

TEST REPORT

N° : R 04 – 035D

December 29th, 2004

SUBJECT: Comparative Tin-lead and Lead free sampling

- Tin lead and “Lead free” SUB contact crimps
- Mechanical and environmental tests.

-Signal contact
8656 family



-Power contact
8638 family

Distribution List

P LEGARE
A BALE
L MAILLET
M PESSON

SUMMARY

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A . Test program and sampling plan :

Power contact

To avoid cabling influence on these 2 batches : one current with tin-lead and the other with only tin, we used the same cable and most important, we used the same application crimp tool.

This one was : 8638CTP01

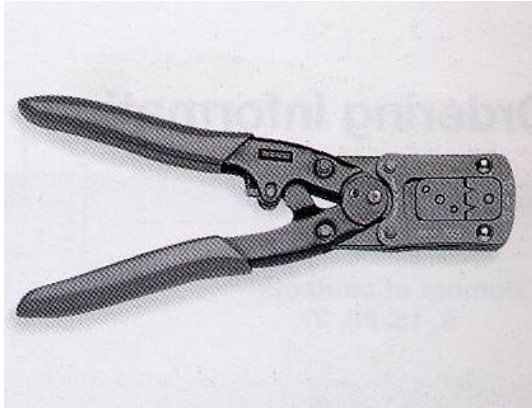


CRIMP Power contact version		
TESTS	SAMPLES	REQUIREMENTS
Visual examination	8638-PSC-3005 8638-PSC-3005 LF	No damage after visual inspection (binocular x 10) IEC 60512-2, Test n°1a (or IEC 60512-1-1)
Mechanical test tensile strength	20 contacts each, crimped on 5.56 mm ² section cable	Tensile strength Force 600N IEC 60512-8 Test n° 16d
Tin Whisker Formation Inspection	8638-PSC-3005 LF 10 contacts crimped on 5.56 mm ² section cable	Initial inspection
		Environmental exposure according to GS-19-028
		Final inspection (each month for 6 month) according to GS-19-028 § 5.5.1

Signal contact

To avoid cabling influence on these 2 batches : one current with tin-lead and the other with only tin, we used the same cable and most important, we used the same application crimp tool.

This one was : 8656 3005



CRIMP Signal contact version			
TESTS	SOCKET SAMPLES	PIN SAMPLES	REQUIREMENTS
Visual examination	8656-6110-ARF 8656-6110-ARFLF	8656-4110-ARF 8656-4110-RFLF	No damage after visual inspection (binocular x 10) IEC 60512-2, Test n°1a (or IEC 60512-1-1)
Conducting grip mechanical test	20 contacts each, crimped on 0.597mm ² cable	20 contacts each, crimped on 0.597mm ² cable	Tensile strength Force 66N IEC 60512-8 Test n° 16d
Tin Whisker Formation Inspection	8656-6110-ARFLF 10 contacts crimped on 0.597mm ² cable	8656-4110-RFLF 10 contacts crimped on 0.597mm ² cable	Initial inspection
			Environmental exposure according to GS-19-028
			Final inspections (each month for 6 month) according to GS-19-028 § 5.5.1

B . Tested P/N :

Signal cable reference: 20 AWG-7/28 AWG (0.597mm²) UL 1061 (300V 80° C)

Power cable reference: 10 AWG-105/30 AWG (5.56mm²) UL 1015 (600V 105° C)

Socket signal contacts :

8656 6110 ARF LF (lead free) : 1,27μ min Ni + 2μ min matte tin

8656 6110 ARF (Sn Pb) : 1μ min Ni + 2μ min tin lead

Pin signal contacts :

8656 4110 ARF LF (lead free) : 1,27μ min Ni + 2μ min matte tin

8656 4110 ARF (Sn Pb) : 1μ min Ni + 2μ min tin lead

Pin Power contacts :

8638 PSC 3005 LF (lead free) : 2μ min Cu + 2μ min tin

8638 PSC 3005 (Sn Pb) : 2μ min Cu + 2μ min tin lead

C . Test method :

1. Mechanical test:

Tensile strength in accordance with IEC 60512-8 Test n° 16d

Part number 8638

Tensile strength Force 600N minimum:

Test and values reading on Zwick / Z010 tensile machine and displacement Force Sensor 10 kN

Part number 8656

Tensile strength Force 66N minimum:

Test and values reading on Zwick / Z010 tensile machine and displacement Force Sensor 500 N

2. Tin whisker formation:

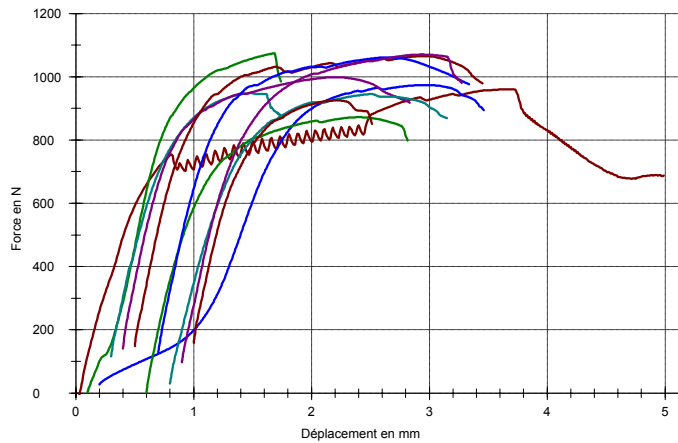
Environmental exposure and final inspection according to GS-19-028

D . Requirements and test results :

D1) SUB Power contacts 8638:

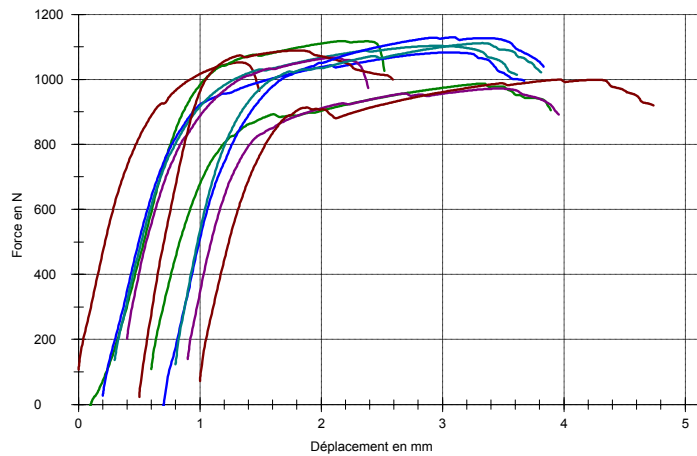
SnPb contact Tensile strength :

Nr	F Maxi N	Série n = 11	F Maxi N
1	960.73	max	1073.90
2	1073.90	min	872.11
3	973.72	x	990.38
4	948.00		
5	998.53		
	1065.37		
7	872.11		
8	1061.28		
9	945.31		
10	1070.46		
11	924.81		



Lead Free contact Tensile strength:

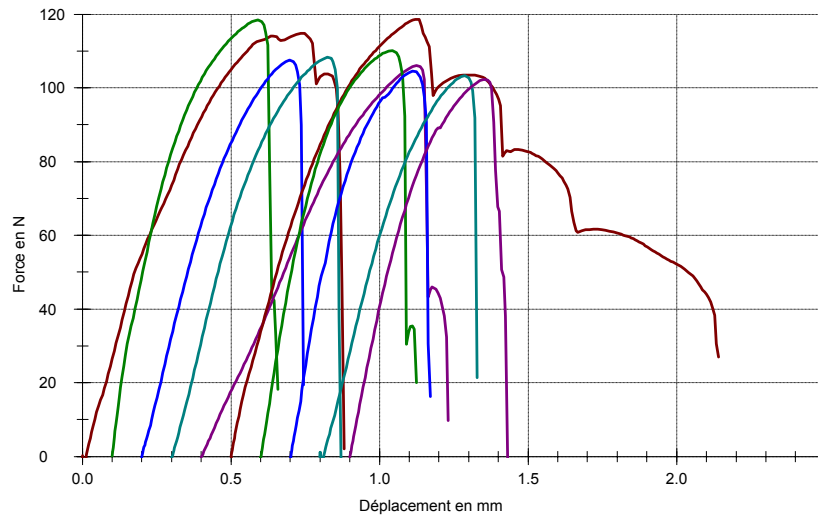
Nr	F Maxi N	Série n = 11	F Maxi N
1	1052.05	max	1129.84
2	1118.22	min	971.38
3	1083.05	x	1064.51
4	1102.72		
5	1066.75		
6	1088.45		
7	987.00		
8	1129.84		
9	1111.10		
10	971.38		
11	999.09		



D2) SUB Signal contacts 8656:

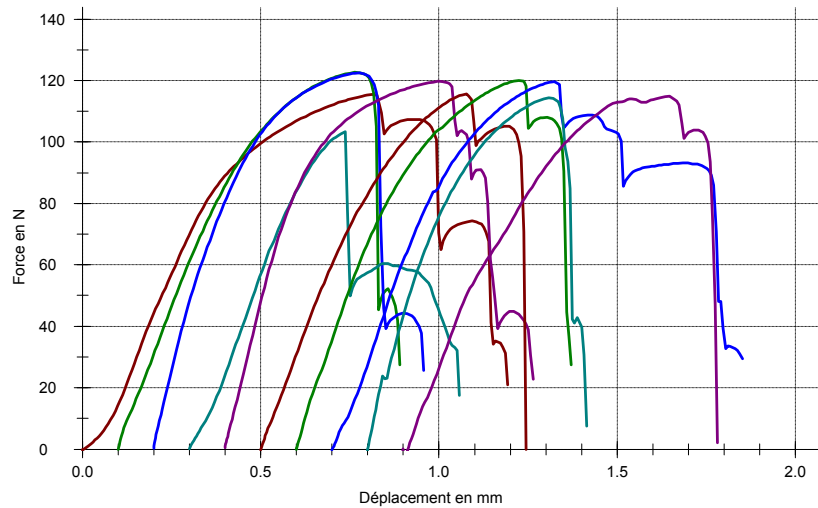
Socket SnPb contact Tensile strength:

Nr	F Maxi N	Série n = 10	F Maxi N
max		max	118.61
min		min	102.28
1	114.85	x	109.40
2	118.43		
3	107.52		
4	108.31		
5	106.08		
6	118.61		
7	110.12		
8	104.53		
9	103.31		
10	102.28		



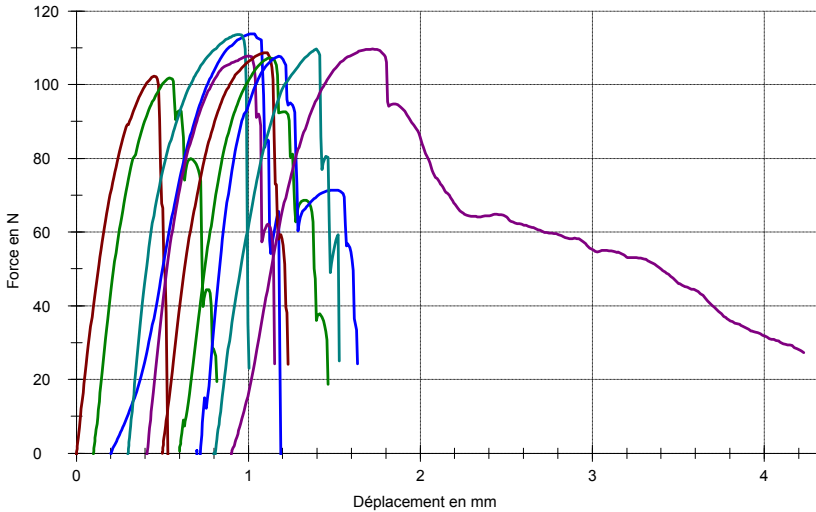
Socket Lead Free contact Tensile strength :

Nr	F Maxi N	Série n = 10	F Maxi N
max		max	122.64
min		min	103.40
1	115.41	x	116.83
2	122.64		
3	122.54		
4	103.40		
5	119.76		
6	115.59		
7	120.07		
8	119.58		
9	114.43		
10	114.85		



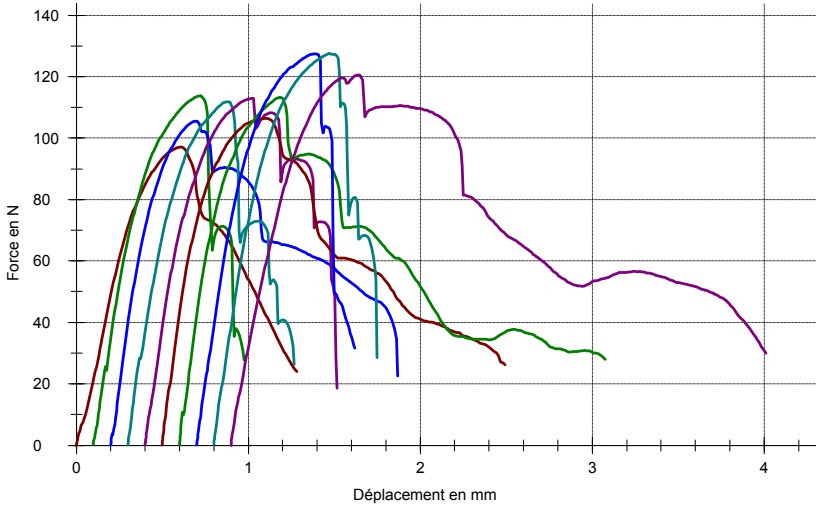
Pin SnPb contact Tensile strength:

Nr	F Maxi N	Série n = 10	F Maxi N
max		max	113.81
min		min	101.78
1	102.28	x	108.20
2	101.78		
3	113.81		
4	113.61		
5	107.76		
6	108.66		
7	107.18		
8	107.66		
9	109.61		
10	109.63		



Pin Lead Free contact Tensile strength :

Nr	F Maxi N	Série n = 10	F Maxi N
max		max	127.58
min		min	97.11
1	97.11	x	113.65
2	113.76		
3	105.51		
4	111.92		
5	112.89		
6	106.38		
7	113.29		
8	127.49		
9	127.58		
10	120.60		



D3) Whiskers formation inspection:

Tests on these crimped contacts are still running. Due to the duration of this test, no results are available at this time.

E . Conclusion :

There is no performance difference between tin lead and tin plating contacts for D sub crimp contacts : signal (8656 family) and power (8638 family).

There is no visual difference on crimped zones and all the strength performance levels are in accordance with the required specifications.

The whisker growth test is still underway therefore no results are available.

Tested samples are available in CDC Sarthe LABORATORY