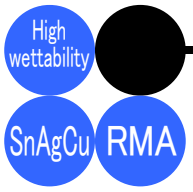
Lead free flux cored solder wire



EVASOL J3-MTS-3

Technical data

Special characteristics

・This product is resin flux cored lead-free solder, Sn-Ag-Cu, in MIL class.
・Beginning of solder wetting is fast and it is able to work at a short time.

Test items

A. Test items for special characteristics

1. Soldering test at a short time

B. Test items for basic characteristics

1. Flux content
2. Halide activator content test
3. Copper plate corrosion test
4. Silver chromate paper test
5. Copper mirror corrosion test
6. Flux solution resistivity test
7. Surface insulation resistance test
8. Electrochemical migration test

Specification

Table. Characteristics of "J3-MTS-3"

Test items			Criteria	Test method	
				JIS	IPC
Solder alloy	Alloy composition		Sn: Remainder Ag:3.0 Cu:0.5	JIS Z 3282	—
	Solidus temperature		217℃		
	Liquidus temperature		220℃		
Flux	Flux type		MIL-RMA		
	Flux solution resistivity		1769Ωm	JIS Z 3197 8.1.1	—
	Halide activator content*		0.09%	JIS Z 3197 8.1.4.2.1	IPC TM650 2.3.35
	Copper plate corrosion		No corrosion	JIS Z 3197 8.4.1	IPC TM650 2.6.15
	Copper mirror corrosion		No corrosion	JIS Z 3197 8.4.2	IPC TM650 2.3.32
	Silver chromate paper test		Passed	JIS Z 3197 8.1.4.2.3	IPC TM650 2.3.33
Resin flux cored solder	Flux content		3.0 %	JIS Z 3197 8.1.2	IPC TM650 2.3.34.1
	Insulation resistance	Initial	$2.3\times10^{13}\Omega$	JIS Z 3197 8.5.3 Condition B	IPC TM650 2.6.3.3
		After 168hr	$2.0\times10^{10}\Omega$		
		After 1008hr	$2.1\times10^{10}\Omega$		
	Electrochemical migration		No migration	JIS Z 3197 8.5.4	IPC TM650 2.6.14.1

*Halide content is calculated Br to Cl. Cl is not contained.

A. Test result for special characteristics

1. Soldering test at a short time

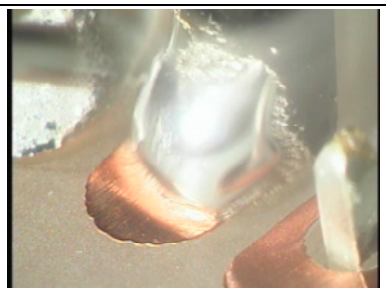
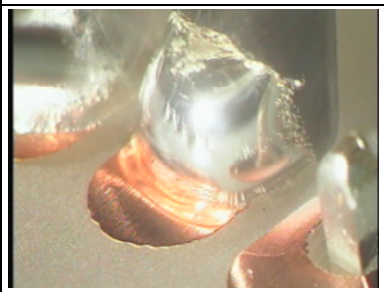
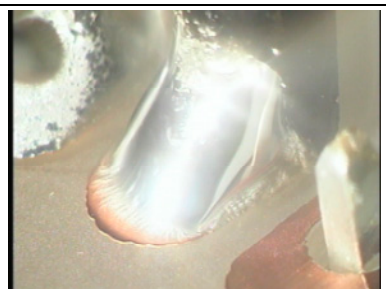
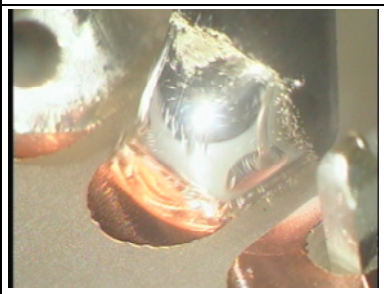
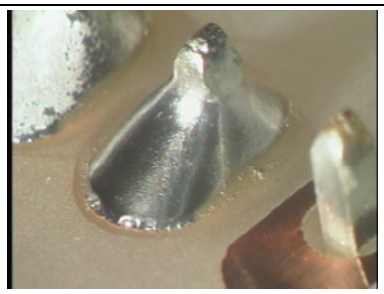
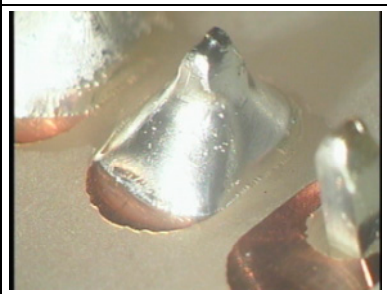
Test method

A connector shall be soldered on a test board with a soldering robot, JAPAN UNIX ・UNIX-401P. Picture, during soldering test, shall be taken by an optical microscope. The time until beginning to wet, behavior of solder and wettability shall be checked.

Condition of soldering
Iron top：2mm, driver type　　Temperature：320℃
Diameter ：φ0.8mm　　Land ：Cu, one side
Pre soldering ：5mm、10mm/s、0.5s
Soldering ：2.5mm、10mm/s、0.25s

Test result

Table. Test result

Soldering time	J3-MTS-3	Normal solder
0.3s		
0.4s		
0.5s		
1s		
Beginning to wet	0.4s	0.5s
Wettability	Soldering has completed.	Soldering has not completed.

"J3-MTS-3" has good wettability to make soldering time shorter.

B. Test results for basic characteristics

1. Flux content

Test method (Based on JIS Z 3197 8.1.2)

After preparing the resin cored solder by 30±1g(= W_1) and cleaning it by 2-propanol, it shall be put into 100ml beaker. Also, glycerin shall be prepared by 20ml and after putting it into them, they shall be heated so as to separate flux from solder completely. After separating flux from solder, only solder shall be removed from them and solidified. After drying and cleaning it, it shall be measured in weight (=W_2). The flux content shall be calculated by the following formula.

$$\text{Flux content (\%)} = (W_1 - W_2) \times 100 / W_1$$

Criteria

Flux content shall be 3.0±0.3 (%)

Test result

Flux content (%)	**3.0**

2. Halide activator content

Test method (Based on JIS Z 3197 8.1.4.2.1)

After preparing the flux by 5.0±0.1g, it shall be put into 300ml beaker and then 2-propanol by 200ml shall be added to them. They shall be dissolved as possible as we can by stirring at room temperature. Stirring them strongly by using the magnetic stirrer, they shall be titrated by using the electric titration equipment with silver nitrate standard solution.

Criteria

Halide activator content shall be 0.08±0.03(%).

Test result

Halide activator content(%)	**0.09**

3. Copper plate corrosion

Test method (Based on JIS Z 3197 8.4.1)

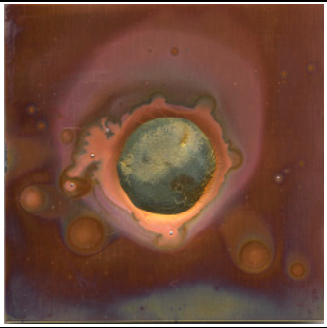
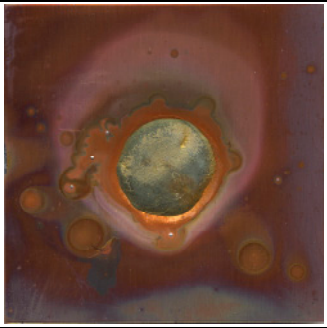
3mm depth hole shall be made at the center of copper plate by using steel sphere of 20mm diameter. After pretreating copper plate, the resin cored solder shall be provided to 3mm depth hole of it and melted. After that copper plate shall be put into the chamber which is adjusted to 40±2℃,90～95% and kept in this condition for 96 hours. 96 hours later, copper plate shall be removed from the chamber and checked about the corrosion condition. After flux residue on copper plate shall be cleaned off by using suitable solvent, the corrosion condition under flux residue shall be checked too.

Criteria

Corrosion shall not be found.

Test result

Table Copper plate corrosion

initial	96 hour later
	
No corrosion	

4. Silver chromate paper test

Test method (Based on JIS Z 3197 8.1.4.2.3)

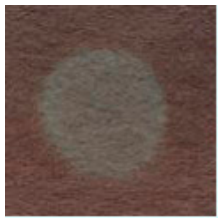
A drop of flux (2-propanol solution including flux by 25%) shall be dropped on a silver chromate paper, and immediately a drop of chlorine standard solution shall be done, too. After removing flux on the test paper by 2-propanol, drying, changing color by halide shall be compared with chlorine standard solution.

Criteria

Test paper shall not be whiter than chlorine standard solution's.

Test result

Table. Silver chromate paper

J3-MTS-3	Standard solution
	
Passed	

5. Copper mirror corrosion

Test method (Based on JIS Z 3197 8.4.2)

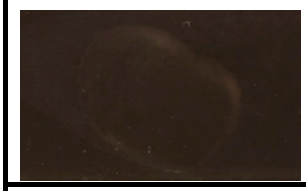
The test flux and standard rosin (2-propanol solution including flux by 25%) shall be made. 0.05ml of each test solution shall be dropped on a copper mirror test plate. The test copper mirror plate shall be kept in a chamber adjusted 25±2℃, 50±5% for 24 hours. 24 hours later, each flux on the test plate shall be removed by 2-propanol. Corrosion shall be checked.

Criteria

Corrosion shall be not found, comparing with standard rosin.

Test result

Table. Copper mirror corrosion

J3-MTS-3	Standard rosin
	
No corrosion	

6. Flux solution resistivity test

Test method (Based on JIS Z 3197 8.1.1)

0.100±0.005ml test flux solution (2-propanol solution including flux by 25%) and 50ml ion exchanged water shall be put into a 50ml beaker. They shall be boiled for 60s on a hot plate, cooled down by flowing water and put into the water bath adjusted 20±2℃. After they shall be reach thermal equilibrium, they shall be measured in resistivity by conductivity meter.

Criteria

Resistivity shall be more than 1000Ωm.

Test result

Table. Flux solution resistivity

	Resistivity (Ωm)	Average (Ωm)
Sample1	1688	1769
Sample2	1893	
Sample3	1725	

7. Surface insulation resistance

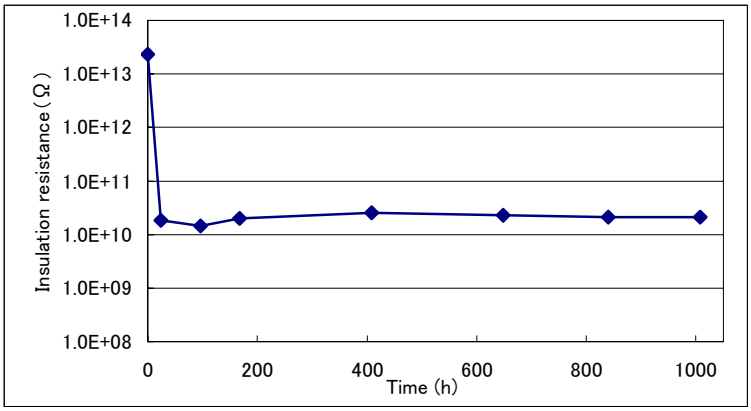
Test method (Based on JIS Z 3197 8.5.3)

The test boards specified JIS shall be coated with 2-propanol solution including flux by 25%. They shall be dried for 5 minutes in a dryer adjusted to 100℃. After that they shall be soldered by floating for 3 seconds on solder bath adjusted to 270±3℃. Before putting them into a chamber, the initial value of surface insulation resistance shall be measured. In this case, coaxial cable shall be used for wiring between measurement pad on test board and insulation resistance meter. They shall be put into the chamber adjusted to 85℃ 85% being careful for a waterdrop not to drop down on the test pattern and 24, 96, 168, 408, 648, 840 and 1008 hours later, surface insulation resistance shall be measured applying the bias voltage DC100V.

Test result

Table Surface insulation resistance

Time(h)	0	24	96	168	408	648	840	1008
Resistance(Ω)	2.3×10^{13}	1.9×10^{10}	1.5×10^{10}	2.0×10^{10}	2.5×10^{10}	2.3×10^{10}	2.1×10^{10}	2.1×10^{10}



8. Electrochemical migration test

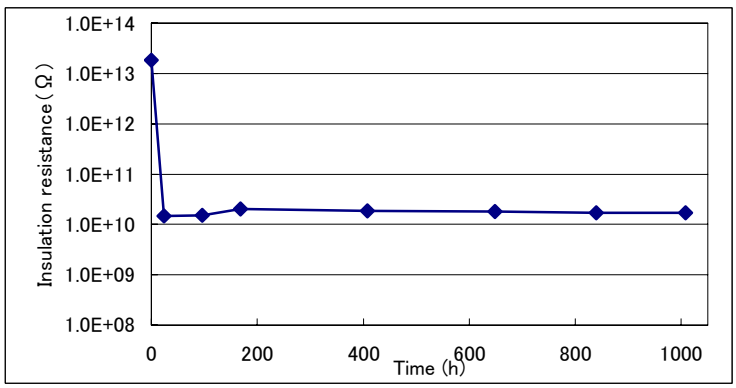
Test method (Based on JIS Z 3197 8.5.4)

The test boards specified JIS shall be coated with 2-propanol solution including flux by 25%. They shall be dried for 5 minutes in a dryer adjusted to 100℃. After that they shall be soldered by floating for 3 seconds on solder bath adjusted to 270±3℃. Before putting them into a chamber, the initial value of surface insulation resistance shall be measured. They shall be put into the chamber adjusted to 85℃ 85% and applied DC45 to 50V being careful for a waterdrop not to drop down on the test pattern and 24, 96, 168, 408, 648, 840 and 1008 hours later, surface insulation resistance shall be measured applying the bias voltage DC100V. 1008hours later, the test boards shall be taken out from the chamber and confirmed whether there shall be any evidence of migration or not.

Test result

Table. Electrochemical migration test

Time (h)	0	24	96	168	408	648	840	1008
Resistance(Ω)	1.9×10^{13}	1.5×10^{10}	1.5×10^{10}	2.0×10^{10}	1.9×10^{10}	1.8×10^{10}	1.7×10^{10}	1.7×10^{10}



No migration