

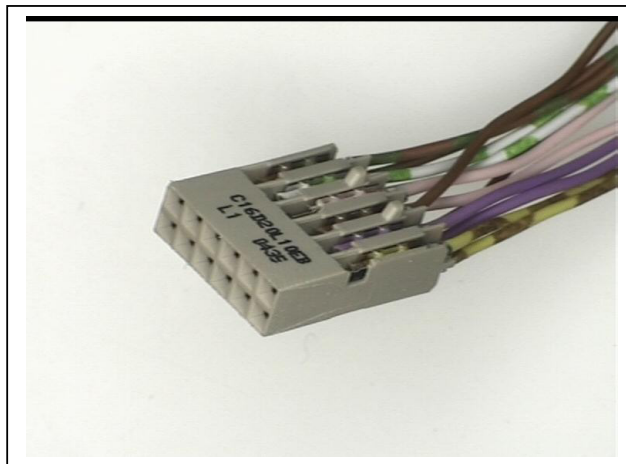
# TEST REPORT

N° : R 04-039A

December, 28th 2004

**SUBJECT:**

- Sofix connectors
  
- Lead free qualification on IDC Sofix contacts  
Comparative tests on tin lead and tin plating contacts



**Distribution List**

Legare Philippe  
Taron Joël

SUMMARY

	Sheets
A. Tested P/N.....	3
B. Test program and sampling plan.....	4
C. Test method.....	5 - 6
D. Requirements and test results.....	7 - 10
E. Conclusion.....	10

**A . Tested P/N :**

**The target of this test is to do comparative tests with current Sofix IDC contacts plated with tin lead and future Sofix IDC contacts plated with only tin .**

<b>Batch definition</b>	<b>Qty</b>	<b>Samples</b>	<b>P/N</b>	<b>Contact plating definition</b>
Batch N°1	1	Connector IDC	D20L10EB	2-5µm 93-7 SnPb IDC zone 2 µm Au min over 2.5 µm Ni contact area zone
	1	Connector IDC	D20L10EBLF	2-4µm Sn over 2.5 µm Ni min IDC zone 2 µm Au min over 2.5 µm Ni contact area zone
Batch N°2	1	Connector IDC	D20L10EB	2-5µm 93-7 SnPb IDC zone 2 µm Au min over 2.5 µm Ni contact area zone
	1	Connector IDC	D20L10EBLF	2-4µm Sn over 2.5 µm Ni min IDC zone 2 µm Au min over 2.5 µm Ni contact area zone
Batch N°3	1	Connector IDC	D20L10EB	2-5µm 93-7 SnPb IDC zone 2 µm Au min over 2.5 µm Ni contact area zone
	1	Connector IDC	D20L10EBLF	2-4µm Sn over 2.5 µm Ni min IDC zone 2 µm Au min over 2.5 µm Ni contact area zone
	1	Connector IDC	D20R10EB	2-5µm 93-7 SnPb IDC zone 2 µm Au min over 2.5 µm Ni contact area zone
	1	Connector IDC	D20R10EBLF	2-4µm Sn over 2.5 µm Ni min IDC zone 2 µm Au min over 2.5 µm Ni contact area zone

**B . Test program and sampling plan :**

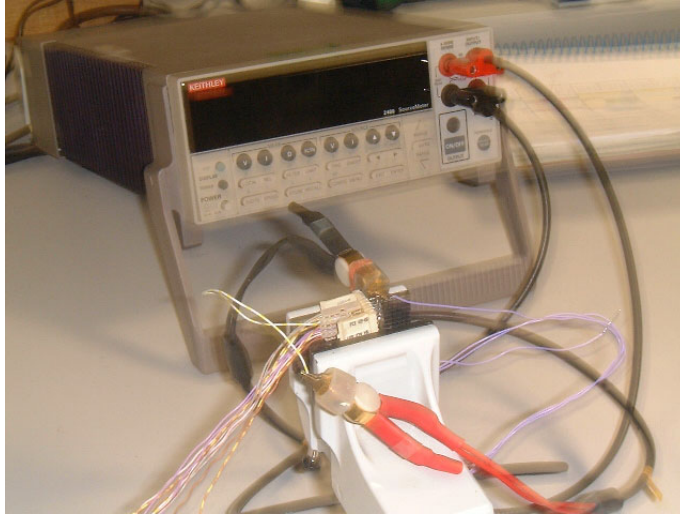
The following tests have been made :

SAMPLE	TESTS	REQUIREMENTS
Batch N°1	Initial visual examination	No defect acc. to GS-20-002 (microscope x10)
	Contact resistance	Rc < 30 mΩ acc. to 1301-RNV-421 Uen §3.4.4
	Bending of wire	No electrical discontinuity higher than 1 microsecond acc. to IPC-TM-650 METHOD 3.7
	Rapid change of temperature	-55°C +100°C during 30mn Nb of cycles:5 acc. to IEC-60512-6 test 11d
	Damp heat - cyclic	+55°C Nb of cycles:6 during 24 hours acc. to IEC-60512-6 test 11m V2
	Contact resistance	ΔRc < 10 mΩ acc. to 1301-RNV-421 Uen §3.4.4
Batch N°2	Initial visual examination	No defect acc. to GS-20-002
	Transverse extraction force	8.9N minimum acc. to GS-12-016 §7.4
Batch N°3	Initial visual examination	No defect acc. to GS-20-002
	Heat ageing (tin whisker formation)	Environmental exposure acc. to GS-19-028
	Visual examination	Final inspections (each month for 6 month) acc. to GS-19-028 § 5.5.1
	Voltage breakdown	1000 V. acc. to IEC-60512-2 test 4a

**C . Test method :**

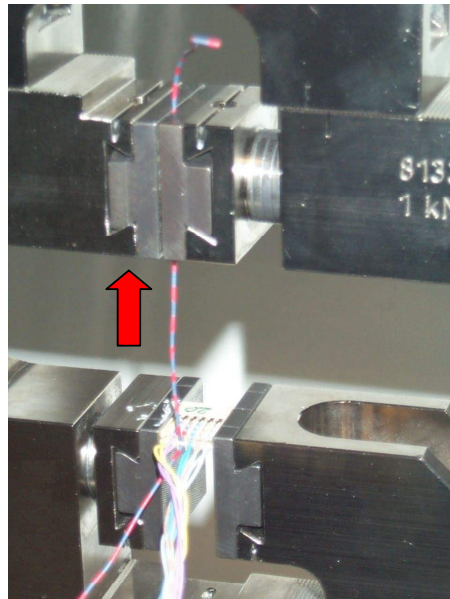
**1. Contact resistance:**

Tests performed with a micro-ohmmeter Keithley in accordance with 1301-RNV-421 Uen §3.4.4



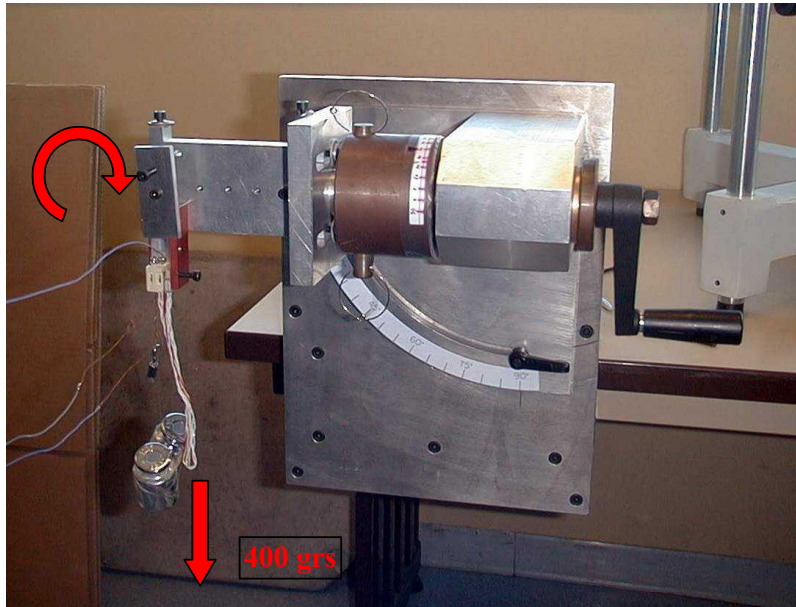
**2. Transverse extraction force:**

Tests performed with the tensile machine Zwick/Z010 in accordance with GS-12-016 §7.4



**3. Bending of wire:**

Tests are performed with a pivoting system and an Oscilloscope DL 154 Alim. 200mA in accordance with IPC-TM-650 METHOD 3.7

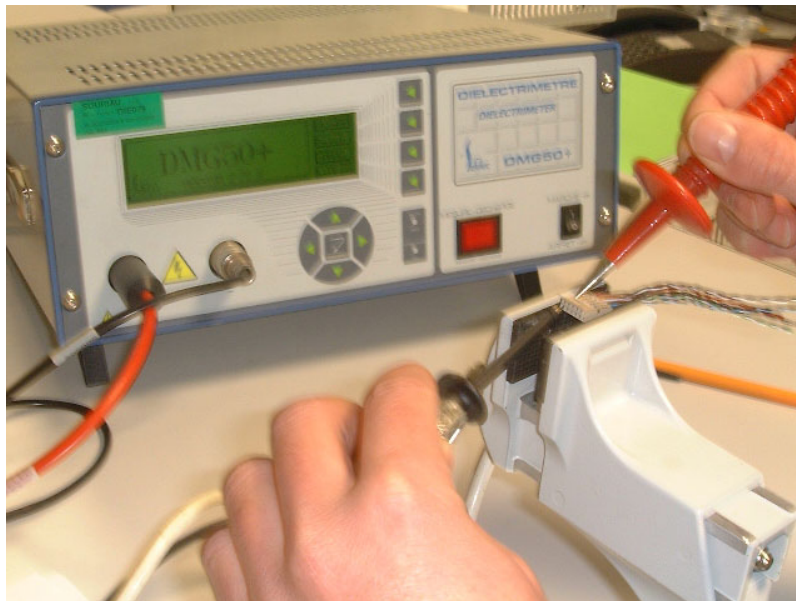


**4. Tin whisker formation:**

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

**5. Voltage breakdown:**

Tests are performed with a dielectrimeter DMG50+ in accordance with IEC-60-512-2 test 4a



**D . Requirements and test result :**

**1. Initial visual inspection:**

Requirements: No visual defect on samples according to GS-20-002

Result: No visual defect on all the batches : N°1, N°2 and N°3

**2. Batch N°1 initial contact resistance:**

Requirements:  $R_c < 30m\Omega$  according to 1301-RNV-421 Uen §3.4.4

Ref. D20L10EBLF				
Sample	Row A	column	Row B	column
1	9.4	a1	8.7	b1
	12.1	a2	12.1	b2
	11.6	a3	10.6	b3
	8.8	a4	8.4	b4
	12.4	a5	11.5	b5
	10.7	a6	8.9	b6
Lot D20L10EB				
Sample	Row A	column	Row B	column
1	9.7	a1	8.9	b1
	13.7	a2	12.8	b2
	9.9	a3	10	b3
	10.8	a4	11	b4
	10.1	a5	9.3	b5
	9.6	a6	8.7	b6

**3. Batch N°1 bending of wire (45° lateral flex test):**

Requirements: No electrical discontinuity higher 1 microsecond

Result: No electrical discontinuity detected

**4. Batch N°1 rapid change of temperature (thermal shock):**

Requirements: Rapid change of temperature -55°C +100°C during 30mn Nb of cycles:5  
 according to IEC-60-512-6 test 11d

Results: test realised in FCI Epernon laboratory, see annexe

**5. Batch N°1 Damp heat - cyclic:**

Requirements: Damp heat cyclic+55°C Nb of cycles:6 during 24 hours  
 according to IEC-60-512-6 test 11m V2

Results: test realised in FCI Epernon laboratory, see annexe

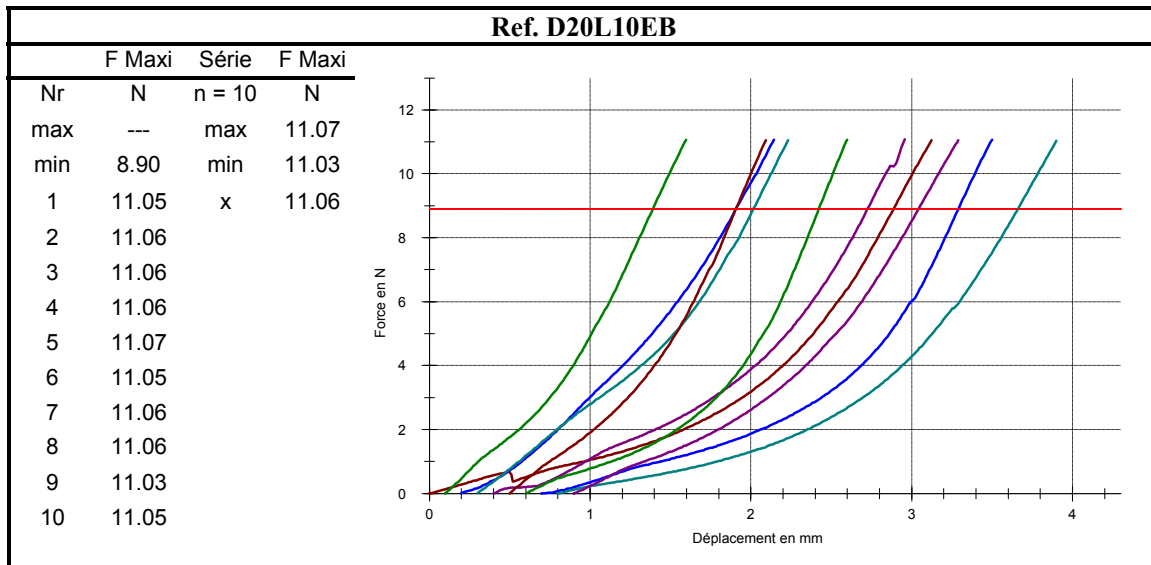
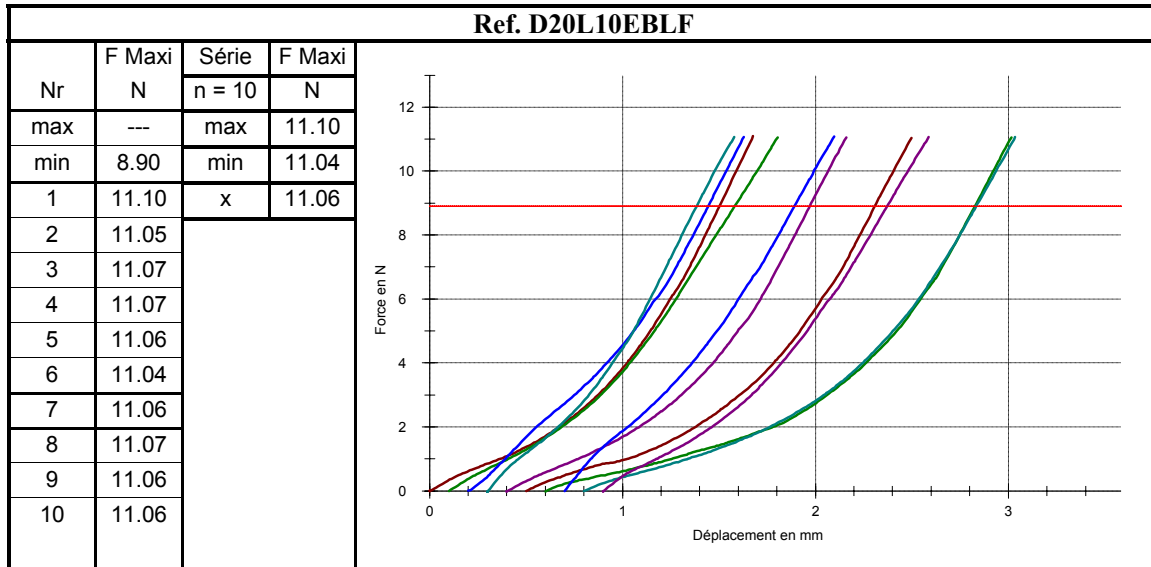
**6. Batch N°1 final contact resistance:**

Requirements:  $\Delta R_c < 10m\Omega$  according to 1301-RNV-421 Uen §3.4.4

<b>Ref. D20L10EBLF</b>								
<b>Sample</b>	<b>Row A initial</b>	<b>Row A final</b>	<b><math>\Delta R_c</math></b>	<b>column</b>	<b>Row B initial</b>	<b>Row B final</b>	<b><math>\Delta R_c</math></b>	<b>column</b>
<b>1</b>	9.4	8.7	<b>0.7</b>	a1	8.7	8.7	<b>0</b>	b1
	12.1	7.7	<b>4.4</b>	a2	12.1	6.4	<b>5.7</b>	b2
	11.6	9	<b>2.6</b>	a3	10.6	7.7	<b>2.9</b>	b3
	8.8	10.4	<b>1.6</b>	a4	8.4	10.7	<b>2.3</b>	b4
	12.4	9.3	<b>3.1</b>	a5	11.5	9	<b>2.5</b>	b5
	10.7	9.3	<b>1.4</b>	a6	8.9	9.9	<b>1</b>	b6
<b>Ref. D20L10EB</b>								
<b>Sample</b>	<b>Row A initial</b>	<b>Row A final</b>	<b><math>\Delta R_c</math></b>	<b>column</b>	<b>Row B initial</b>	<b>Row B final</b>	<b><math>\Delta R_c</math></b>	<b>column</b>
<b>1</b>	9.7	12.5	<b>2.8</b>	a1	8.9	6.5	<b>2.4</b>	b1
	13.7	11.2	<b>2.5</b>	a2	12.8	8.1	<b>4.7</b>	b2
	9.9	10.8	<b>0.9</b>	a3	10	12.4	<b>2.4</b>	b3
	10.8	9.3	<b>1.5</b>	a4	11	9.8	<b>1.2</b>	b4
	10.1	11.3	<b>1.2</b>	a5	9.3	11.1	<b>1.8</b>	b5
	9.6	12.2	<b>2.6</b>	a6	8.7	12.9	<b>4.2</b>	b6

**7. Batch N°2 Transverse extraction force:**

Requirements: 8.9N minimum according to GS-12-016 §7.4



**8. Batch N°3 Whiskers formation inspection:**

Tests on this batch are still running. Due to the duration of this tests, no results are available at this time

**9. Batch N°3 Voltage breakdown:**

Tests will be done after whiskers formation inspection.

**E . Conclusion :**

**There is no difference between tin lead and tin plated contacts for IDC Sofix contacts. All the contact resistance, the transverse extraction force and wire bending measurements are in accordance with the required specifications after the rapid change of temperature (thermal shocks) and damp heat – cyclic tests. The whisker growth test is still underway, therefore no results are available.**

Tested samples are available in CDC Sarthe LABORATORY

**ANNEXE**



"120241ed1terminal  
block.pdf"