

#46019E-2 Revised on APR 16, 2013



eco+PLUS\*

# Koki no-clean LEAD FREE solder paste Super Low-Void & Anti-pillow M500 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.





#### **Product Features**

- Ensures OUTSTANDING continual PRINTABILITY with super fine pitch (0.4mm/16mil) and CSP (>0.25mm dia.) applications for normal to fast printing (10 ~ 80mm/sec.) and long stencil idle time.
- Highly heat RESISTANT and PERFECT MELTING and wetting at super fine pitch (<0.4mm pitch) and micro components (<0.3mm dia CSP, 0603 chip).
- Conforms to Halogen-free standard (Cl + Br: below1500ppm) EN-14582
- Specially formulated flux chemistry ensures EXTREMELY LOW
   VOIDING with CSPs and broad contact area components, e.g. QFN.
- Designed to prevent occurrence of HIDDEN PILLOW DEFECTS.
- Enables REUSE of leftover from previous day. Economical.





#### **Specifications**

Application		Printing – Stencil		
Product		S3X48-M500	S3X58-M500	
Alloy	Composition (%)	Sn96.5Ag3.0Cu0.5		
	Melting point (°C)	217 — 219		
	Shape	Spherical		
	Particle size (µm)	20 – 45	20 – 38	
Flux	Halide content (%)	0		
	Flux type* <sup>2</sup>	ROL0		
Product	Flux content (%)	$11.5 \pm 0.5$		
	Viscosity <sup>*1</sup> (Pa.S)	$220 \pm 30$		
	Copper plate corrosion*3	Passed		
	Tack time	> 48 hours		
	Shelf life (below 10°C)	6 months		

1. Viscosity : 2. Flux type :

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























#### Viscosity variation in continual printing

300mm

- Print (knead) solder paste on the sealed-up stencil continually up 2880 strokes and observe viscosity variation.
- Squeegee : Metal blades
- Squeegee angle : 60°
- Squeegee speed : 30mm/sec.
- Print stroke :
- Printing environment : 23.0~25.0°C, 50~60%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









#### **Tack time**

- Stencil:
- Measurement instrument :
- Probe pressure :
- Pressurizing time :
- Pull speed :
- Test method :
- Test environment :

- 0.2mm thick, 0.6mm dia. aperture
- Malcom tackimeter TK-1
- 50qf
- 0.2sec
  - 10mm/sec.
    - In accordance with JIS Z 3284 25+/-1°C, 50+/-10%RH



Unique solvent system successfully assures sufficient tack time.







#### Heat slump

- Stencil thickness :
- Stencil aperture :
  - Pattern (1) 3.0mm × 0.7mmm Pattern (2) 3.0mm × 1.5mm

0.2mm

- Spacing between apertures: 0.2mm to 1.2mm
- Heat profile : 180°C × 5min.



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





















80sec

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#### Solder beading

Material : Glass epoxy FR-4
Surface treatment : OSP
Stencil thickness : 0.12mm (laser cut)
Stencil aperture : 100% aperture opening to pad
Components
2125 resistor : 30 pcs./board
1608 resistor: 30 pcs./board
Total : 60 chips/board

Air

- Heat source : Hot air convection
- Zone structure : 5 pre-heat zones +2 peak zones

3

0

Atmosphere :



#### \*Fault finding design













#### Solder spreading

Ν

Aaterial pieces :	Copper, Brass, Nickel (*Pre-conditioning – acetone cleaning + soft etched by 15% sulfuric acid
	solution)

- Stencil thickness : 0.2mm (laser cut)
- Stencil aperture : 6.5mm diameter
- Heat source & temp.: Reflow simulator \*Same profile as "Super fine pattern wetting".



- \* Definition
  - Category 1: Solder has spread more than the area where solder paste was printed.
  - Category 2: Solder has spread whole area where solder pasted was printed.
  - Category 3: Solder has not partially spread.
  - Category 4: Solder spread is less than the area where solder paste was printed.











No evidence of electromigration can be observed.





#### Contents Features **Specifications** Continual printability Viscosity variation Intermittent printability Tack time Heat slump Solder balling Super fine pattern wetting Anti-Pillow defect Solder beading Voiding Solder spreading Voltage applied SIR Halide content Handling guide

#### Halide content

- •Test method :
- A: IPC-TM650 2.3.28.1

B: BS EN14582 Measurement instrument: ICS-1500 (DIONEX) AQF-100 (MITSUBISHI CHEMICAL ANALYTECH)

Halide content (wt%)

Method	А	В
Fluoride	ND	ND
Chloride	ND	ND
Bromide	0.02	0.03



### **M500 Series**

Contents	Handling guide	
Features	1 Printing	
Cracifications	1) Recommended printing parameters	
Specifications	(1) Squeegee	
Continual printability	1. Kind : Flat	
	2. Material : Rubber or metal blade	
Viscosity variation	3. Angle : 60~70° (rubber) or metal blade	
	4. Pressure : Lowest	
Intermittent printability	5. Squeegee speed 20~80mm/sec.	
Tack time	(2) Stencil	
	1. Thickness : 150~100μm for 0.65~0.4mm pitch pattern	
Heat slump	2. Type : : Laser or electroform	
	3. Separation speed : 7.0~10.0mm/sec.	
Solder balling	4. Snap-off distance : 0mm	
Super fine pattern wetting	(3) Ambiance	
	1. Temperature : 22~25°C	
Anti-Pillow defect	2. Humidity : 40~60%RH	
Solder beading	3. Air draft : Air draft in the printer badly affects stencil life and tack pe solder pastes.	rformance of
Voiding	2. Shelf life	
Volding	0~10°C : 6 months from manufacturing date	
Solder spreading		
Voltage applied SIR	* Manufacturing date can be obtained from the lot number	
	ex. Lot No. 9 06 15 2	
Halide content	No. of lot: 2nd	
	Date : 15st	
Handling guide	Month : July	
	└───→ Year : 2008	
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