Solder Paste Evaluation Results

Issued date:	AUGUST 2008
Product name :	Sn63/Pb37 NC254 89.5-T3

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Tin-Lead No-Clean Solder Paste Evaluation Results

Item	Results	Acceptability	Test Method
SAMPLE TESTED			
Sample description	NC254 Sn63/Pb37	-	-
Powder size	Type 3 : -325/+500 mesh 0 % 97 % 3 %	Type 3 : Max 1% > 45 µ Min 80% 45-25 µ Max 10% < 20 µ	IPC TM 650 2.2.14 Table
Alloy composition	Sn 63 Pb 37	-	Table
Melting point by DSC	183 °C		DSC
Flux classification	REL0	-	IPC-J-STD-004
Metal content	88,5-90.5 %	-	IPC TM 650 2.2.20
POWDER TESTING			
Powder shape	spherical	spherical	Microscope
Apparent powder density	4,72 g/cm^3	n/a	ASTM B 212-99
FLUX MEDIUM TESTING			
Acid value	104,8 mg KOH/ g flux	-	IPC TM 650 2.3.13
Halides content	0.0 %	-	IPC TM 650 2.3.35
Water content Karl Fisher	0.234 %		AIM test method
Fluorides spot test	No fluoride	-	IPC TM 650 2.3.35.1 IPC TM 650 2.3.35.2
Corrosivity test Copper mirror	L	L	IPC TM 650 2.3.32
Corrosion Flux	Pass	-	IPC TM 650 2.6.15
Halide free or Silver chromate paper test	Pass	Pass	IPC TM 650 2.3.33
Surface Insulation Resistance SIR test	85°C, 85% See attached data	85°C, 85% All data over 1.00E+08 Ω	IPC TM 650 2.6.3.3

Bellcore SIR and Electromigration	SIR: 65°C, 85% 4 days See attached data	SIR: 65°C, 85% 4 days All data over 1.00E+11 Ω	GR-78-CORE
VISCOSITY TESTING			
Paste viscosity test T-bar spindle test method (Brookfield)	612 kcp	650 ± 10% kcp	IPC TM 650 2.4.34
Paste Viscosity test, spiral test method (Malcom PCU205)	η 10 rpm/6s-1 = 238.0Pa.s TI = 0,54 R = 8,4 %	- - R < 10%	JIS Z 3284-1994
PASTE TESTING			
Tack test	29 gf, 24 hrs	-	IPC TM 650 2.4.44
Solder balling (ceramic plate)	Pass	No halo	IPC TM 650 2.4.43
Wetting test Malcom SP-1 (wetting force)	F = 2,68 gf Pass	Fpeak > F Uniform solder, no solder spatter	Malcom SP-1 method and IPC TM 650 2.4.45
Paste shelf life	1 year @ 4°C	-	AIM TM 125-11
SOLDER PASTE EVALUATION			AIM TM 119P-15
Paste stencil life test	24 hrs	-	

Alloy Analysis & Particle Size

AIM
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CERTIFICAT D'ANALYSE
CERTIFICATE OF ANALYSIS

CLIENT/ *CUSTOMER* :		DATE :	August 08, 2008
PRODUIT/ *PRODUCT* :	POWDER SN63/PB37 45µ		
VOTRE NO. DE COMMANDE/ *YOUR ORDER NUMBER* :		NOTRE NO. DE COMMANDE/ *OUR ORDER NUMBER* :	

LOT : 63402 (08/E/29-T3)

ELEMENTS			%	ELEMENTS			%
(Al)	ALUMINIUM	/ *ALUMINUM*	<0.001	(As)	ARSENIC	/ *ARSENIC*	<0.01
(Sn)	ÉTAIN	/ *TIN*	62.89	(Bi)	BISMUTH	/ *BISMUTH*	0.013
(Pb)	PLOMB	/ *LEAD*	BALANCE	(Cd)	CADMIUM	/ *CADMIUM*	<0.001
(Sb)	ANTIMOINE	/ *ANTIMONY*	0.02	(In)	INDIUM	/ *INDIUM*	<0.007
(Cu)	CUIVRE	/ *COPPER*	<0.01	(Fe)	FER	/ *IRON*	<0.003
(Au)	OR	/ *GOLD*	0.002	(Ni)	NICKEL	/ *NICKEL*	<0.001
(Ag)	ARGENT	/ *SILVER*	<0.01	(Zn)	ZINC	/ *ZINC*	0.001

Distribution de la grosseur des particules de poudre / *Powder Particle Size Distribution*	
< 25µ	3%
25µ-45µ	97%
45µ-50 µ	0%
> 53 µ	0%
ASPECT RATIO < 1.3	95%

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4.10.002y - Rev. 005 - 2005-11-24

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Corrosion

Manual: IPC-STD-004
Test method: 2.6.15 IPC-TM-650

Scope:
This test method is designed to determine the corrosive properties of flux residues under extreme environmental conditions. A pellet of solder is melted in contact with the test flux on a sheet metal test piece. The solder is then exposed to prescribed conditions of humidity.

Chamber Condition:

Temperature	Relative humidity	Time (days)
40±1°C	93±2%	240hr (10days)

Result: pass (no corrosion)

Copper Mirror

Manual: IPC-STD-004
Test method: 2.3.32 IPC-TM-650

Scope:
This test method is designed to determine the removal effect the flux has (if any) on the bright copper mirror film which has been vacuum deposited on clear glass. The test is done at prescribed conditions, temperature and humidity.

Chamber Condition:

Temperature	Relative humidity	Time (days)
23±2°C	50±5%	24hr (1days)

Corrosion level	**RESULT**
LOW	√
MEDIUM	
HIGH	

Copper Mirror
Copper mirror after 24hrs.

Sn63 NC254 89.5T3 BLANK

Solder Ball

Manual: IPC-STD-005
Test method: 2.4.43 IPC-TM-650

Scope:
This test is carried out to determine the reflow properties of the solder paste. The ability of the prealloyed solder particles in the paste to reflow into a sphere.

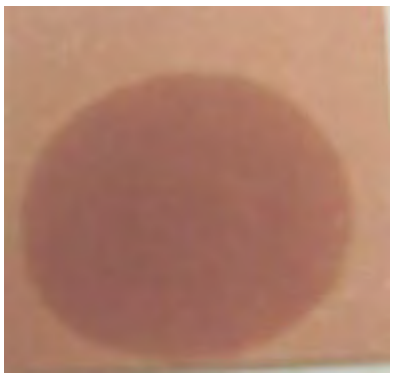
Condition:

Powder size type	3
Temperature for 15min	25 ± 2°C
Temperature for 4hours	25 ± 3°C & 50 ± 10%RH

Halides

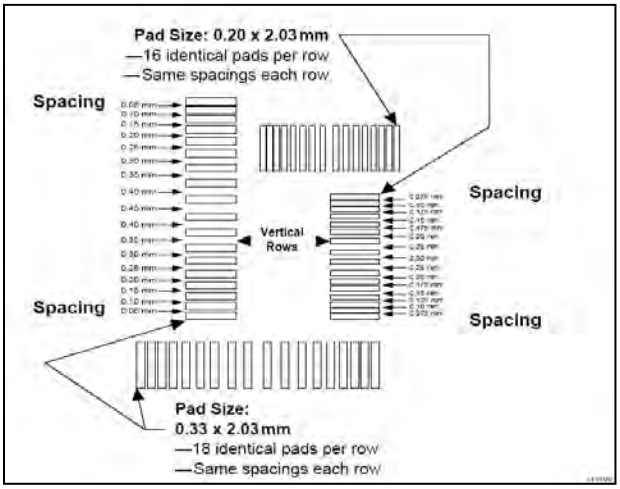
Manual: IPC-STD-004
Test method: 2.3.33 IPC-TM-650

Scope:
This test method is designed to determine the presence (if any) of chlorides and bromides in soldering flux by visual examination after placement on test paper.

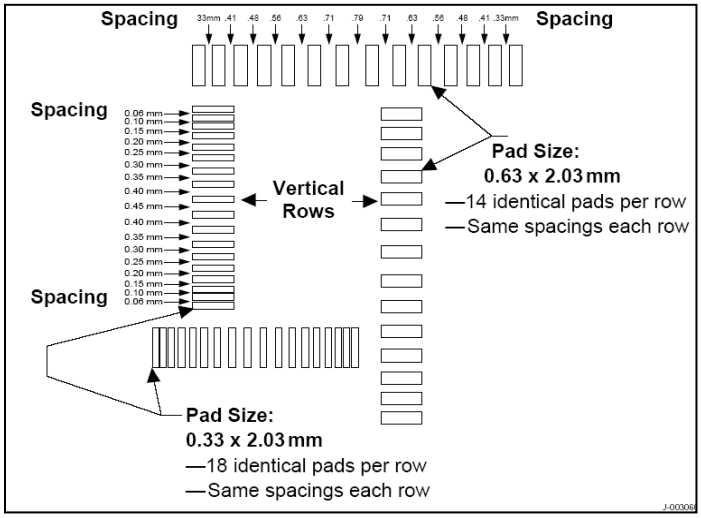
Silver chromate paper test.


Slump

Manual: IPC-STD-005
Test method: 2.4.35 IPC-TM-650
Scope:
This method is to evaluate the slump behavior after printing of solder paste at different condition and using two stencil thicknesses.



Stencil IPC –A-20 (0.1mm thick)			
Pad size 0.33 x 2.03mm		Pad size 0.2x2.03mm	
Cold 10-20min T: 25°C ± 5°C RH: 50% ±10%	Hot 10-15min T:150°C ±10°C	Cold 10-20min T: 25°C ± 5°C RH: 50% ±10%	Hot 10-15min T : 150°C ± 10°C
Bridging	**Bridging**	**Bridging**	**Bridging**
Max :0.25mm	**Max :0.30mm**	**Max :0.175mm**	**Max :0.20mm**
NC258	**NC258**	**NC258**	**NC258**
0.06	**0.20**	**0.10**	**0.15**



Stencil IPC-A-21 (0.2mm thick)			
Pad size 0.63 x 2.03mm		Pad size 0.33x2.03mm	
Cold 10-20min T: 25°C ± 5°C RH: 50% ±10%	Hot 10-15min T : 150°C ± 10°C	Cold 10-20min T: 25°C ± 5°C RH: 50% ±10%	Hot 10-15min T:150°C ± 10°C
Bridging	**Bridging**	**Bridging**	**Bridging**
Max :0.56mm	**Max :0.63mm**	**Max :0.25mm**	**Max :0.30mm**
NC258	**NC258**	**NC258**	**NC258**
0.0	**0.48**	**0.10**	**0.30**

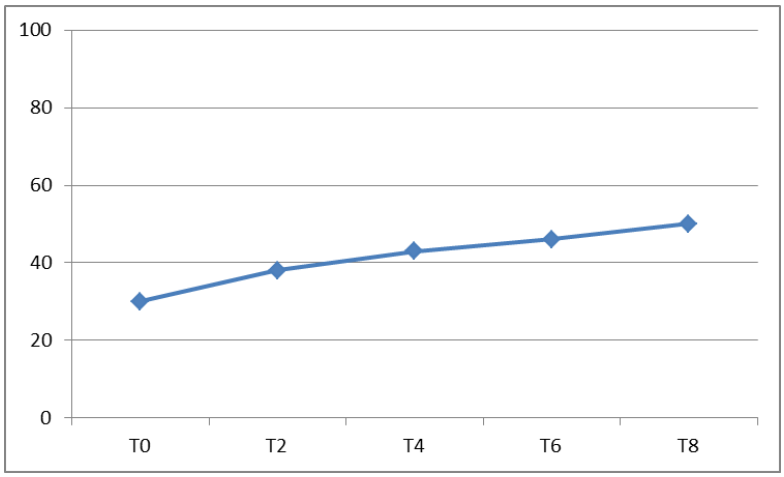
Tack

Manual: IPC-STD-005
Test method: 2.4.44 IPC-TM-650

Scope:
This test is to determine the ability of a printed pattern of solder paste to retain a probe placed in the solder paste. Time between printing and probe placement are progressively increased to simulate variables in a manufacturing process.

Condition:

Temperature & Humidity	TIME
25±2°C 50±% RH	8hr



IPC SIR

GENERAL REFERENCES

AIM NC254 Sn63/Pb37 solder paste was tested to J-STD-004 and IPC-TM-650 method 2.6.3.7., Surface Insulation Resistance

SAMPLE AND INSTRUMENTATION

Solder paste: AIM NC 254 Sn63/Pb37
Test coupon: IPC-B-24, bare copper
Environmental chamber: Thermotron SE-300
Electrical testing equipment: AutoSIR Gen3 System

TEST CONDITION

Temperature/humidity: 40°C/ 90%RH
Test/bias voltage: 10V
Test duration: 7 days, tested at every 20 minutes

PASS-FAIL CRITERIA

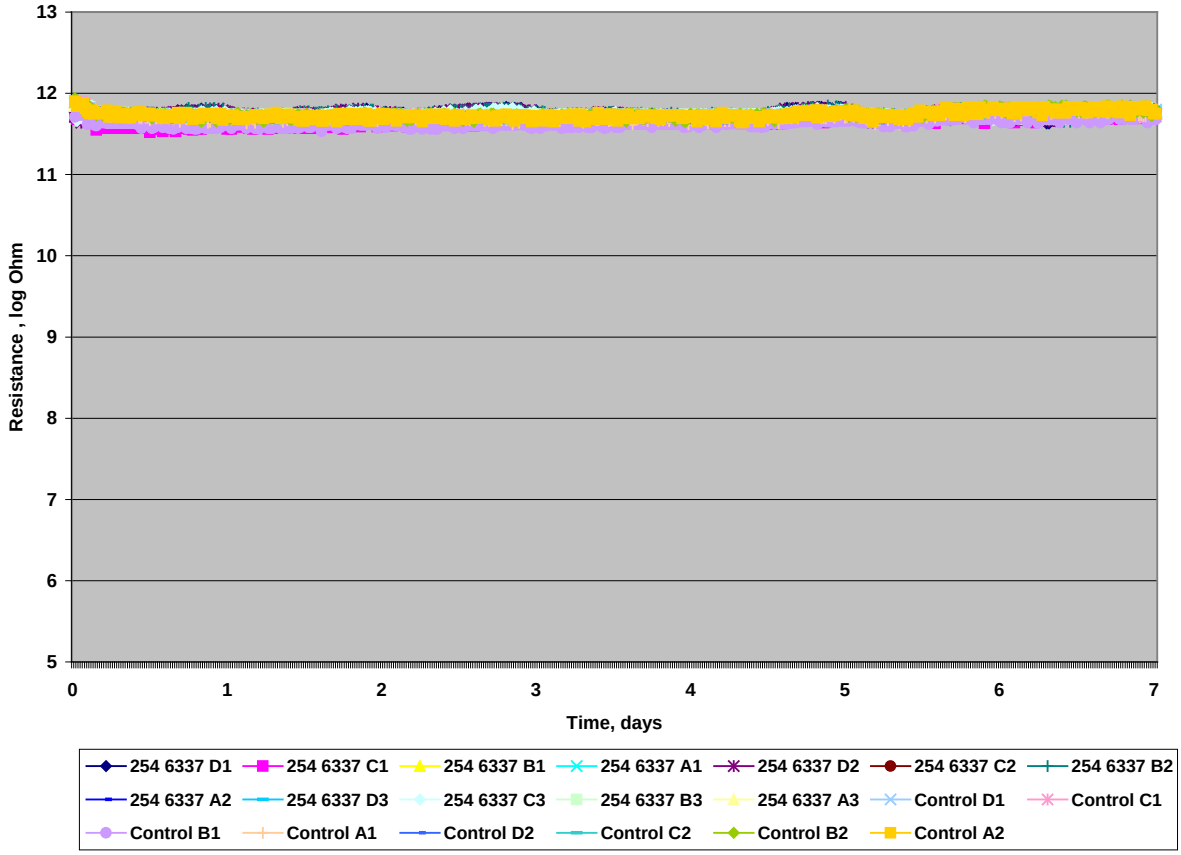
IPC J-STD-004B §3.4.1.4.1
All measurements on all test patterns shall be exceed the 100 MΩ
No evidence electrochemical migration that reduces conductor spacing by more than 20%.
No corrosion of the conductors.

TEST RESULTS

1. Test data see attached Excel file, pass
2. Presence of dendrites: No
3. Maximum percent reduction of spacing: 0%.
4. Presence of discoloration between conductors: No
5. Presence of water spots. No
6. Presence of subsurface metal migration. No

DATE: November 15, 2010

RESULT CHART



Viscosity

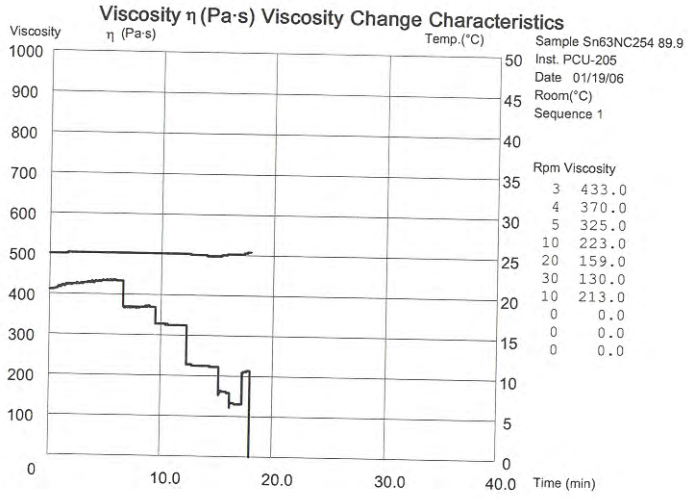
This section of the report presents the Malcom viscosity readings and figures for NC254 medium and solder paste. It also includes the infrared spectrum test results for the medium.

Equipment used: Malcom PCU 205 viscometer
Standard: JIS Z 3284-1994; JIS standard 25 ^{0}C

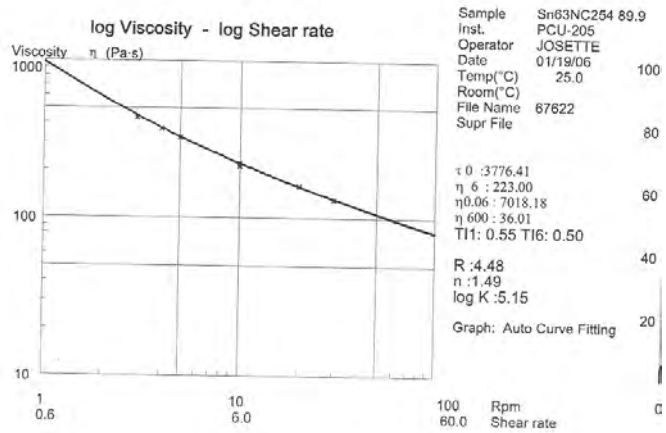
Room condition during testing: Temperature 25.0 ^{0}C
Relative humidity 27 %

Malcom

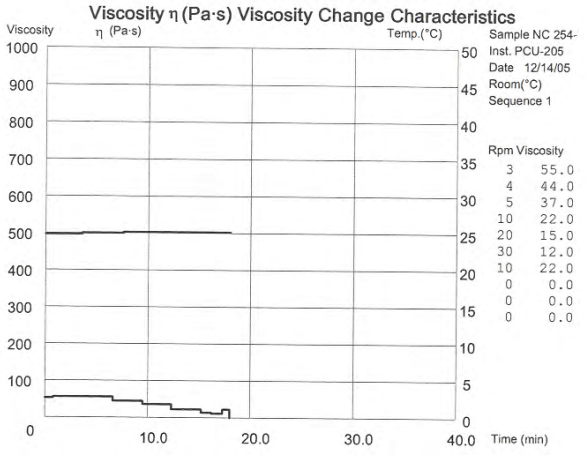
Solder Paste NC254 Sn63/Pb37
Viscosity test spiral test method graphs : JIS Z 3284-1994
Step real time variation:



Solder Paste NC254 Sn63/Pb37
Viscosity test spiral test method graphs : JIS Z 3284-1994
Log Viscosity VS Log Shear Rate:



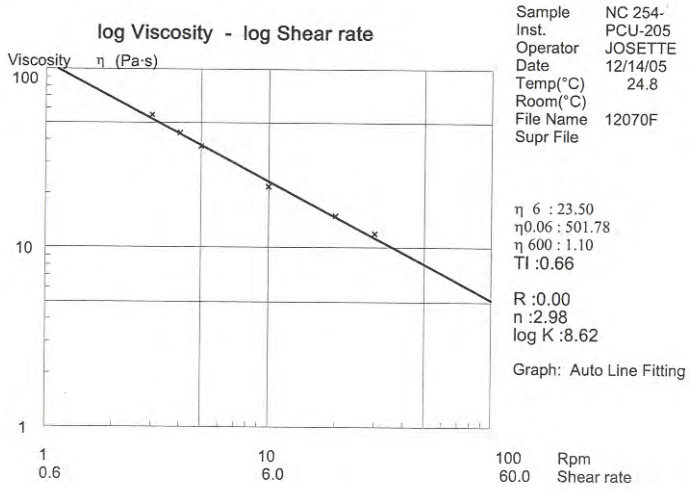
Medium NC254
Viscosity test spiral test method graphs : JIS Z 3284-1994
Step real time variation:



Medium NC254

Viscosity test spiral test method graphs: JIS Z 3284-1994

Log Viscosity VS Log Shear Rate:



Karl Seelig, Vice President of Technology