ECO+PLUS® series
Lead free SOLUTIONS you can TRUST

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#50017E-2
2013.01.24

Koki no clean LEAD FREE flux cored solder wire

Contents

REACH compliant

70M series

Product information

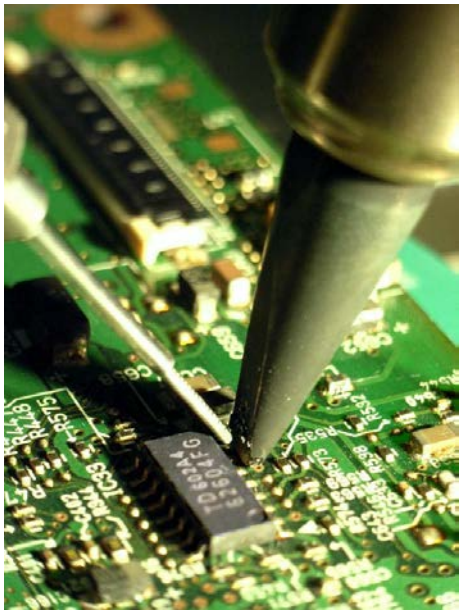
LINE-UP

S01X7Ca - 70M

S03X7Ca - 70M

SB6N - 70M

S3X - 70M



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

- Free of the regulated substances listed in JIG-101 (rev.3), which has been quoted in REACH, RoHS, etc.
- Drastically reduces iron tip erosion (S01X7Ca / S03X7Ca) with added Co forming barrier layers
- SB6N contains 6% indium, highly resistant to severe temperature environments
- Excellent wetting to lead frame components
- No tailing or spiking and a clean take away of the soldering iron
- Minimized fume and flux sputtering

Specifications

Contents

Items			S01X7Ca	S03X7Ca	SB6N	S3X
Alloy	Composition (%)		Sn 0.1Ag 0.7Cu 0.03Co + α	Sn 0.3Ag 0.7Cu 0.03Co + α	Sn 3.5Ag 0.5Bi 6.0In	Sn 3.0Ag 0.5Cu
	Melting point (ºC)		217 - 227	217 - 227	202 - 210	217 -219
Flux	Halide content (%)*		0.09 ± 0.03			
	Copper mirror corrosion *		Pass			
	Flux Type (IPC J-STD-004)		ROL1			
Product	Flux content (%) *		3.2 ± 0.3			
	Dryness *		Pass			
	Copper plate corrosion *		Pass			
	Aqueous solution resistivity test (Ωm) *		≥ 800			
	SIR (Ω) * [85 °C,85%RH,168Hrs outside chamber]		≥ 1×10^{13}			
	Voltage applied migration (Ω, visual check) *	[40 ºC,90%RH,DC50V, 1000Hrs inside chamber]	≥ 1×10^{12} No migration observed			
		[85ºC,85%RH,DC50V, 1000Hrs inside chamber]	≥ 1×10^{10} No migration observed			
	Flux sputtering [350ºC,30 shots, in total]		≤ 30 pc.	≤ 30 pc.	≤ 45 pc.	≤ 35 pc.
	Iron tip erosion [400ºC 10,000shots, rate of decrease]		≤ 14%	≤ 17%	≤ 27%	≤ 51%
	Shelf life		3 years			

* Data based on S3X-70M.
Refer to each item herein for detailed test method.

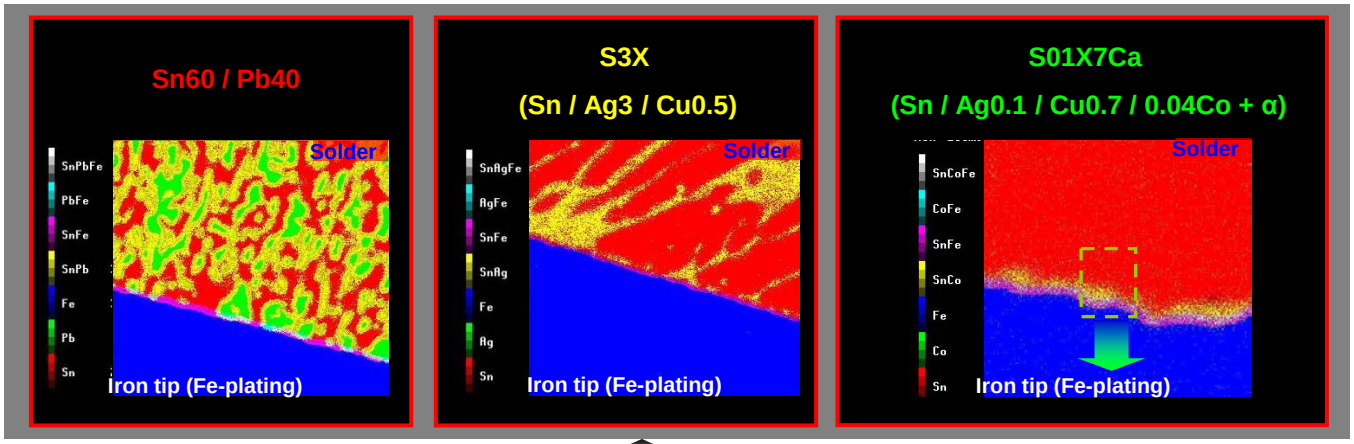
Product code

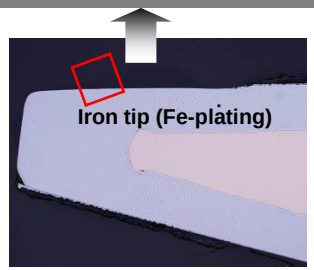
S01X7Ca – 70 M

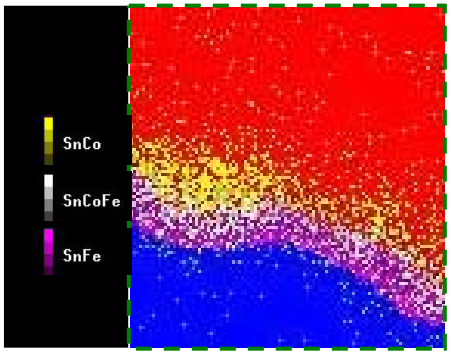
- S01X7Ca: Alloy composition
- 70: Flux number
- M: Flux type

Alloy composition (%)	**S01X7Ca**	: Sn 0.1Ag 0.7Cu 0.03Co + α
	S03X7Ca	: Sn 0.3Ag 0.7Cu 0.03Co + α
	SB6N	: Sn 3.5Ag 0.5Bi 6.0In
	S3X	: Sn 3.0Ag 0.5Cu
Flux type	**M**	: Low halide or halogen free
Flux number	Solid used	

Mechanism of preventing tip erosion - S01X7Ca / S03X7Ca alloys



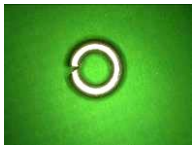


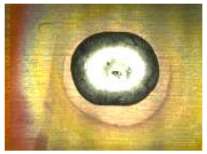
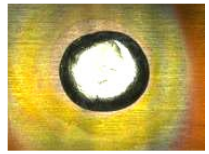
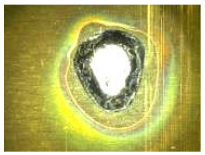
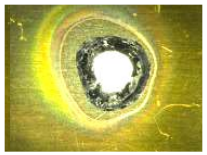
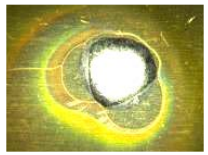
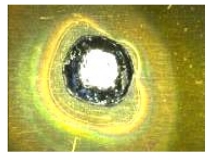


When using Sn60/Pb40 solder, tip erosion is minor, as Pb in the interface forms Pb-Fe compound, preventing Sn-Fe from dispersing Fe into the solder. Whereas in lead free solders such as S3X (SAC305), tip erosion is noticeable because Fe gets dispersed constantly into the solder. Having Co as its constituent, S01X7Ca ad S03X7Ca alleviate tip erosion, with Co replacing Fe in Sn-Fe, and forming barrier layers of Sn-Fe, Sn-Co-Fe, and Sn-Co between Fe plating and the solder.

Solder spread factor

・Test method: In-house method
・Test piece: Copper, brass, nickel piece (surface delipidated)
・Wire diameter: 0.8mm （outer diameter of the ring: 1.6mm）*as shown
・Melting conditions: Keep 5 sec. after melting over solder bath of 300ºC

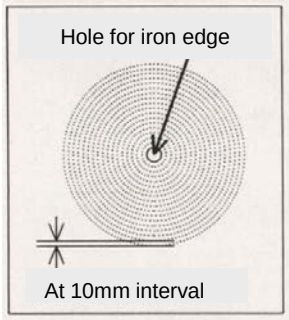


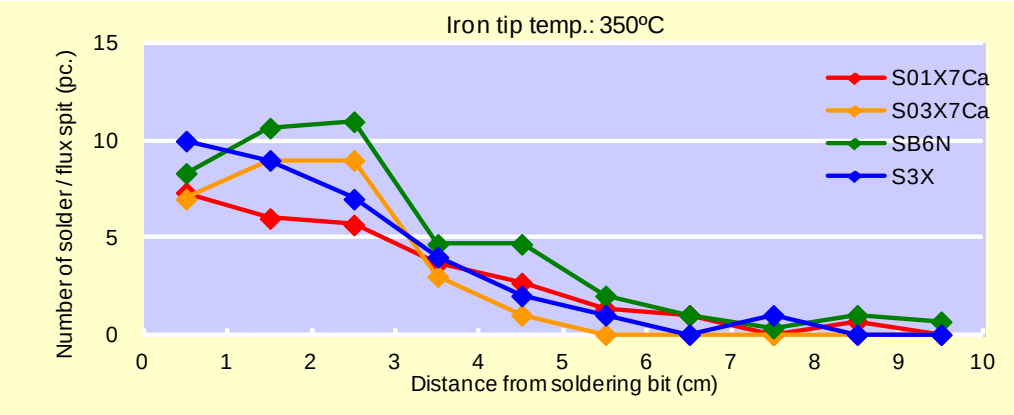
Base	S01X7Ca	S03X7Ca	SB6N	S3X
Cu				
Brass				
Ni				

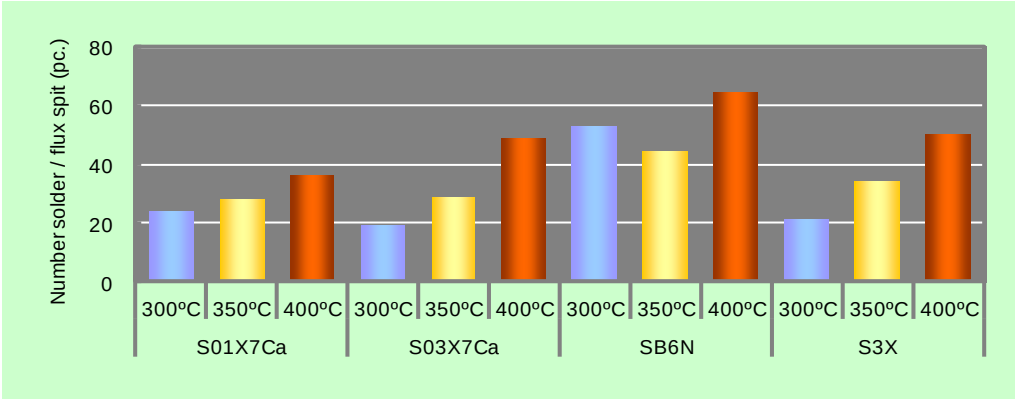
Alloy composition does not seem to affect solder spread factor.

Solder / Flux spitting

・Test method : In-house test method
・Solder iron temperature: 300・350・400ºC
・Solder wire diameter: 0.8mm
・Feeding speed: 10mm/2sec（interval = 8 sec.）
・Feeding amount: 30 shots

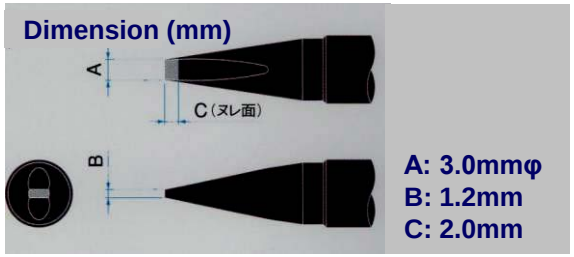




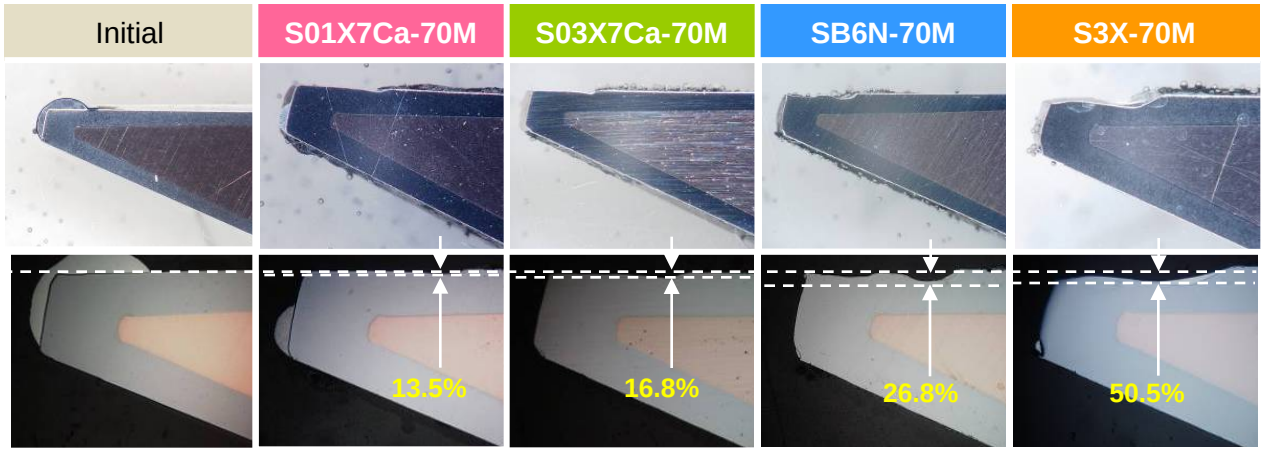


Iron tip erosion

- Test equipment : UNIX-412R
- Iron tip temp.: 400ºC (Iron tip : P3DR)
- Solder wire diameter: 0.8mm
- Feeding speed: 5.0mm/shot, feeding tact=1.0mm/sec
- Number of feeding: 10,000 shots



Iron tip configuration



Compared to SAC305 (S3X), a standard lead free solder alloy, S01X7Ca / S03X7Ca / S3XCa significantly extend the life of the iron tip, by having Co as its constituent. The less the Ag content, the longer the life of the iron tip tends to be.

Other properties

Item	Result	Method
Dryness of flux residue	Pass	JIS Z 3197
Halide content	0.0912 (%)	JIS Z 3197
Aqueous solution resistivity	940 (ohm.m)	JIS Z 3197
Copper mirror corrosion	Pass	IPC-JSTD-004
Copper plate corrosion	Pass	IPC-JSTD-004
SIR	2.96×10^{10} (ohm)	85ºC,85%RH,168hrs.
Voltage applied SIR	4.2×10^{10} (ohm)	85ºC,85%RH,1000hrs,DC50V
	1.29×10^{13} (ohm)	40ºC,90%RH,1000hrs,DC50V

Handling guide

1. Recommended solder iron temperature: 330 – 380ºC

May require adjustment according to solder wire diameter, specific heat capacity of component, and the feeder. Cautions should be taken not to set it too high as it could hinder heat conduction due to carbonization of the flux.

2. Shelf life: 3 years from the date of production

The flux shall retain the activation level during the warranty period as it does not soften below 70ºC. However, keep away from heat and moisture, and store in a place where temperature change is moderate throughout the year to prevent the solder surface from oxidation.

* How to read a lot number

ex. **Lot No. 12 09 100 72**

- 72 → Production number of flux
- 100 → Production number of solder alloy
- 09 → Month of production (September)
- 12 → Last two digits of calendar year of production (2011)