



NL932 Solder Paste

Alloy: **SAC305 Type 3** Metal Loading: **88.5%**
QC/Lot#: **23948** Mfg Date: **8/14/2012**

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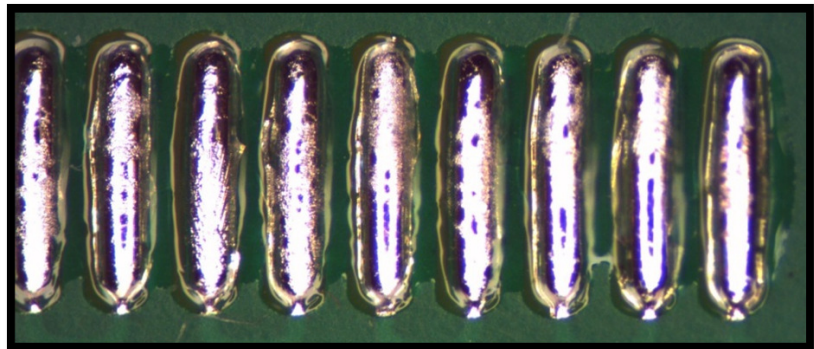
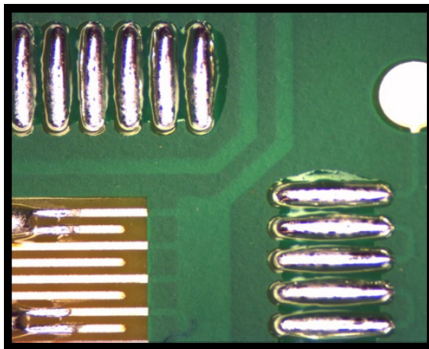
Summary

NL932 is a No Clean Lead Free Solder Paste that leaves a minimal clear residue. This residue isn't pin probable. NL932 is Halogen free and classified as ROL0. Attributes compared to the other products that were tested are below:

- * Best paste to minimize graping
- * Excellent wetting paste
- * Very little slump with a low viscosity
- * Extended tack life up to 72 hours

Recommended when the user wants allow graping, high wetting, low residue/cleanable and halogen free paste

Cosmetics





Standards Tests

NL932 Solder Paste

Metal Loading

Metal 88.5%

Viscosity

Brookfield 550 Kcps
Malcom 132 Pa·s

Silver Chromate

Pass



Copper Mirror

Pass (No evidence of mirror breakthrough)

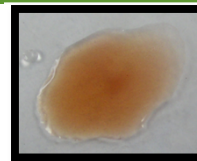


IPC Classification

ROLO

Flouride

Pass



Tack Testing

0 Hours	24 Hours	48 Hours	72 Hours	96 Hours
84.6	97.92	100.26	97.52	50.02

SIR

Pass

Consistently measures above the 8.0 Log 10 Ohms with no signs of corrosion or dendrite growth. Controls performed well electrically and showed no signs of dendrites or corrosion.

Electromigration

Pass

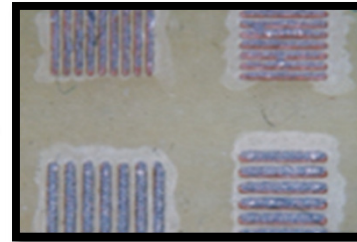
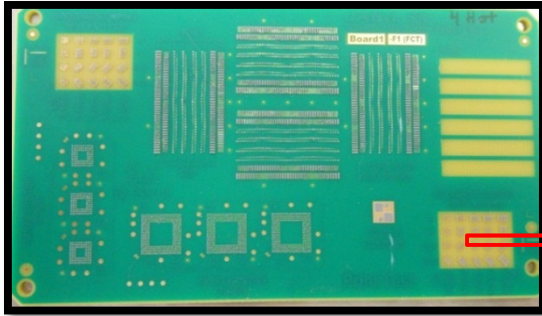
The average resistance for the samples did not degrade beyond acceptable limits from 96 to 500 hours for the test. The samples did not exhibit signs of corrosion. Meeting these requirements results in a **passing solder** paste.





Cold Slump

NL932 Solder Paste



Cold Slump

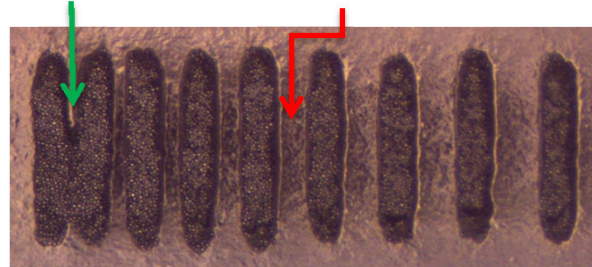
IPC Slump Results

Bridging Quantity

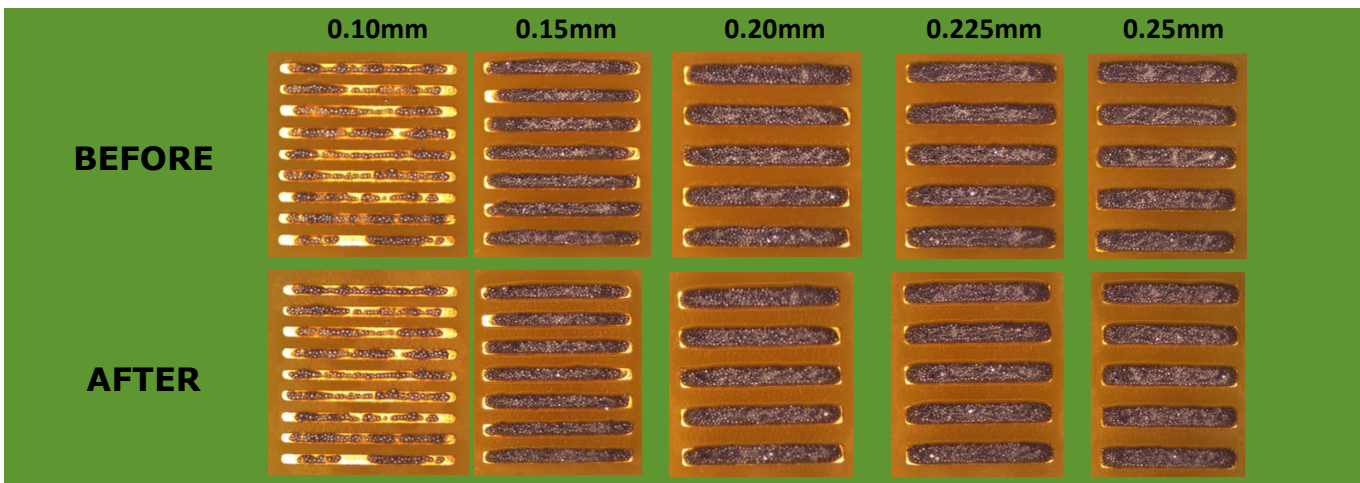
Pad	Defect Count
0.10mm	0
0.15mm	0
0.20mm	0
0.225mm	0
0.25mm	0

Cold Slump 0.06
Passing Result

25C slump fail
limit (0.25mm)



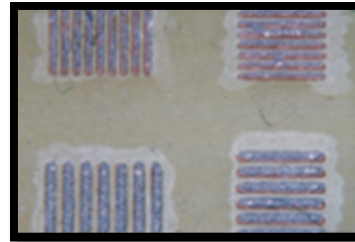
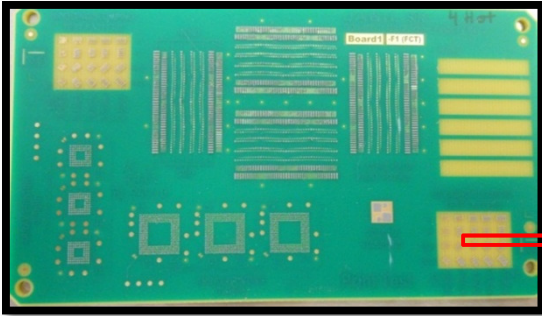
Cold Slump Test Board





Hot Slump

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Hot Slump

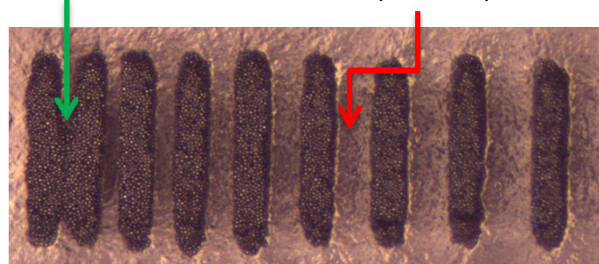
IPC Slump Results

Bridging Quantity

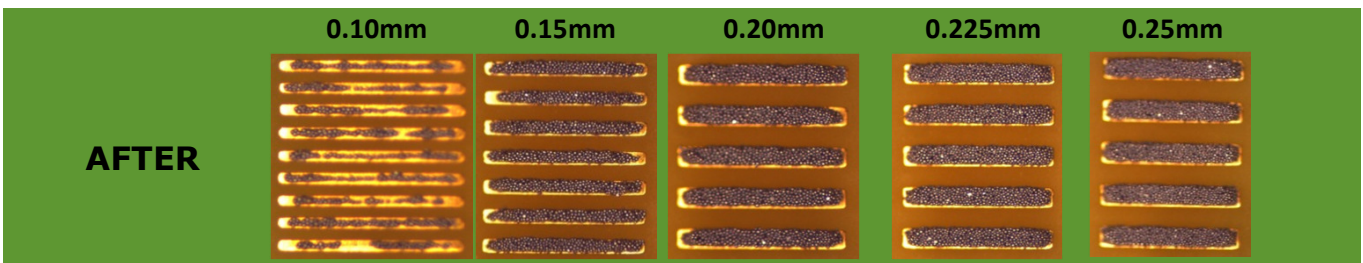
Pad	Defect Count
0.10mm	0
0.15mm	0
0.20mm	0
0.225mm	0
0.25mm	0

Hot Slump 0.15
Passing Result

150C slump fail
limit (0.30mm)

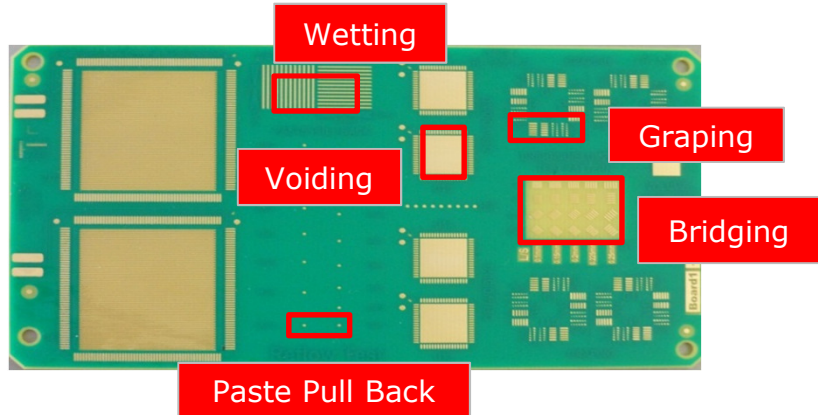


Hot Slump Test Board



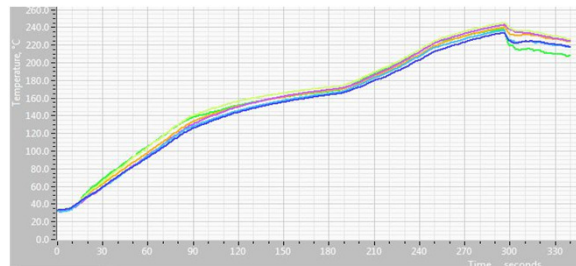
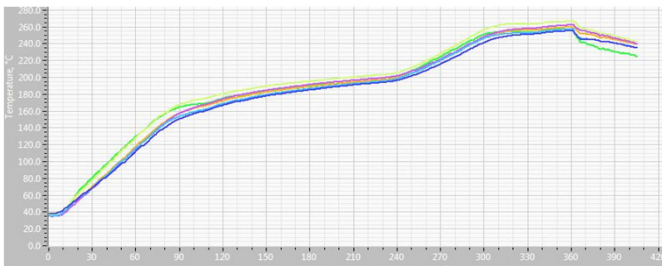


Inspection Area Overview

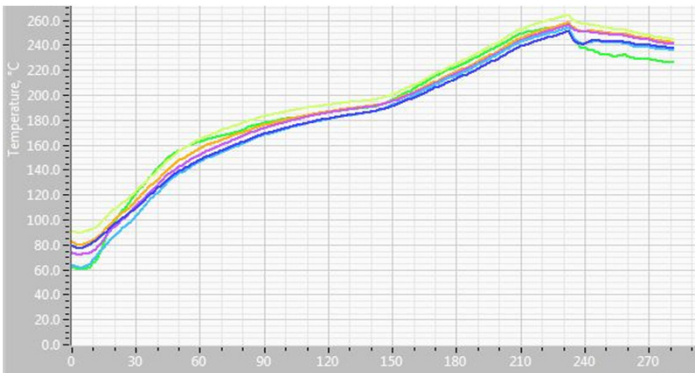


High Curve

Low Curve



Optimal Curve



Reflow Data (Graping)

NL932 Solder Paste

Graping Inspection

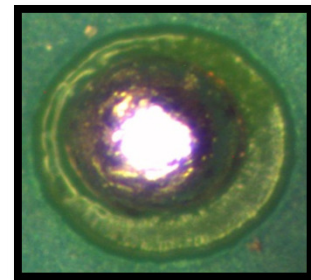
Measure the performance of graping on 96 pads with 1/2 being mask defined. Pad size varies from 7X7 mil to 12X12 mil. When counting the pads we identified the largest feature pad that showed the graping effect then counted all pads at this size and smaller. These are recorded in the tables below. Pads were on four different locations of the board.

Graping Comparison

<u>Product</u>	<u>Total Grapes</u>
NL932	29
NL938PT	50
NL930PT	37
WS889	62
Competitor A	102
Competitor B	61

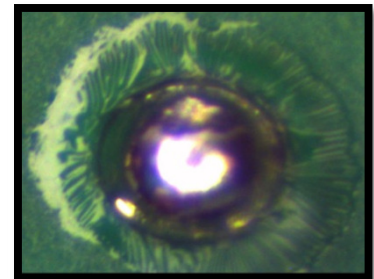
High

CRD	Brd 1	Brd 2	Brd 3	Brd 4	Total
G1	8	9	6	9	32
G7	12	11	8	13	44
G10	11	8	6	8	33
G15	13	9	7	5	34



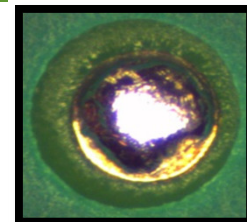
Low

CRD	Brd 1	Brd 2	Brd 3	Brd 4	Total
G1	7	5	5	8	25
G7	5	1	1	4	11
G10	4	3	5	5	17
G15	5	2	3	0	10



Optimal

CRD	Brd 1	Brd 2	Brd 3	Brd 4	Total
G1	4	5	3	1	13
G7	2	2	0	2	6
G10	0	1	4	2	7
G15	1	0	0	2	3

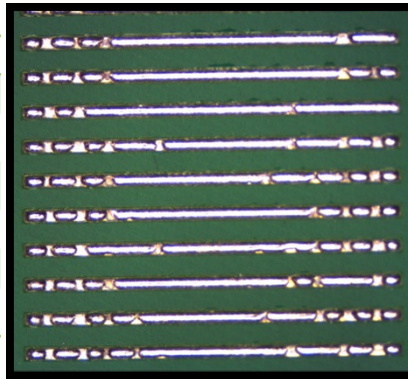


Reflow Data (Wetting)
NL932 Solder Paste
Wetting/Spread Inspection Test

In each of the wetting/spread areas we identified the number of lines that had one or more bridge of the solder bricks. The maximum number of lines is 24. We then measure the most bricks that were bridged in one line. These results are shown below.

High

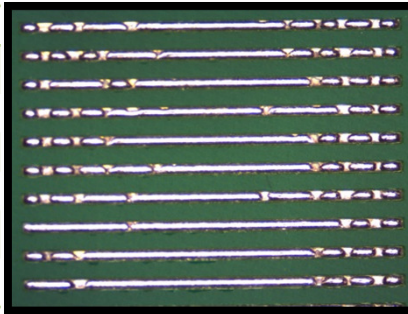
Board	Total Lines	Most on 1
1	24 out of 24	12 out of 15
2	24 out of 24	14 out of 15
3	24 out of 24	11 out of 15
4	24 out of 24	11 out of 15
Total	96 out of 96	48 out of 60


Wetting Comparison

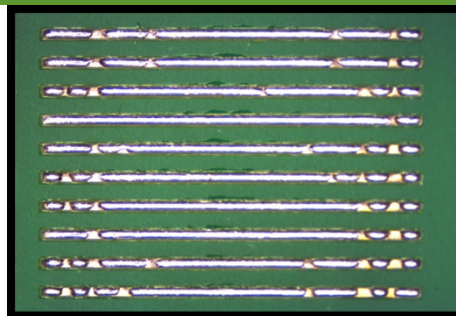
Product	Total	Most
NL932	24	11.75
NL938PT	24	14
NL930PT	24	14.5
WS889	24	5.5
Competitor A	24	12
Competitor B	24	11

Low

Board	Total Lines	Most on 1
1	24 out of 24	9 out of 15
2	24 out of 24	12 out of 15
3	24 out of 24	10 out of 15
4	24 out of 24	9 out of 15
Total	96 out of 96	40 out of 60


Optimal

Board	Total Lines	Most on 1
1	24 out of 24	12 out of 15
2	24 out of 24	13 out of 15
3	24 out of 24	11 out of 15
4	24 out of 24	11 out of 15
Total	96 out of 96	47 out of 60





Reflow Data (Solder Ball)

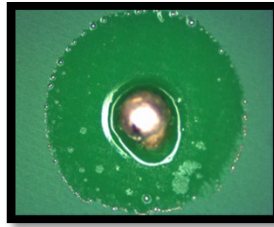
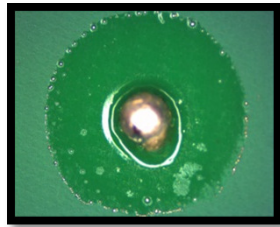
NL932 Solder Paste

Paste Pullback (Solder Ball)

Measure the performance by volume of the solder paste to pullback on a pad. The start of the volume was at 500% with the maximum being 1250%. Any solder ball that was found not coalescing with the rest of the solder was failed.

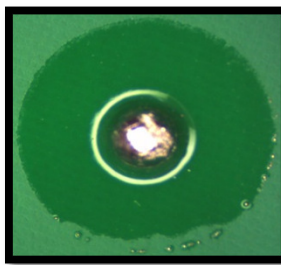
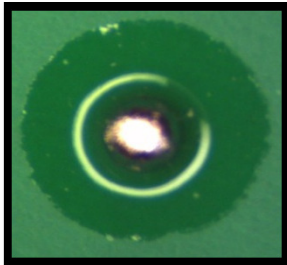
High

Board	Pad Size
1	525%
2	575%
3	525%
4	525%
Average	538%



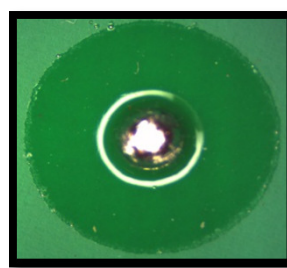
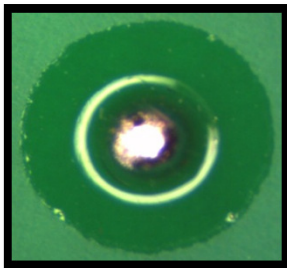
Low

Board	Pad Size
1	975%
2	775%
3	1125%
4	975%
Average	963%



Optimal

Board	Pad Size
1	1225%
2	975%
3	775%
4	725%
Average	925%



Paste Pullback Comparison

Product	Total
NL932	925%
NL938PT	1050%
NL930PT	525%
WS889	1225%
Competitor A	963%
Competitor B	525%





Reflow Data (Bridging)

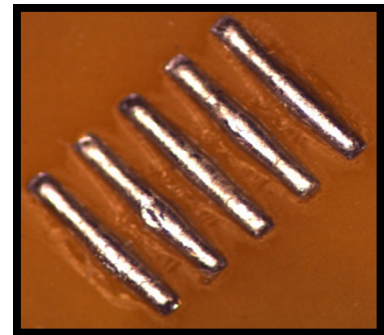
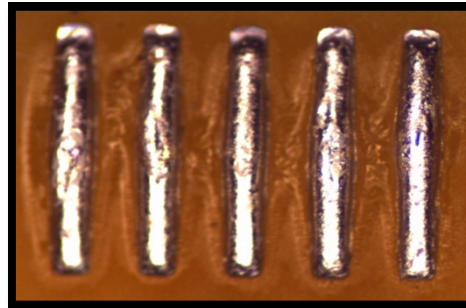
NL932 Solder Paste

Bridging Inspection

We measured the number of bridge occurrences and recorded in the tables below. We should note that the .1mm pads had minimal paste release which led to 0 bridges. Thus this pad offered no value in this study.

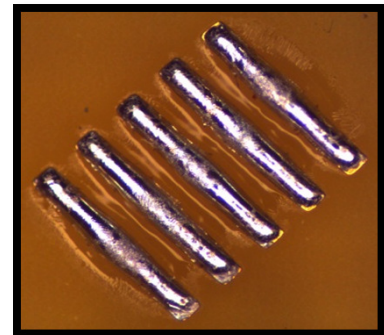
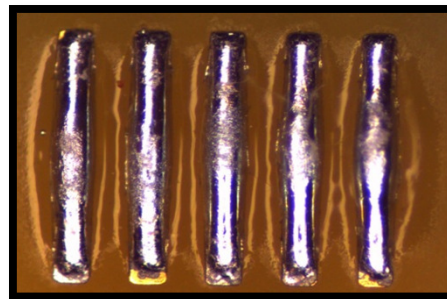
High

Board	Defect Count
1	0
2	1
3	6
4	4
Total	11



Low

Board	Defect Count
1	0
2	1
3	4
4	2
Total	7



Optimal

Board	Defect Count
1	0
2	0
3	0
4	2
Total	2

