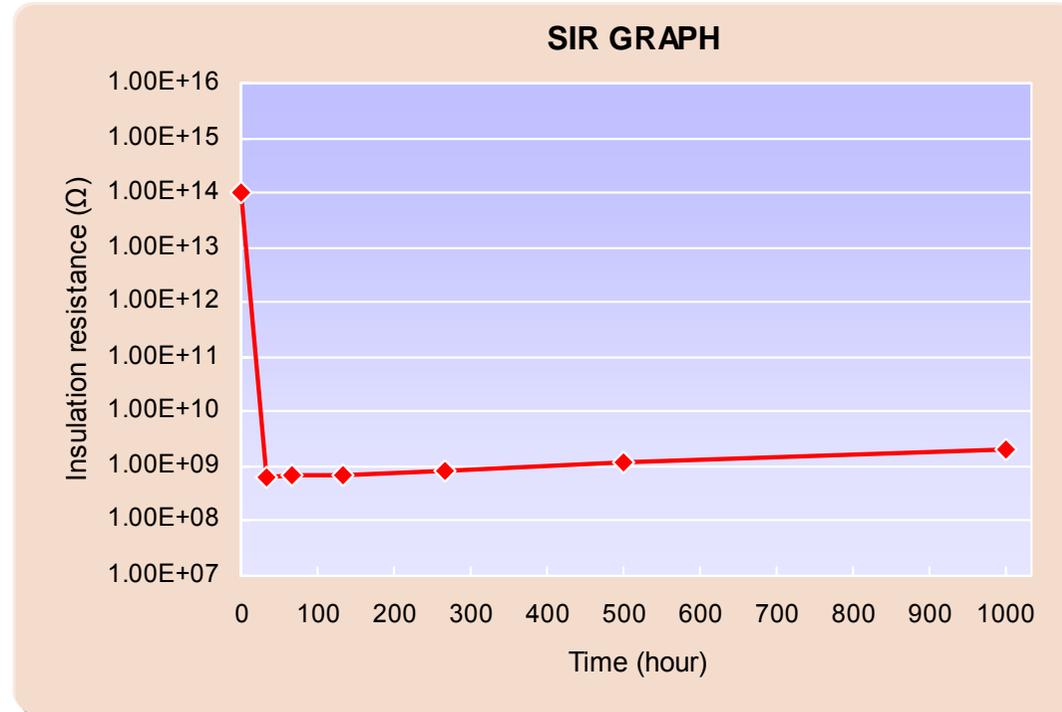
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## Voltage applied surface insulation resistance

- Test conditions : 85±2°C × 85%RH for 1000 hours
- Stencil thickness : 100 micron
- Comb type electrode : JIS type-II
- Measurement voltage : DC100V
- Voltage applied : DC50V
- Test method : JIS Z 3197



No evidence of electromigration can be observed.



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Item	Result	Method
Heat slump	0.2mm pass	JIS Z 3284
Solder balling	Category 3	JIS Z 3284
Copper mirror corrosion	Type L	JIS Z 3284 IPC-TM-650
Copper plate corrosion	Pass	IPC-TM-650, JIS Z 3284
Silver chromate paper	Pass	IPC-TM-650
Halide content	0	IPC-TM-650



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### 1. Printing

#### 1) Recommended printing parameters

##### (1) Squeegee

- 1. Kind : Flat
- 2. Material : Rubber or metal blade
- 3. Angle : 60~70° (rubber) or metal blade
- 4. Pressure : Lowest
- 5. Squeegee speed : 20~80mm/sec.

##### (2) Stencil

- 1. Thickness : 150~100μm for 0.65~0.4mm pitch pattern
- 2. Type : Laser or electroform
- 3. Separation speed : 7.0~10.0mm/sec.
- 4. Snap-off distance : 0mm

##### (3) Ambiance

- 1. Temperature : 22~25°C
- 2. Humidity : 40~60%RH
- 3. Air draft : Air draft in the printer badly affects stencil life and tack performance of solder pastes.

### 2. Shelf life

0~10°C : 6 months from manufacturing date

\* Manufacturing date can be obtained from the lot number

ex. **Lot No. 1 11 15 2**

1	11	15	2	→ <b>No. of lot : 2nd</b>
			→	<b>Date : 15st</b>
		→	<b>Month : Nov.</b>	
				<b>Year : 2011</b>



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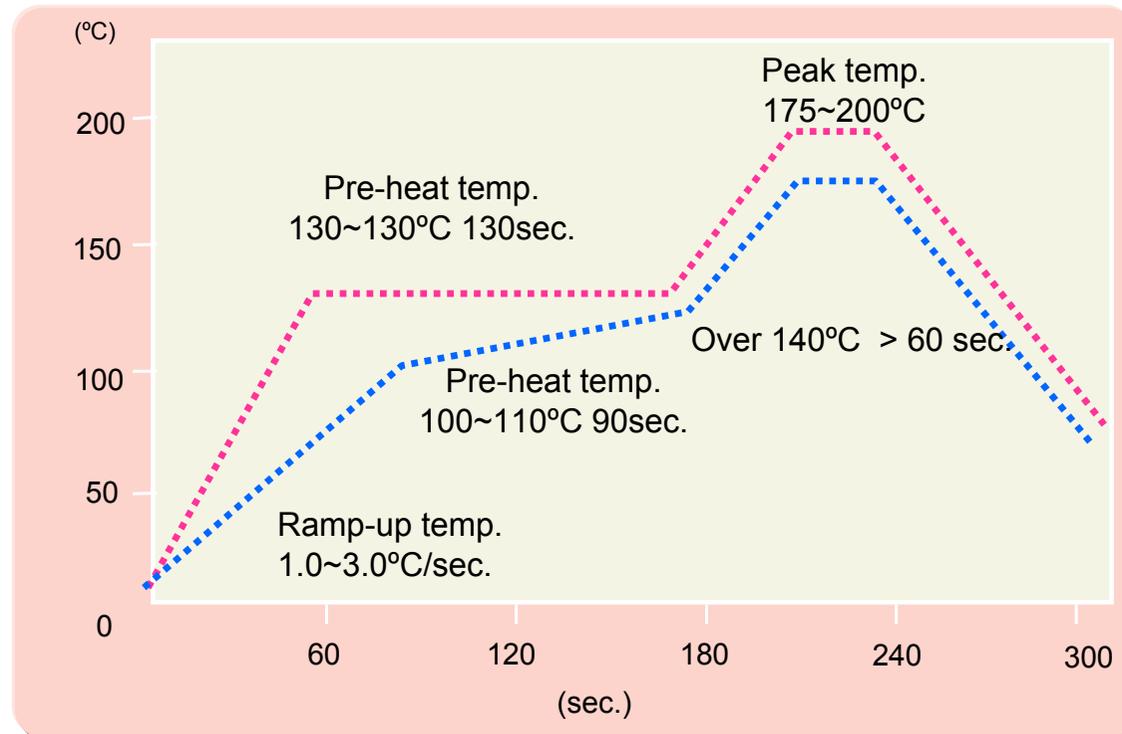
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## Handling guide - Recommended reflow profile



	<u>Pre-heat zone</u>	<u>Peak zone</u>
..... Lower limit:	100~110°C 90sec	175°C
..... Upper limit:	130~130°C 130sec	200°C

Lowering the pre-heat and peak temperatures could lead to a drop in electrical reliability.

