

**KOKI**

# Soldering Materials for Lead Free Assembly



Solder  
Pastes

Wave Soldering  
Fluxes

Flux Core  
Wire Solder

*Various high performance soldering materials  
for diverse soldering requirements*

# No-clean Lead Free Solder Pastes

Koki offers a range of high performance lead free solder pastes manufactured with high purity oxide free solder powders.

Specially developed high temperature resistant no-clean flux systems ensure high soldering quality comparable with conventional lead containing solder pastes, realizing excellent fine pitch/micro components printing and powerful solder wetting.



## Lead free alloy

Alloy code	TS58	S3X58	SX58	SXA48*	SB1X48	TZB48
Alloy composition	SnAg3.5	SnAg3Cu0.5	SnAg3.5Cu0.7	SnAg3.5Cu0.5Sb0.2	SnAg2.5Cu0.5Bi1	SnZn8Bi3
Melting point ( C)	221	217-218	217-218	217-221	214-220	193-199
Particle size ( m)	20 - 38	20 - 38	20 - 38	20 - 45	20 - 45	20-45
Specific gravity	7.4	7.4	7.4	7.4	7.4	7.3
Flux selection	M201-3 or M301-3 (M301-3L) **See table below.					M401
Flux content (%)	12.0	12.0	12.0	12.0	12.0	12.0
Viscosity (Pa)	2000 (1700)	2000 (1700)	2000 (1700)	1900 (1600)	1900 (1600)	2000

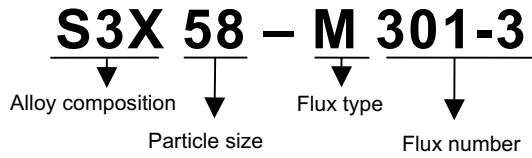
\*CASTIN alloy is manufactured under license of AIM Inc. Under U.S. patent No. 5,405,577 and Japanese patent No. 2,752,258.

## Flux

Flux code		M201-3	M301-3	M301-3L	M401
Alloy selection (see table above)		TS58, S3X58, SX58, SXA48, SB1X48			TZB48
Halide content (%)		0.1	0		0.03
Flux type		ROL1	ROL0		ROL1
Surface insulation resistance ( )	Initial value	$> 1 \times 10^{13}$	$> 1 \times 10^{13}$		$> 1 \times 10^{13}$
	After humidification	$> 1 \times 10^{12}$	$> 1 \times 10^{12}$		$> 1 \times 10^{12}$
Aqueous solution resistivity ( cm)		$> 5 \times 10^4$	$> 5 \times 10^4$		$> 5 \times 10^4$
Solder spreadability (%)		$> 87$	$> 85$		$> 85$
Tack time (hour)		$> 24$	$> 24$		$> 8$
Shelf life (below 10°C) month)		6	6		3

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

**Product number indication**



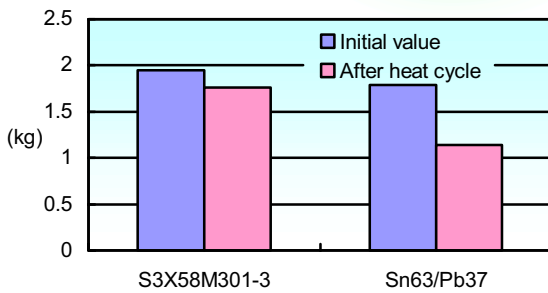
Particle size ( m )	48 : 20 – 45 58 : 20 – 38
Flux type	M : Low halide, halide free
Flux number	Solids and solvent used

**Product information : S3X58-M301-3 (SnAg3.0Cu0.5)**

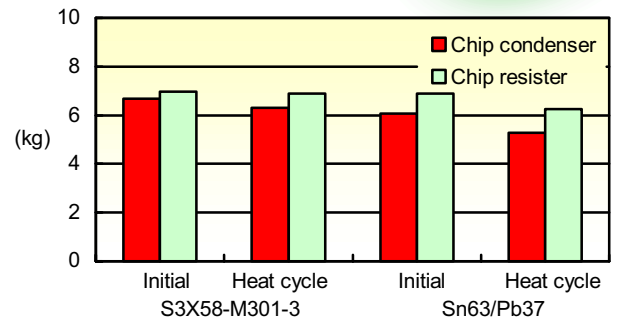
**1) Bonding strength** (heat cycle: -30 ~ +85°C; 30min/cycle × 500 cycles)

QFP lead wire peel strength test  
 Pull speed : 1.0mm/sec.  
 Number of test : 60 leads

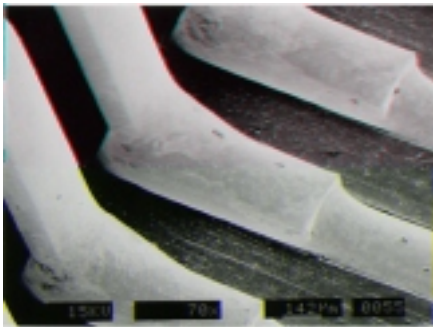
Pull at 45 degree.



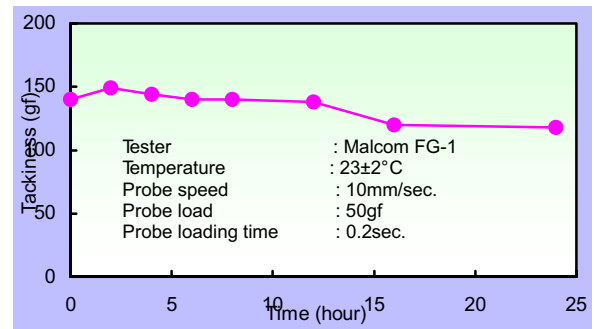
Chip components shear strength  
 Push speed : 1.0mm/sec.  
 Number of test: 20 components



**2) Solder wettability** (Plating of lead wire : Sn/Pb)

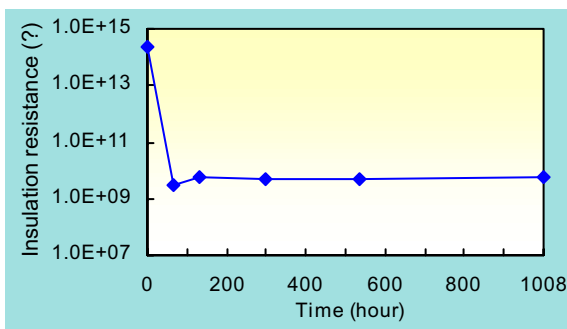


**3) Tackiness**

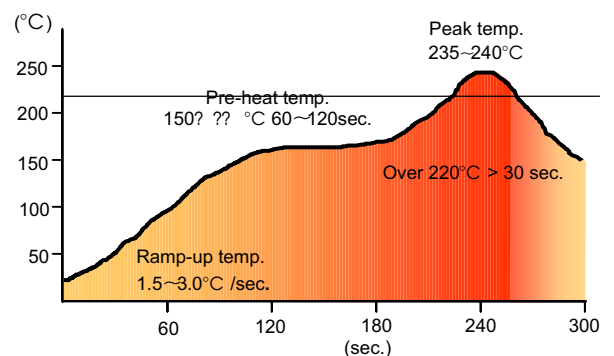


**4) Voltage applied surface insulation resistance**

(85%RH×85°C; Voltage applied 100V)



**4) Recommended reflow profile**



# No-clean Wave Soldering Fluxes

Koki has developed a series of wave soldering fluxes specifically designed for lead free soldering with a soldering performance equivalent to that of conventional soldering processes using lead.

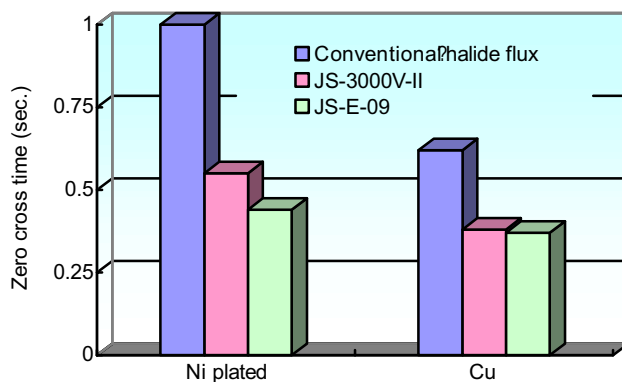
Specially selected activator systems ensure excellent soldering quality even in air, ensuring, good wetting and through-hole filling in combination with SnAgCu, SnAgBiCu and SnCu based solders.

Flux code		JS-3000V-II	JS-E-09
Type of solvent		Water base, low VOC	Isopropyl alcohol
Appearance		Colorless clear liquid	Yellowish clear liquid
Specific gravity	(20°C)	1.00	0.823
Solids content	(%)	2.8	15.2
Halide content	(%)	0	0.071
Copper plate corrosion test		Passed	Passed
Copper mirror corrosion test		Passed	Passed
Surface insulation resistance ( )	Initial value	$> 1 \times 10^{13}$	$> 1 \times 10^{10}$
	After humidification	$> 1 \times 10^{12}$	$> 1 \times 10^{13}$
Aqueous solution resistivity	( cm)	$> 5 \times 10^4$	$> 5 \times 10^4$
Solder spreadability	(%)	$> 80$	$> 80$
Alloy selection		<b>SnAgCu, SnAgBiCu, SnCu</b>	
Application method		Spray	Spray, foam
Features		Very low residue. Excellent solderability. Contains only 5% of alcohol	Excellent solderability even with lead free components. Excellent through hole fill.

\*Tests methods : In accordance with JIS-Z-3197-1986

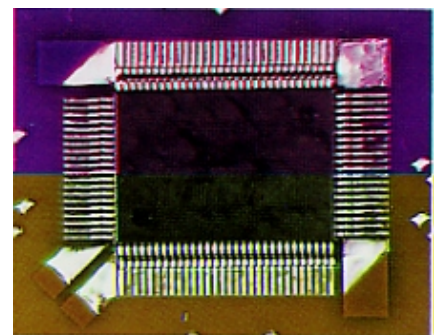
## 1) Wettability test

## 2) Solderability



Solder alloy : SnAg3.5Cu0.5  
Equipment : Solder Checker SAT-5000  
Dipping speed : 25mm/sec.

Solder temp. : 250 C  
Dipping depth : 2mm  
Dipping time : 4 sec.



Solder alloy : SnAg3.5Cu0.5  
Lead plating : SnPb (alloy42)  
Conveyor angle : 3.5  
Solder temp. : 250 C

Flux: JS-E-09  
Conveyor speed : 1.0m/min  
Pre-heating : 120 C  
Dip time : 5sec

# No-clean Flux Core Wire Solder

A newly developed flux system, which combines both high softening point resins and heat resistant activators, successfully realises excellent solderability with minimal flux spattering.

S3X-51M and TX-51M have proven to give excellent performance not only with SnAg based lead free alloys, but also with SnAgBiCu and SnZnBi solders.



Product		S3X-51M	TX-51M
Alloy composition	(%)	SnAg3.0Cu0.5	SnCu0.5
Melting point	(C)	217 -218	228
Flux content	(%)	3.4	3.4
Halide content	(%)	0.13	0.13
Dryness		Good	Good
Copper plate corrosion test		Passed	Passed
Surface insulation resistance ( )	Initial value	$> 1 \times 10^{13}$	$> 1 \times 10^{13}$
	After humidification	$> 1 \times 10^{11}$	$> 1 \times 10^{11}$
Solder spreadability	(%)	$> 75$	$> 75$
Diameter	(mm)	0.6, 0.8, 1.0, 1.2	

\*Tests methods : In accordance with JIS-Z-3197.

