



NL930PT Solder Paste

Alloy: **SAC305 Type 3** Metal Loading: **88.5%**
QC/Lot#: **23688** Mfg Date: **6/22/2012**

Contents

Section 1:	Summary
Section 2:	Standard Tests
Section 3:	Slump Data
Section 4:	Reflow Data

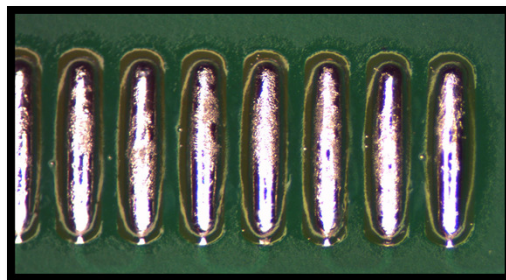
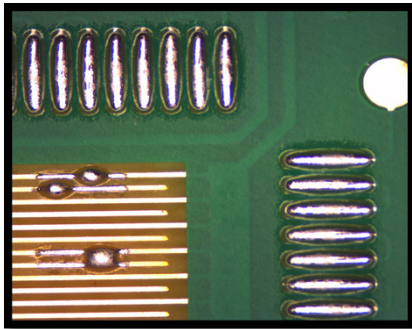
Summary

NL930PT is a No Clean Lead Free Solder Paste that leaves a clear residue that is pin probable. NL930PT is Halogen Free and classified as ROL0. Attributes compared to the other products that were tested are below:

- * Best wetting paste in study
- * Minimal graping
- * Very low slump combined with low viscosity
- * Good cosmetics with an average amount of residue
- * Exceptional pin probability

All around great performer for a no clean lead free paste that needs to be pin probable

Cosmetics





Standards Tests

NL930PT Solder Paste

Metal Loading

Metal 88.5%

Viscosity

Brookfield 650 Kcps
Malcom 170 Pa·s

Silver Chromate

Pass



Copper Mirror

Pass (No evidence of mirror breakthrough)

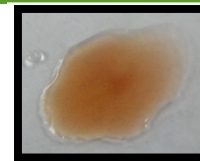


IPC Classification

ROLO

Flouride

Pass



Tack Testing

0 Hours	24 Hours	48 Hours	72 Hours	96 Hours
101.68	106.88	98.34	99.66	68.28

SIR

Pass

Electromigration

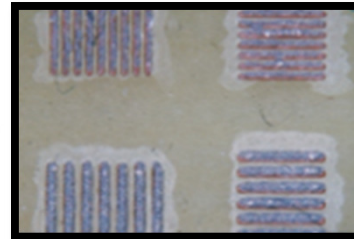
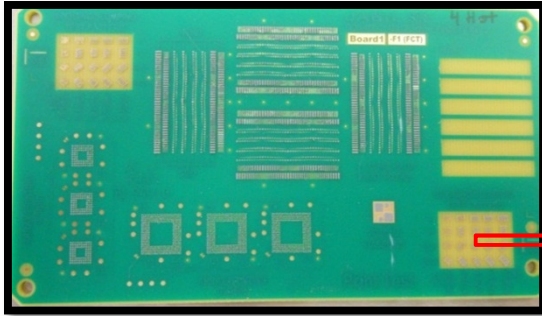
Pass





Cold Slump

NL930PT Solder Paste



Cold Slump

IPC Slump Results

Bridging Quantity

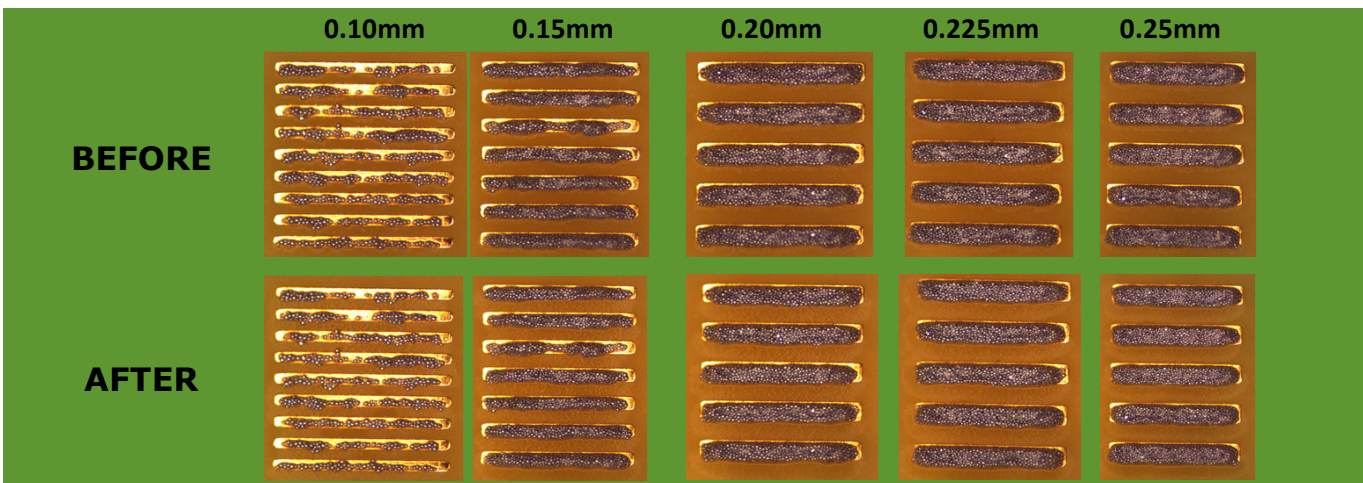
Pad	Defect Count
0.10mm	0
0.15mm	0
0.20mm	0
0.225mm	0
0.25mm	0

**Cold Slump 0.06
Passing Result**

25C slump fail
limit (0.25mm)



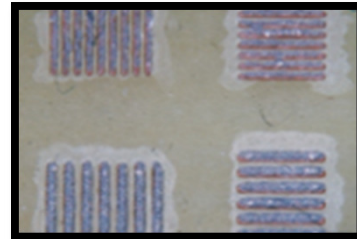
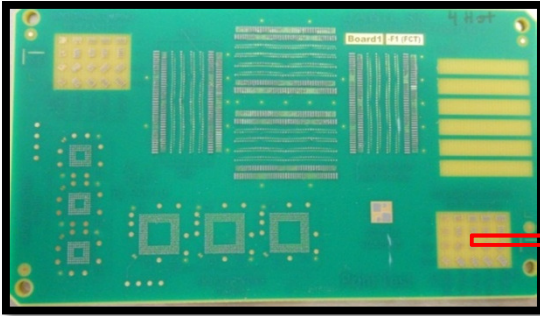
Cold Slump Test Board





Hot Slump

NL930PT Solder Paste



Hot Slump

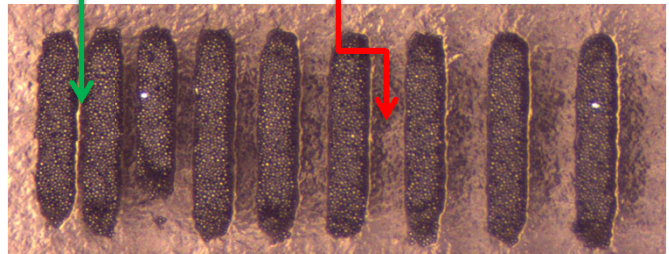
IPC Slump Results

Bridging Quantity

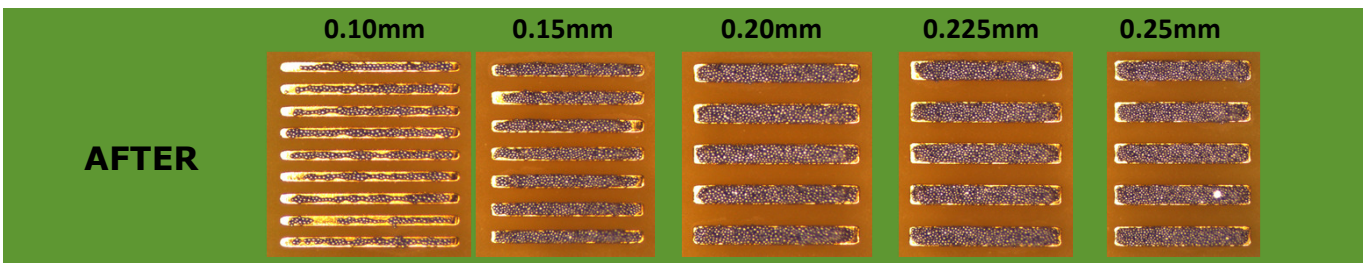
Pad	Defect Count
0.10mm	0
0.15mm	0
0.20mm	0
0.225mm	0
0.25mm	0

Hot Slump 0.06
Passing Result

150C slump fail
limit (0.30mm)

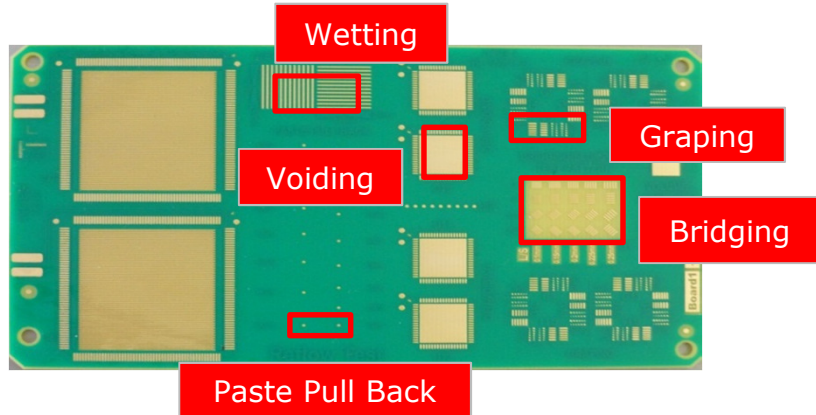


Hot Slump Test Board



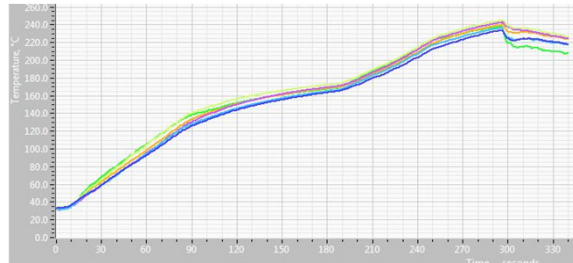
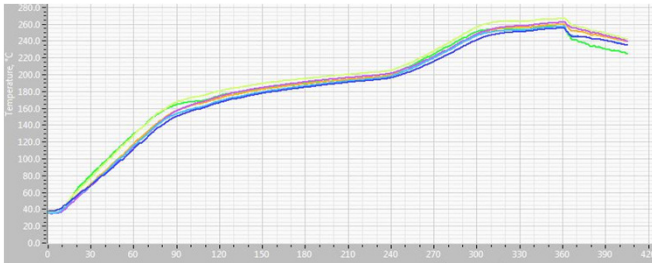


Inspection Area Overview

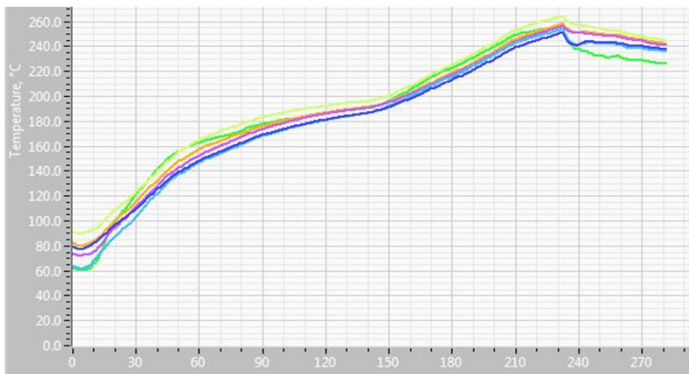


High Curve

Low Curve



Optimal Curve





Reflow Data (Graping)

NL930PT Solder Paste

Graping Inspection

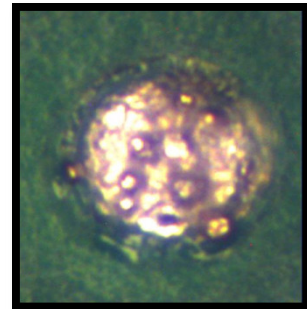
Measure the performance of graping on 96 pads with 1/2 being mask defined. Pad size varies from 7X7 mil to 12X12 mil. When counting the pads we identified the largest feature pad that showed the graping effect then counted all pads at this size and smaller. These are recorded in the tables below. Pads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

Graping Comparison

<u>Product</u>	<u>Total Grapes</u>
NL932	29
NL938PT	20
NL930PT	37
WS889	62
Competitor A	102
Competitor B	61

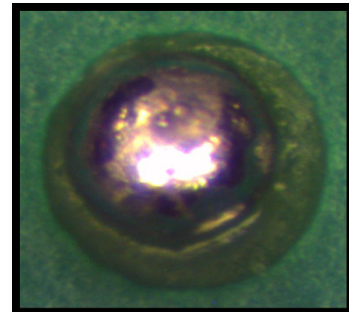
High

CRD	Brd 1	Brd 2	Brd 3	Brd 4	Total
G1	10	6	9	6	31
G7	9	9	12	9	39
G10	13	6	12	9	40
G15	8	7	9	8	32



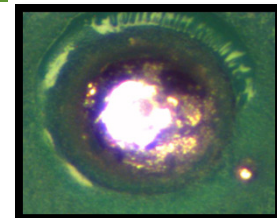
Low

CRD	Brd 1	Brd 2	Brd 3	Brd 4	Total
G1	9	5	5	5	24
G7	10	4	3	3	20
G10	13	2	2	4	21
G15	7	3	0	2	12



Optimal

CRD	Brd 1	Brd 2	Brd 3	Brd 4	Total
G1	1	3	1	0	5
G7	2	2	2	2	8
G10	4	4	1	3	12
G15	5	2	1	4	12

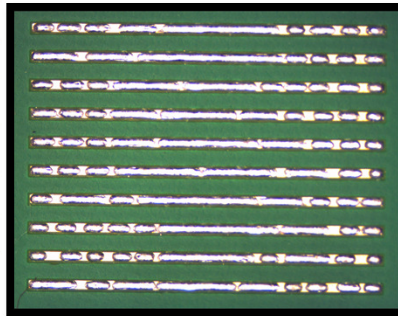


Reflow Data (Wetting)
NL930PT Solder Paste
Wetting/Spread Inspection Test

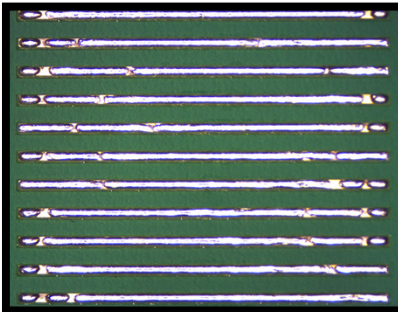
In each of the wetting/spread areas we identified the number of lines that had one or more bridge of the solder bricks. The maximum number of lines is 24. We then measure the most bricks that were bridged in one line. These results are shown below.

High

Board	Total Lines	Most on 1
1	24 out of 24	13 out of 15
2	24 out of 24	15 out of 15
3	24 out of 24	14 out of 15
4	24 out of 24	14 out of 15
Total	96 out of 96	56 out of 60


Low

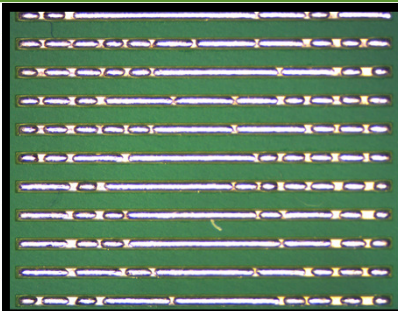
Board	Total Lines	Most on 1
1	24 out of 24	14 out of 15
2	24 out of 24	14 out of 15
3	24 out of 24	13 out of 15
4	24 out of 24	13 out of 15
Total	96 out of 96	54 out of 60


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

Optimal

Board	Total Lines	Most on 1
1	24 out of 24	15 out of 15
2	24 out of 24	15 out of 15
3	24 out of 24	14 out of 15
4	24 out of 24	14 out of 15
Total	96 out of 96	58 out of 60





Reflow Data (Solder Ball)

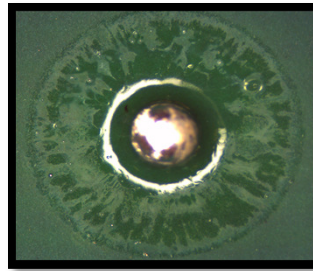
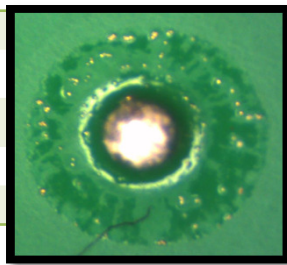
NL930PT Solder Paste

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.

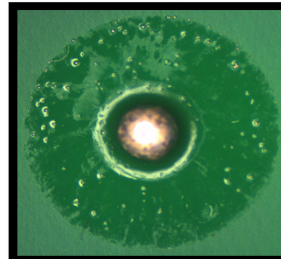
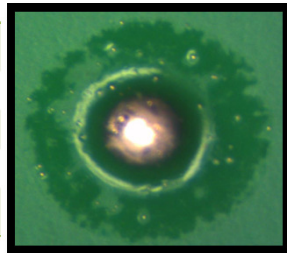
High

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



Low

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

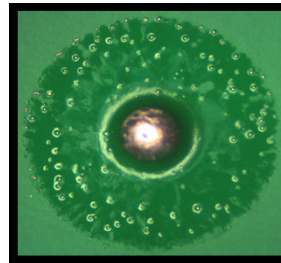
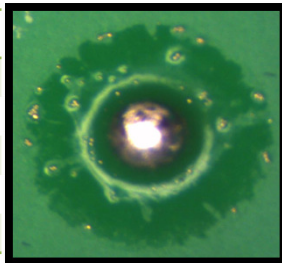


Paste Pullback Comparison

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

Optimal

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





Reflow Data (Bridging)

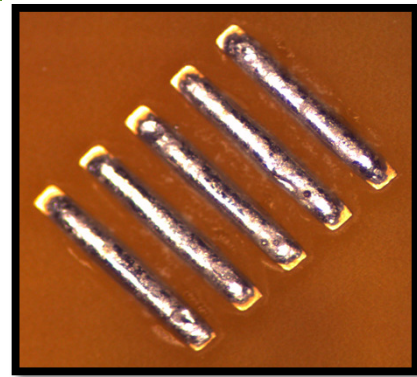
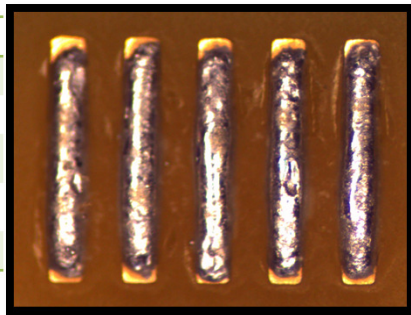
NL930PT Solder Paste

Bridging Inspection

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

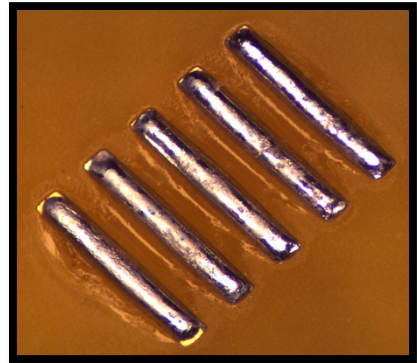
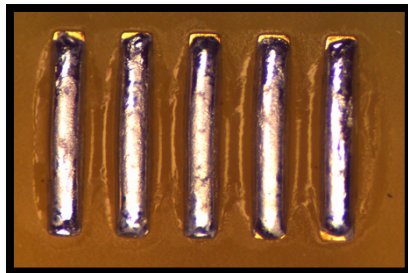
High

Board	Defect Count
1	0
2	0
3	6
4	4
Total	10



Low

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



Optimal

Board	Defect Count
1	0
2	1
3	7
4	5
Total	13

