

## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

Wetting

Voltage applied SIR

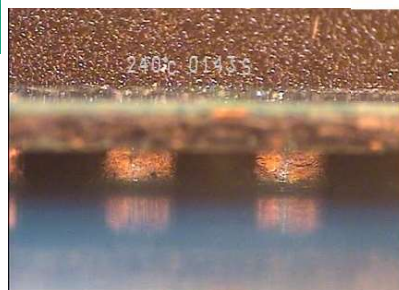
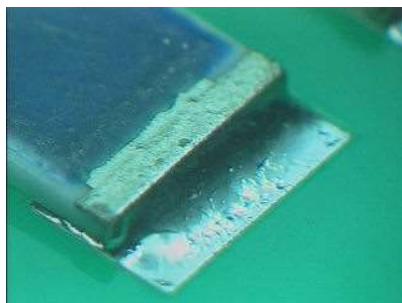
Handling guide

# Koki no-clean **Leaded** solder paste

## *Low Voids Hi-performance*

## SS48-955LV series

## 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.



## Contents

### Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

Wetting

Voltage applied SIR

Handling guide

## Product Features

- Solder alloy composition is **Sn 36Pb 2Ag**.
- Employment of rigidly classified 20□38 micron solder powder ensures outstanding continual printing with fine pitch (0.5mm/20mil) and even super fine pitch (0.4mm/16mil) application and long stencil idle time.
- Carefully selected flux chemistry ensures low voids formation.
- Extremely long stencil idle time and tack time offers a wide process window
- Low color flux residue offers superior cosmetic appearance.
- Conforms to Bellcore tests (Copper Mirror, Halides, Surface Insulation Resistance, Electro migration) GR-78-CORE, Issue 1.

No clean ROLO	Powder Type 3 or 4	Fine pattern 0.4mm pitch CSP<0.3mm	Idle time > 60 min. CSP 0.3mm	Tack time >36hrs.	High heat slump resist	Powerful wetting	Low beading	Low voiding	High reliability
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## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

Wetting

Voltage applied SIR

Handling guide

## Specifications

Application		Printing - Stencil
Product		<b>SS-48-955LV</b>
Alloy	Composition (%)	Sn62, Pb36, Ag2
	Melting point (°C)	179-190
	Shape	Spherical
	Particle size (μm)	20 – 45
Flux	Halide content (%)	0.0
	Flux type	ROL0* <sup>3</sup>
Product	Flux content (%)	10 ± 0.5
	Viscosity* <sup>1</sup> (Pa.S)	210 ± 10%
	Copper plate corrosion* <sup>2</sup>	Passed
	Tack time	> 36 hours
	Shelf life (below 10°C)	6 months

1. Viscosity :

Malcom spiral type viscometer, PCU-205 at 25°C 10rpm

2. Copper plate corrosion :

In accordance with JIS

3. Flux type :

According to IPC J-STD-004



## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

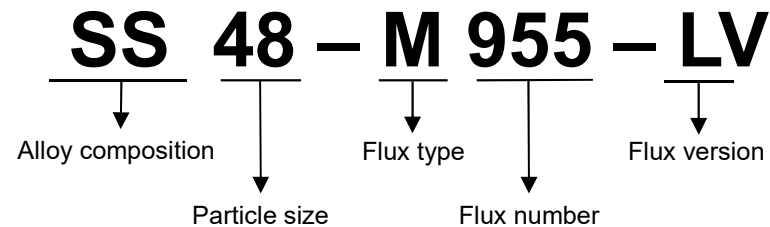
Copper corrosion

Wetting

Voltage applied SIR

Handling guide

## Specifications – Alloy selections



Alloy composition (%)	<b>SS</b> : Sn62PbAg2
Particle size (μm)	<b>58</b> : 20 ~ 38 <b>48</b> : 20 ~ 45
Flux type	<b>M</b> : Low halide, halide free <b>N</b> : Nitrogen use
Flux number	Solids and solvent used



## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

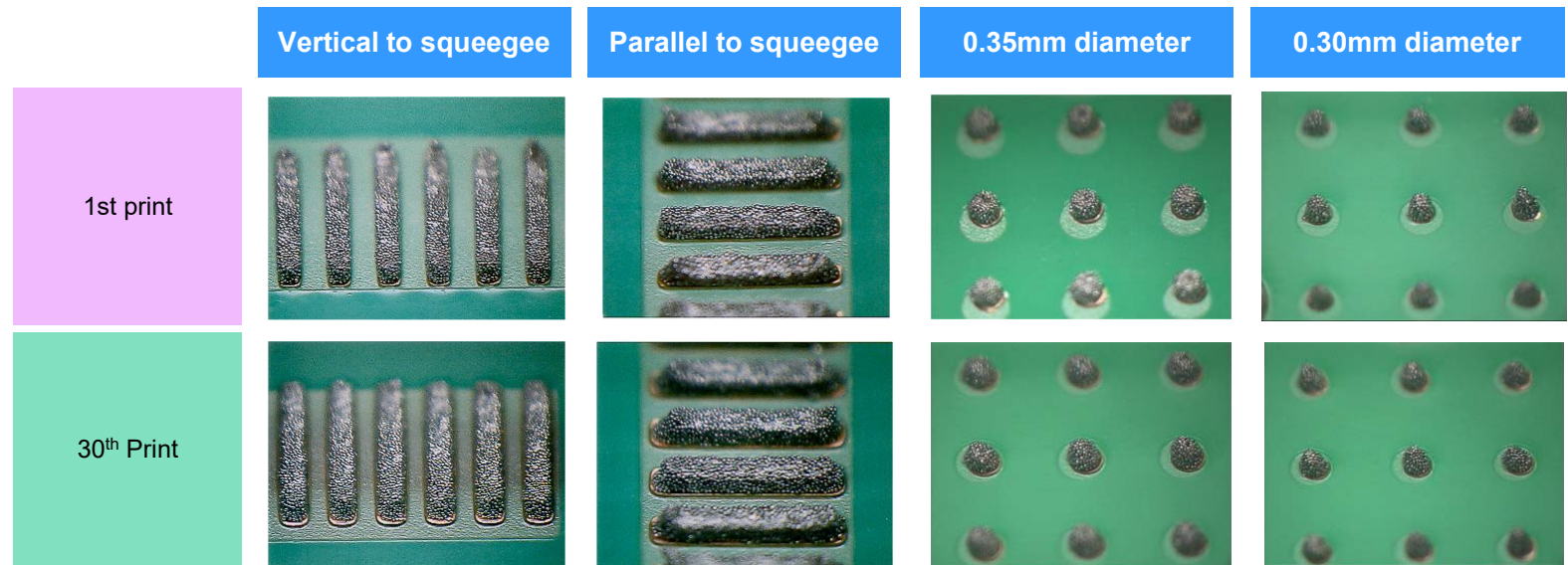
Wetting

Voltage applied SIR

Handling guide

## Continual printability

- Stencil thickness: 0.15mm (laser cut)
- Printer: Model MK-880SV Minami Kogaku
- Squeegee type: Metal
- Squeegee travel speed: 30mm/sec Squeegee angle: 60°
- Squeegee separating speed: 0.5mm/sec
- The number of printing: 10 pcs. on continuous basis
- Printing ambit: 23.5-25.0°C (50-60%RH)



Newly developed additives provide a lubricating effect that greatly improve the paste release properties and assures excellent print quality even with microBGA, 0603 and super fine pitch components.



## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

Wetting

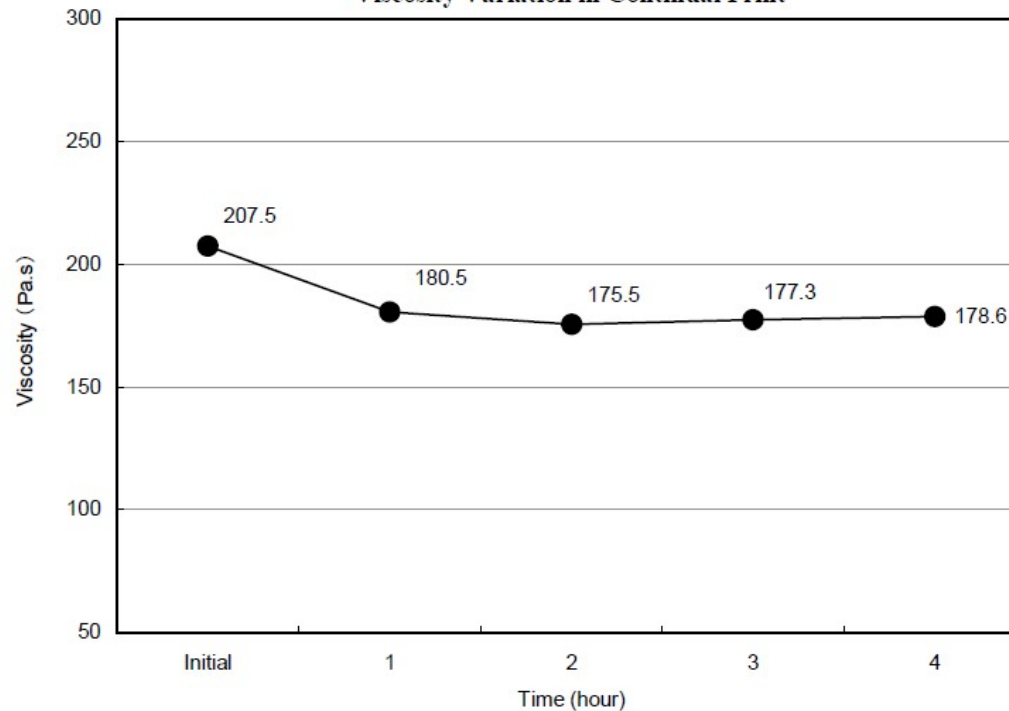
Voltage applied SIR

Handling guide

## Viscosity variation in continual printing

- Print (knead) solder paste on the sealed-up stencil continuously for 4 hours to observe the viscosity variation.
- Stencil : 0.15mm thickness, laser cut stencil
- Printer : Model MK-880SV Minami Kogaku
- Squeegee : Metal blade
- Angle - 60°
- Speed - 30 mm/sec
- Print stroke : 300mm
- Atmosphere : 23.5~25.0° C (50~60%RH)
- Measurement of viscosity : Before printing, at 1, 2, 3 and 4 hours by Malcom viscometer PCU-205

Viscosity Variation in Continual Print





## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

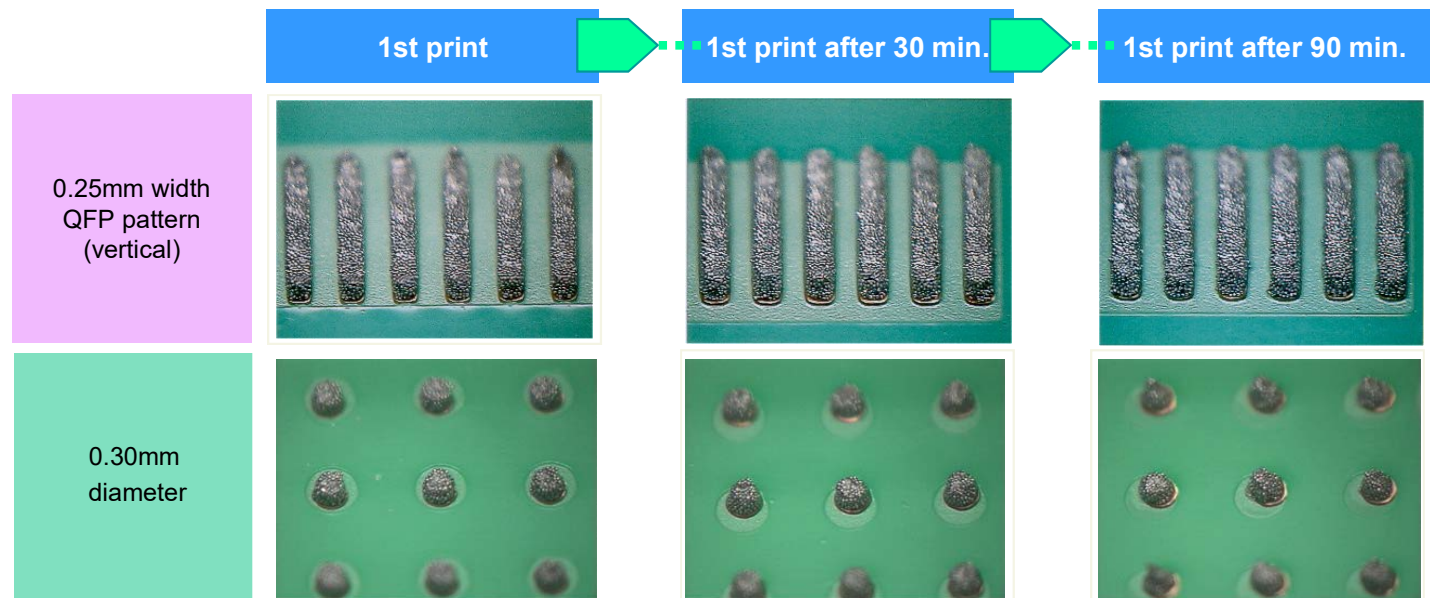
Wetting

Voltage applied SIR

Handling guide

## Intermittent printability (Stencil idle time)

- Print solder paste for 30min. continuously and stop to idle the paste for 30, 60, 90min. intervals, and resume the printing and observe the 1st print result to verify intermittent printability.
- Stencil : 0.15mm thickness, laser cut stencil
- Printer : Model MK-880SV Minami Kogaku
- Squeegee : Metal blade / Angle - 60° / Speed - 30 mm/sec
- Print stroke : 300mm / Atmosphere : 23.5~25.0° C (50~60%RH)
- Test patterns
  - 1. QFP pad pattern : 1) Width 0.25 mm Length 1.5 mm Distance 0.2 mm
  - 2) Width 0.2 mm Length 1.5 mm Distance 0.2 mm



Unique formulation solvent system assures extremely long stencil idle time, eliminating printing faults and improving process window and production yields.



## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

**Tack time**

Heat slump

Solder balling

Copper corrosion

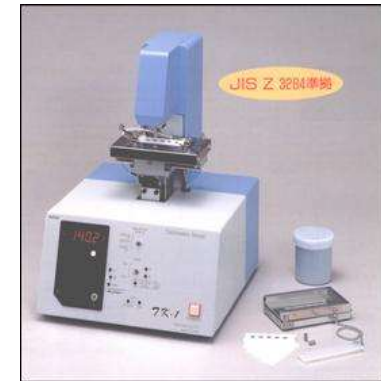
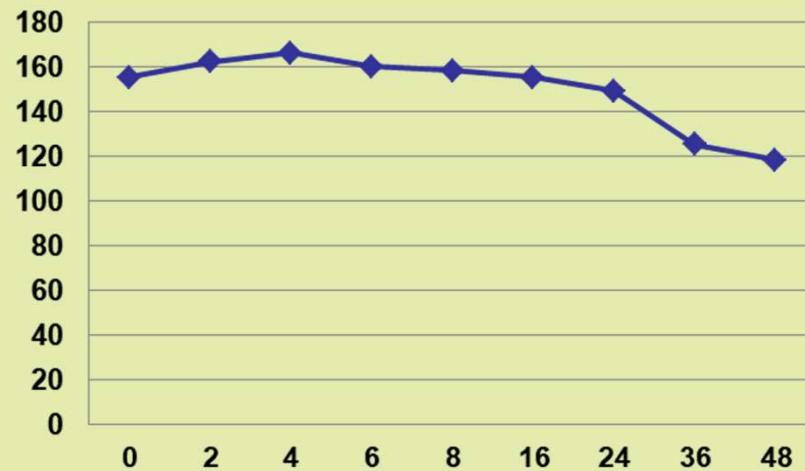
Wetting

Voltage applied SIR

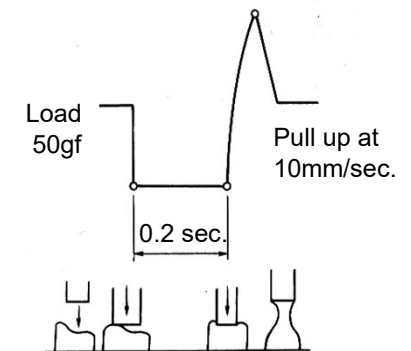
Handling guide

## Tack time

- Stencil : 0.2mm thick, 0.6mm dia. aperture
- Measurement instrument : Malcom tackimeter TK-1
- Probe pressure : 50gs
- 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 has succeeded to extend tack time dramatically (>72 hours) helps widen process window significantly.





## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

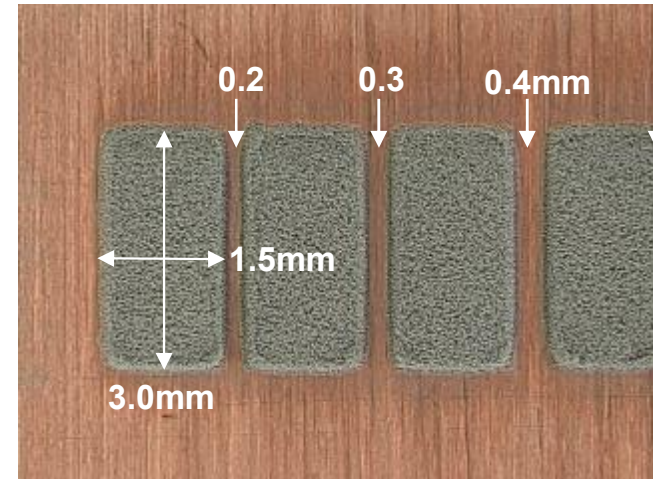
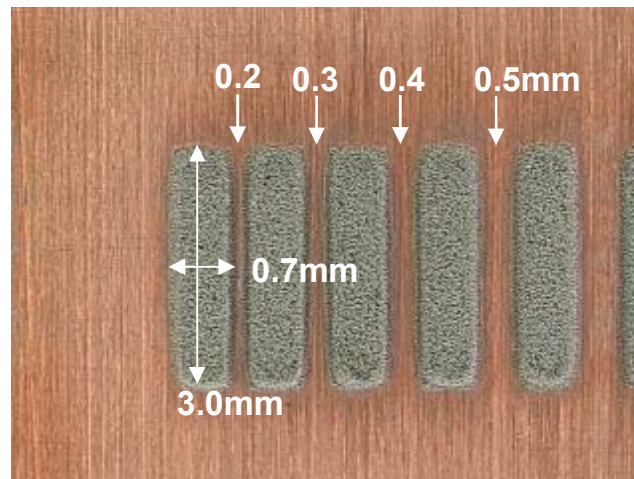
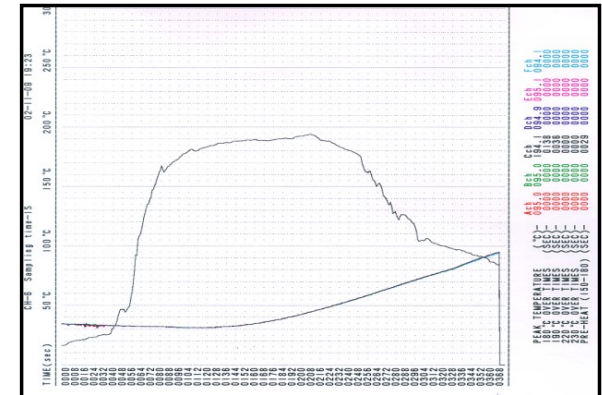
Wetting

Voltage applied SIR

Handling guide

## Heat slump

- Stencil thickness : 0.2mm
- Stencil aperture : Pattern (1) 3.0mm × 0.7mm  
Pattern (2) 3.0mm × 1.5mm
- Spacing between apertures: 0.2mm to 1.2mm
- Heat profile : 150°C × 300 sec.
- Test method : In accordance with JIS Z 3284



Improved heat slump property assures reduced soldering defects, such as solder beading and bridging.



## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

**Solder balling**

Copper corrosion

Wetting

Voltage applied SIR

Handling guide

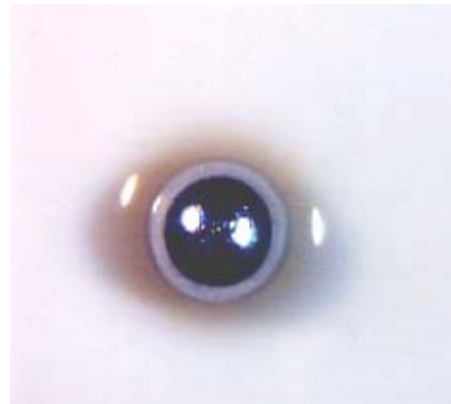
## Solder balling (Residue cosmetics)

- Stencil : 0.2mm thick
- Stencil aperture : 6.5mm diameter
- Solder pot temperature : 250°C
- Test method : In accordance with JIS Z 3284

Category 1	2	3	4

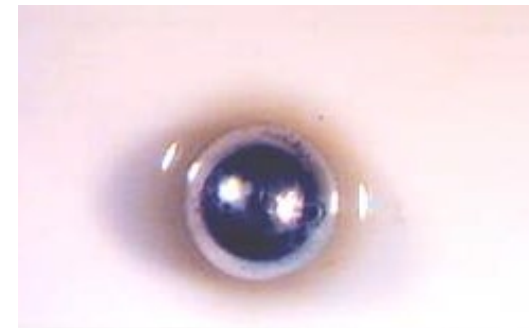
\*Solder paste tested: S3X48-M406-3

1 hour after printing



Category 2

24 hours after printing



Category 3

**Almost no solder balling and resistant to ambient temperature and humidity.**



## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

**Copper corrosion**

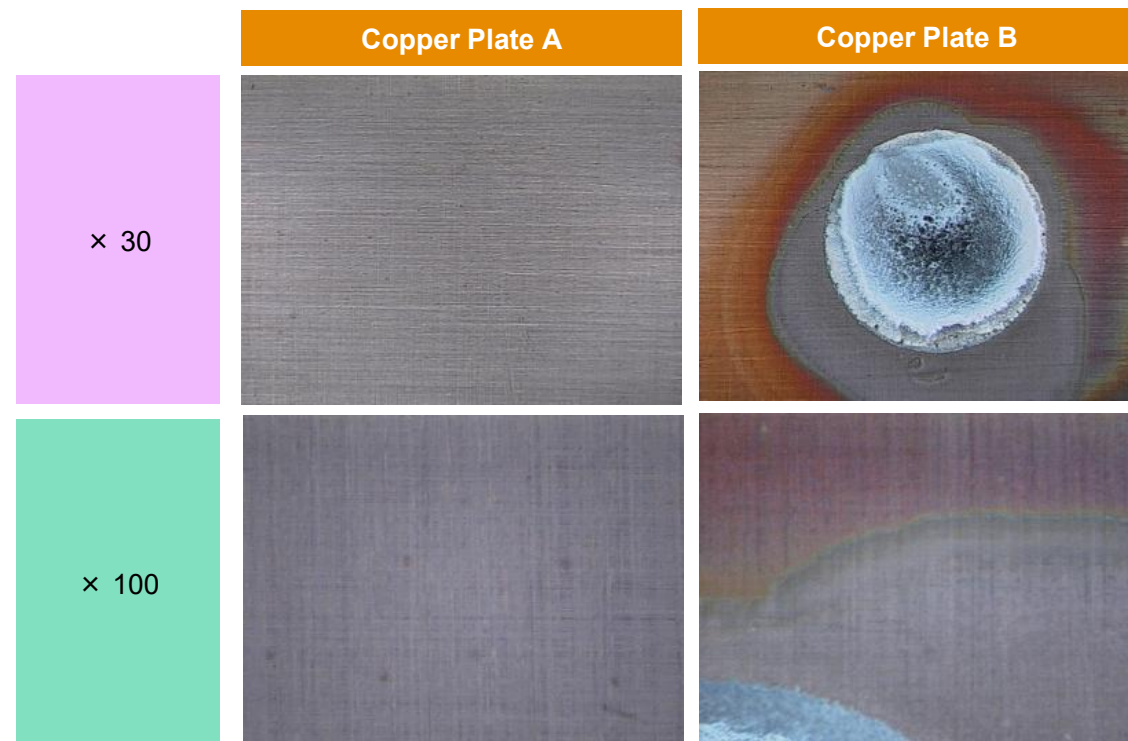
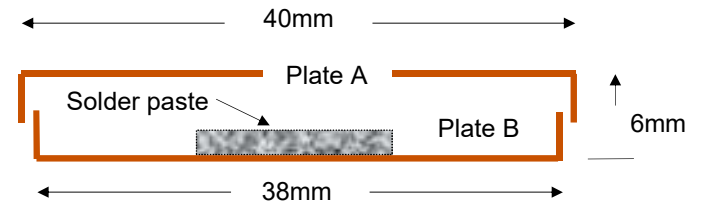
Wetting

Voltage applied SIR

Handling guide

## Copper corrosion

- Test conditions :  $40 \pm 2^\circ\text{C}$  90~95%RH for 72 hours
- Test method : JIS Z 3197



No evidence of corrosion can be observed.



## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

Wetting

Voltage applied SIR

Handling guide

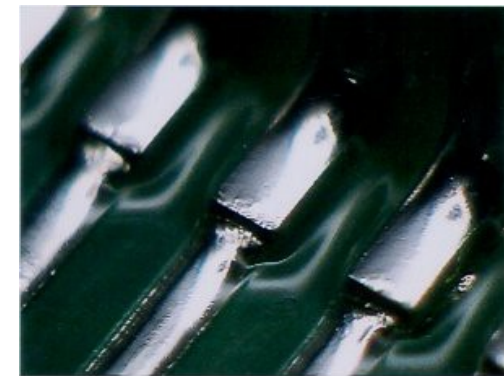
## Wetting Condition

- PCB: Koki test board SP-RTP-002
- Stencil: 150μm / Model MK-880SV (Minami Kogaku)
- Reflow: Far infrared + Hot air convection | 3 pre-heat zones + 1 reflow zone

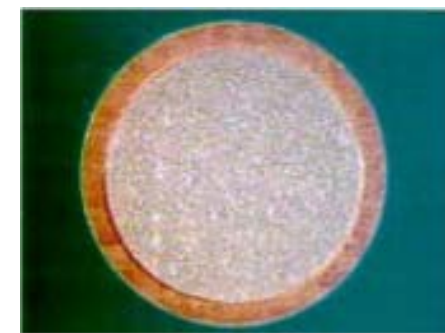
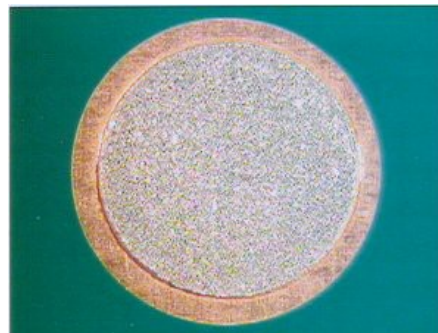
**KOKI SS48-955LV**

**Conventional Paste**

**QFP  
0.65mm pitch**



**Pad diameter  
6.0mm stencil  
aperture 5.0mm**



## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

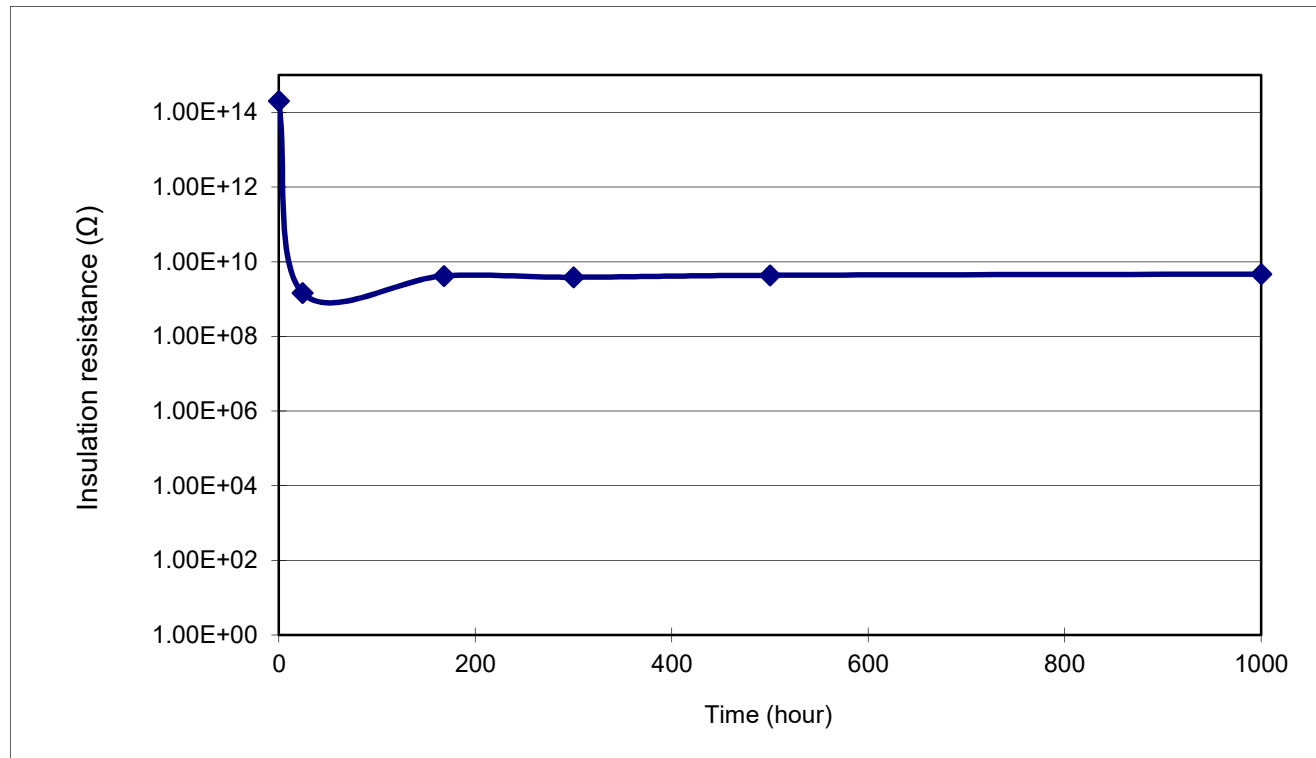
Wetting

Voltage applied SIR

Handling guide

## Voltage applied surface insulation resistance

- Test conditions :  $85\pm 2^{\circ}\text{C} \times 85\%\text{RH}$  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.





## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

Copper corrosion

Wetting

Voltage applied SIR

Handling guide

## Handling guide

### 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 : 10~60mm/sec

##### (2) Stencil

1. Thickness : 200~120μm for 0.65~0.4mm pitch pattern
2. Type : Laser or electroform
3. Separation speed : 0.1~10.0mm/sec. depending on PCB pattern, aperture design
4. Snap-off distance : 0 – 0.5mm

##### (3) Ambiance

1. Temperature : 24 ± 4°C
2. Humidity : 25~65%RH
3. Air draft : Air draft in the printer badly affects stencil life and tack performance of solder pastes.

### 2. Shelf life

- 1) 0~10°C : 6 months from manufacturing date
- 2) At 20~30°C : 1 month from manufacturing date

\* Manufacturing date can be obtained from the lot number

ex. Lot No. 6 07 21 2

→	No. of lot	: 2nd
→	Date	: 21st
→	Month	: July
→	Year	: 2006





## Contents

Features

Specifications

Continual printability

Viscosity variation

Intermittent printability

Tack time

Heat slump

Solder balling

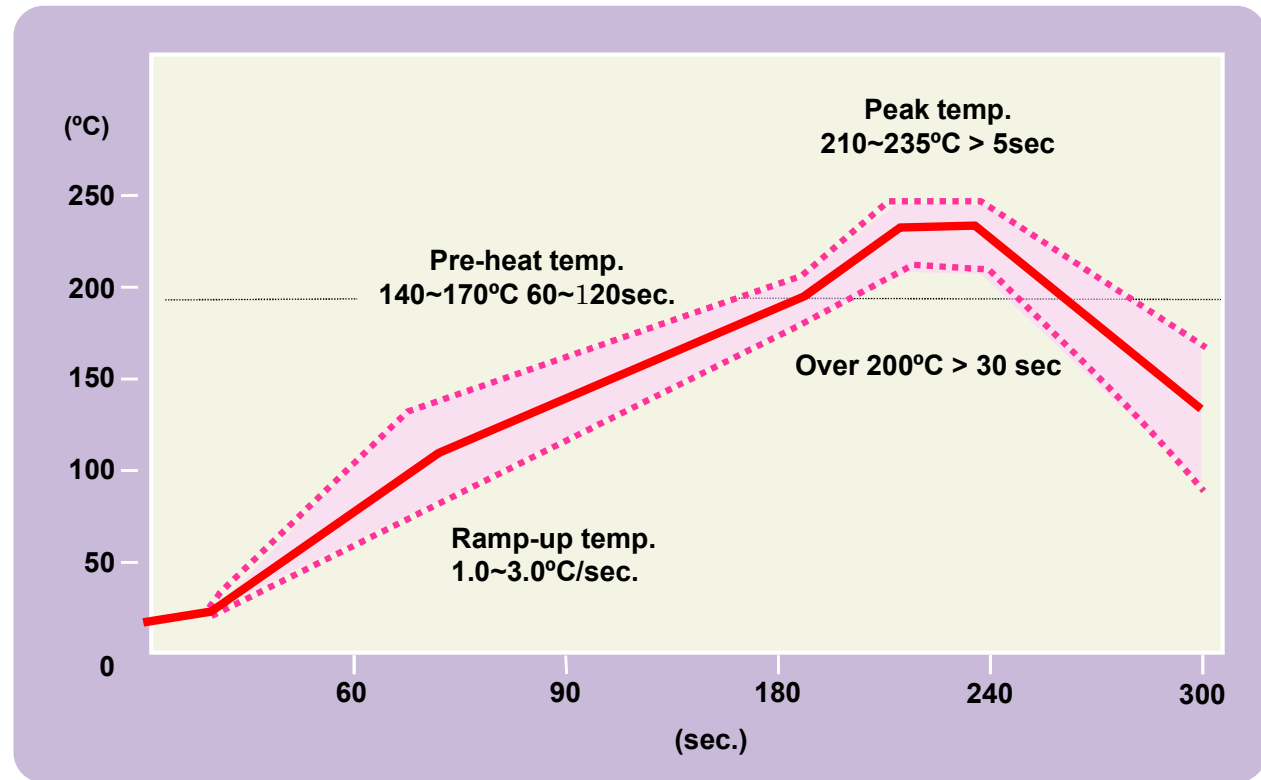
Copper corrosion

Wetting

Voltage applied SIR

Handling guide

## Handling guide - Recommended reflow profile



Excess pre-heating (time & temperature) may cause too much oxidation.

Relatively short and low pre-heat may be recommendable, especially for fine pitch/micro pattern components .

