

**AMP**

ENVIRONMENTAL TESTING LABORATORY

<b>Job Number:</b> E96.01.03.	<b>Project Number:</b> 640082.	<b>Date of issue:</b> April 1996.
<b>Description:</b> Micro-MaTch, SMD. Female In-board. (Qualification test)		<b>Part numbers:</b> 1-188431-4 rev. 0

**Scope:**

To determine the mechanical and electrical performance of the Micro-MaTch SMD, when the connector is tested according to the AMP Product Specification 108-19052 Rev. B.

**Conclusions:**

The measuring results of the tests meet the requirements according to the AMP Product Specification 108-19052, rev. B.

NOTE: This result applies to all Micro-MaTch SMD connectors with partnumber X-188431-X.

**Test Specification:** AMP Product Specification 108-19052, rev. B.

**Test Carried Out:** 1 see pages 3-4.  
2  
3

**Distribution:** 1 E. Leytens.  
2 Doc. center.  
3 File LAB.

**Test Engineer:** J. Peetjens.  **Requested by:** Product Engineering

**Laboratory Manager:** D.M.J. Jooren. **Classification:** Unrestricted.

**Disposal of Samples:** File LAB. **Report Number:** R 041 - 1847.

**Appendices:** **Page 1 of 16 Pages**



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    Solderability: ..... 4

    Resistance to soldering heat: ..... 4

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**SAMPLE DESCRIPTION:**

Testgroups 1, 2 and 3, in this report indicated as InB1, InB2 and InB3, consist of five 14 position female-in-board Micro-MaTch SMD connectors (lot 1..5) soldered, with solder pasta used for reflow-process, on AMP test printed circuit boards.

-Micro-MaTch: P/N: 1-188431-4, revision code 0.

-Dispenser: EFD 1000 XLE.

-Pasta: Multicore, RMA Soldercream for auto dispensing, type SN62.

-Oven: Heraeus T5042EK.

-PCB: AMP test printed circuit board (epoxy), number 5LH-014-100.

Testgroups 4 and 6, in this report indicated as InB4 lot 1..5 and InB6 lot 1..5, consist of five 20 position female-in-board Micro-MaTch SMD connectors.

-Micro-MaTch: P/N: 1-188431-4, revision code 0.

Testgroup 5; the samples of testgroups 1, 2 and 3 are used to examine the solderability.

**TESTPROCEDURES:**

512-2-2a:

**Termination resistance:**

The termination resistance was measured with an open circuit voltage of 20 mVolt and a maximum current of 100 mA DC. For measuring points see fig. 1a (testgroup 1, 3) and fig. 1b (testgroup 2) on page 3.

512-2-3a:

**Insulation resistance: (Method C)**

This measurement was done with a programmable electrometer. Measuring voltage was 100 Volt during one minute.

512-2-4a:

**Voltage proof:**

This measurement was done with a high voltage tester. The test duration was one minute at 500 V<sub>AC</sub>.

512-6-11m:

**Damp heat cyclic:**

The samples were subjected to a damp heat cyclic test under the following conditions:

Upper temperature : 55 °C for 12 hours.

Lower temperature : 25 °C for 12 hours.

Relative humidity : 95%.

Condition : Unmated.

Number of cycles : 6.

512-6-11j:

**Cold:**

The samples were subjected to a temperature of -40°C during 2 hours.

512-6-11i:

**Dry heat:**

The samples were subjected to a dry heat test under the following conditions:

Temperature : 105 °C.

Conditions : Unmated.

Duration : 16 hours.

512-6-11d:

**Rapid change of temperature:**

The samples were subjected to a rapid change of temperature test under the following conditions:

One cycle consists of:

Upper temperature : 105 °C for 15 minutes.

Lower temperature : -40 °C for 15 minutes.

Conditions : Unmated.

Number of cycles : 10

**AMP**

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- 512-5-9a: **Mechanical operation:**  
The samples were mated and unmated for 20 times with a maximum rate of 10 cycles per minute.
- 512-4-6d: **Vibration:**  
The samples were mounted on a vibration table. The frequency was traversed from 10-55-10 Hz with one octave per minute. The samples were vibrated with an amplitude of 0,75 mm. The duration was 10 cycles in each of the three mutually perpendicular directions. Interruption of continuity greater than 1 micro-second were detected.
- 512-8-15a: **Contact retention in housing:**  
The contact retention force was measured on the push-pull tester.
- EIA RCX-0102/101: **Solderability:**  
The samples were soldered on the PCB's according to the reflow soldering method (Para 2.4.2).
- EIA RCX-0102/101: **Resistance to soldering heat:**  
The samples were subjected to a temperature of  $300 \pm 5^\circ\text{C}$  for 3 sec (Para. 3.3.4.)

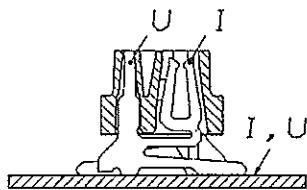


Figure 1a.

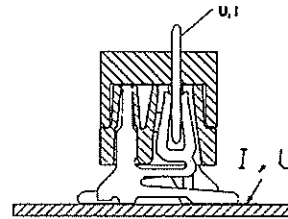


Figure 1b.

**TESTSEQUENCE:****Testgroup 1**

Visual examination  
 Preconditioning  
 Termination resistance  
 Insulation resistance  
 Voltage proof  
 Climatic sequence  
   Dry heat  
   Damp heat cyclic, 1 cycle  
   Cold  
   Damp heat cyclic, 5 cycles  
 Termination resistance  
 Insulation resistance  
 Voltage proof  
 Rapid change of temperature  
 Termination resistance  
 Insulation resistance  
 Voltage proof  
 Visual examination

**Testgroup 2**

Visual examination  
 Termination resistance  
 Mechanical operation  
 Termination resistance  
 Damp-heat cyclic  
 Termination resistance  
 Visual examination

**Testgroup 3**

Visual examination  
 Termination resistance  
 Rapid change of temperature  
 Termination resistance  
 Vibration  
 Termination resistance  
 Visual examination

**Testgroup 4**

Visual examination  
 Contact retention in housing  
 Visual examination

**Testgroup 5**

Visual examination  
 Solderability  
 Visual examination

**Testgroup 6**

Visual examination  
 Resistance to soldering heat  
 Visual examination

**EQUIPMENT USED:**

<u>Equipment</u>	<u>Producer</u>	<u>Type</u>	<u>Series Nb</u>	<u>Cal Due.</u>
Push pull tester	AMP	MkI	Blue	
Force measuring system	HBM	KWS 3073	07057	each use.
Oven	Heraeus	T5042EK	7600793	12-99.
Oven	Heraeus	UT6060	9102050	11-96.
Climatic chamber (TS)	Weiss	64/80DUST	224/17413	11-96.
Climatic chamber	Weiss	125SBDU70	200776	11-96.
Micro-ohmmeter	Keithley	580	374687	11-96.
Desk top computer	H.P	Serie 300	C165/85	
High voltage tester	Sefelec	PR-12-NN	264	02-96.
Accelerometer	B & K	4371	650308	12-97.
Exciter control	B & K	1050	1412882	12-97.
Vibrator	Ling + B&K	PA2000	S1165-002	12-97.
Electrometer	Keithley	617	325475	11-96.

**SUMMARY of the Testresults:****REQUIREMENT****MEASURED RESULTS****Group InB1**

*The test results of the termination resistance before and after the tests are listed on pages 8..11.*

Termination resistance initial:  
maximum 10 mΩ.

maximum 5,73 mΩ.

Insulation resistance initial:  
minimum 1000 MΩ.

All tested connectors: > 1000 MΩ.

Termination resistance after climatic sequence:  
maximum 10 mΩ

maximum 5,61 mΩ.

Insulation resistance after climatic sequence:  
minimum 1000 MΩ.

All tested connectors: > 1000 MΩ.

Termination resistance after rapid change of temperature:  
maximum 10 mΩ

maximum 5,47 mΩ.

Insulation resistance after rapid change of temperature:  
minimum 1000 MΩ.

All tested connectors: > 1000 MΩ.

Voltage proof:

All tested connectors passed the voltage proof, no breakdowns or flashovers were found initial, after climatic sequence and after the rapid change of temperature test.

**Group InB2**

*The test results of the termination resistance (incl. male-female connection) before and after the tests are listed on pages 12..15.*

Termination resistance initial:  
maximum 10 mΩ.

maximum 8,01 mΩ.

Termination resistance after mechanical operation:  
maximum 10 mΩ

maximum 8,06 mΩ.

Termination resistance after damp-heat cyclic:  
maximum 10 mΩ

maximum 8,31 mΩ.

**REQUIREMENT****MEASURED RESULTS****Group InB3.**

*The test results of the termination resistance before and after the tests are listed on pages 16..19.*

Termination resistance initial:  
maximum 10 mΩ.

maximum 5,80 mΩ.

Termination resistance after rapid change of temperature:  
maximum 10 mΩ

maximum 5,71 mΩ.

Termination resistance after vibration.  
maximum 10 mΩ

maximum 5,55 mΩ.

Vibration:

During the vibration test no discontinuity > 1μ sec was detected.

**Group InB4.**

*The test results of the contact retention force are listed on page 20.*

Contact retention in housing:  
Minimum 10 N per individual contact

minimum 13 N.

**Group InB5:**

After the solderability test no damages such as pinholes, void or rough surface were found.

**Group InB6:**

After the resistance to soldering heat test no deformation or defects, that are detrimental to the connector functions, were found.



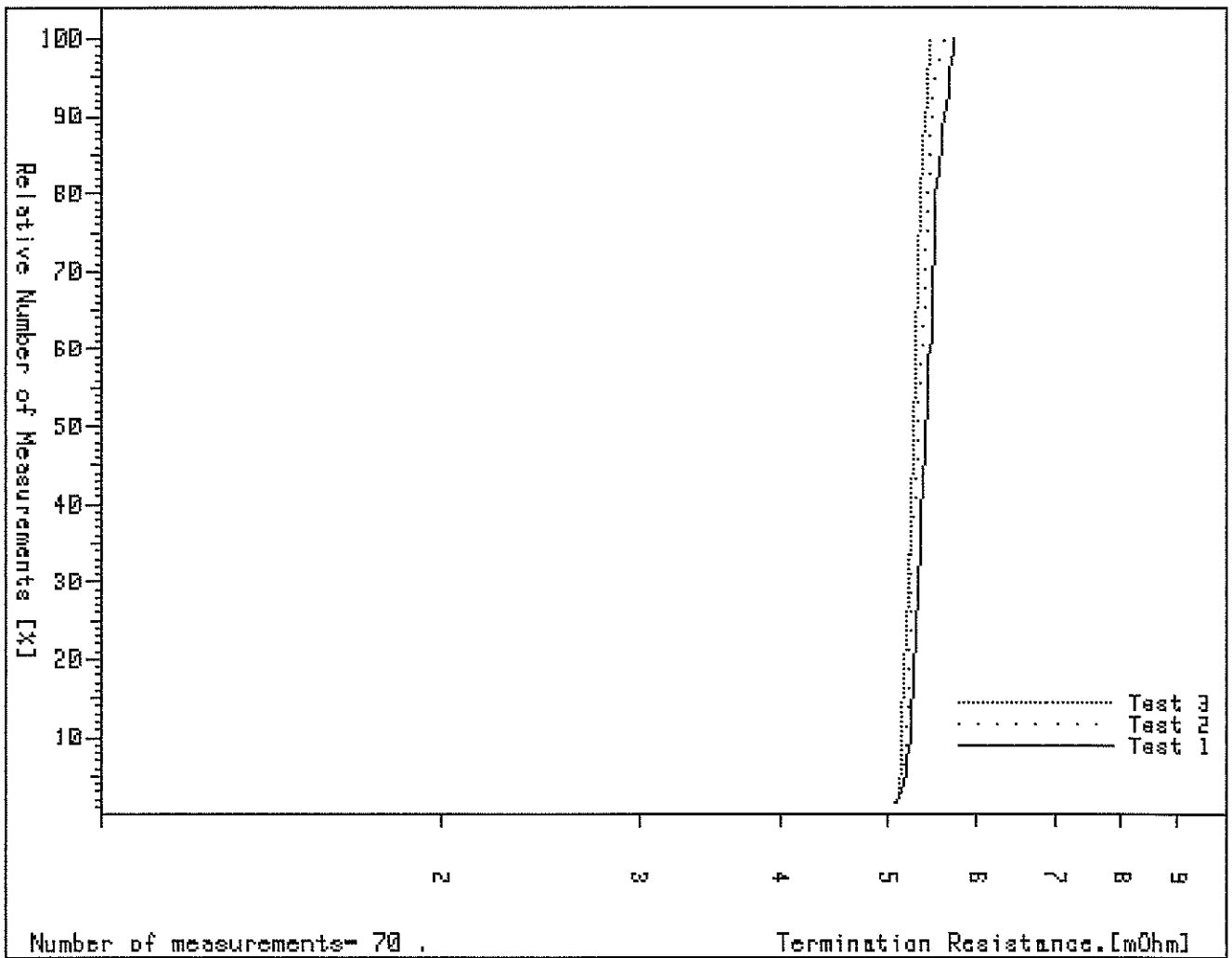
TESTRESULTS: Group InB1

Product: Micro-Match SMD

Test 1 : Termination resistance initial  
 Test 2 : Climatic sequence  
 Test 3 : Rapid change of temperature  
 Group : InB1 - InB1  
 Lot : 1 - 5

All values in milliohms

	Test 1	Test 2	delta R	Test 3	delta R
Max. :	5,73	5,61	0,21	5,47	0,15
Min. :	5,07	5,07	-0,62	5,11	-0,55
Mean :	5,42	5,33	-0,08	5,28	-0,14
Stdv :	0,15	0,12	0,17	0,09	0,17







\*\*\*\*\*  
 Termination Resistances in milliOhms.  
 \*\*\*\*\*  
 Product Tested: Micro-Match SMD

Col. Group	Lot	Test				
-1-: InB1	1	Termination resistance initial				
-2-: InB1	2	Termination resistance initial				
-3-: InB1	3	Termination resistance initial				
-4-: InB1	4	Termination resistance initial				
-5-: InB1	5	Termination resistance initial				
		-1-	-2-	-3-	-4-	-5-
01	5,44	5,51	5,56	5,51	5,49	
02	5,29	5,27	5,59	5,33	5,34	
03	5,31	5,16	5,31	5,19	5,49	
04	5,43	5,44	5,37	5,27	5,43	
05	5,48	5,73	5,24	5,51	5,31	
06	5,22	5,39	5,25	5,58	5,48	
07	5,39	5,46	5,29	5,35	5,40	
08	5,19	5,24	5,34	5,35	5,39	
09	5,41	5,28	5,61	5,32	5,50	
10	5,43	5,49	5,34	5,37	5,67	
11	5,47	5,50	5,66	5,53	5,67	
12	5,55	5,28	5,24	5,34	5,50	
13	5,15	5,68	5,51	5,48	5,60	
14	5,43	5,69	5,72	5,07	5,35	
Max.:	5,55	5,73	5,72	5,58	5,67	
Min.:	5,15	5,16	5,24	5,07	5,31	
Mean:	5,37	5,44	5,43	5,37	5,47	

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\*\*\*\*\*  
 Termination Resistances in milliohms.  
 \*\*\*\*\*  
 Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test
-1-: InB1	1	Climatic sequence
-2-: InB1	2	Climatic sequence
-3-: InB1	3	Climatic sequence
-4-: InB1	4	Climatic sequence
-5-: InB1	5	Climatic sequence

	-1-	-2-	-3-	-4-	-5-
01	5,46	5,27	5,46	5,41	5,17
02	5,21	5,38	5,49	5,21	5,30
03	5,32	5,26	5,33	5,38	5,27
04	5,59	5,22	5,43	5,45	5,41
05	5,61	5,40	5,23	5,25	5,35
06	5,24	5,22	5,46	5,33	5,41
07	5,25	5,45	5,29	5,51	5,21
08	5,25	5,24	5,29	5,44	5,39
09	5,19	5,30	5,39	5,16	5,36
10	5,20	5,34	5,43	5,33	5,47
11	5,21	5,56	5,25	5,49	5,39
12	5,43	5,24	5,43	5,33	5,37
13	5,18	5,21	5,32	5,32	5,52
14	5,25	5,07	5,24	5,13	5,36
Max.:	5,61	5,56	5,49	5,51	5,52
Min.:	5,18	5,07	5,23	5,13	5,17
Mean:	5,31	5,30	5,36	5,34	5,36

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\*\*\*\*\*  
 Termination Resistances in milliOhms.  
 \*\*\*\*\*  
 Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test				
-1-: InB1	1	Rapid change of temperature				
-2-: InB1	2	Rapid change of temperature				
-3-: InB1	3	Rapid change of temperature				
-4-: InB1	4	Rapid change of temperature				
-5-: InB1	5	Rapid change of temperature				
		-1-	-2-	-3-	-4-	-5-
01	5,45	5,26	5,44	5,46	5,15	
02	5,31	5,36	5,47	5,35	5,14	
03	5,31	5,30	5,42	5,34	5,33	
04	5,38	5,22	5,31	5,31	5,24	
05	5,28	5,21	5,17	5,20	5,38	
06	5,31	5,31	5,24	5,21	5,13	
07	5,22	5,42	5,37	5,31	5,15	
08	5,24	5,20	5,25	5,33	5,15	
09	5,11	5,18	5,40	5,26	5,27	
10	5,31	5,11	5,27	5,27	5,35	
11	5,31	5,23	5,27	5,22	5,34	
12	5,40	5,33	5,17	5,15	5,31	
13	5,29	5,26	5,21	5,15	5,38	
14	5,28	5,25	5,17	5,12	5,43	
Max.:	5,45	5,42	5,47	5,46	5,43	
Min.:	5,11	5,11	5,17	5,12	5,13	
Mean:	5,30	5,26	5,30	5,26	5,27	

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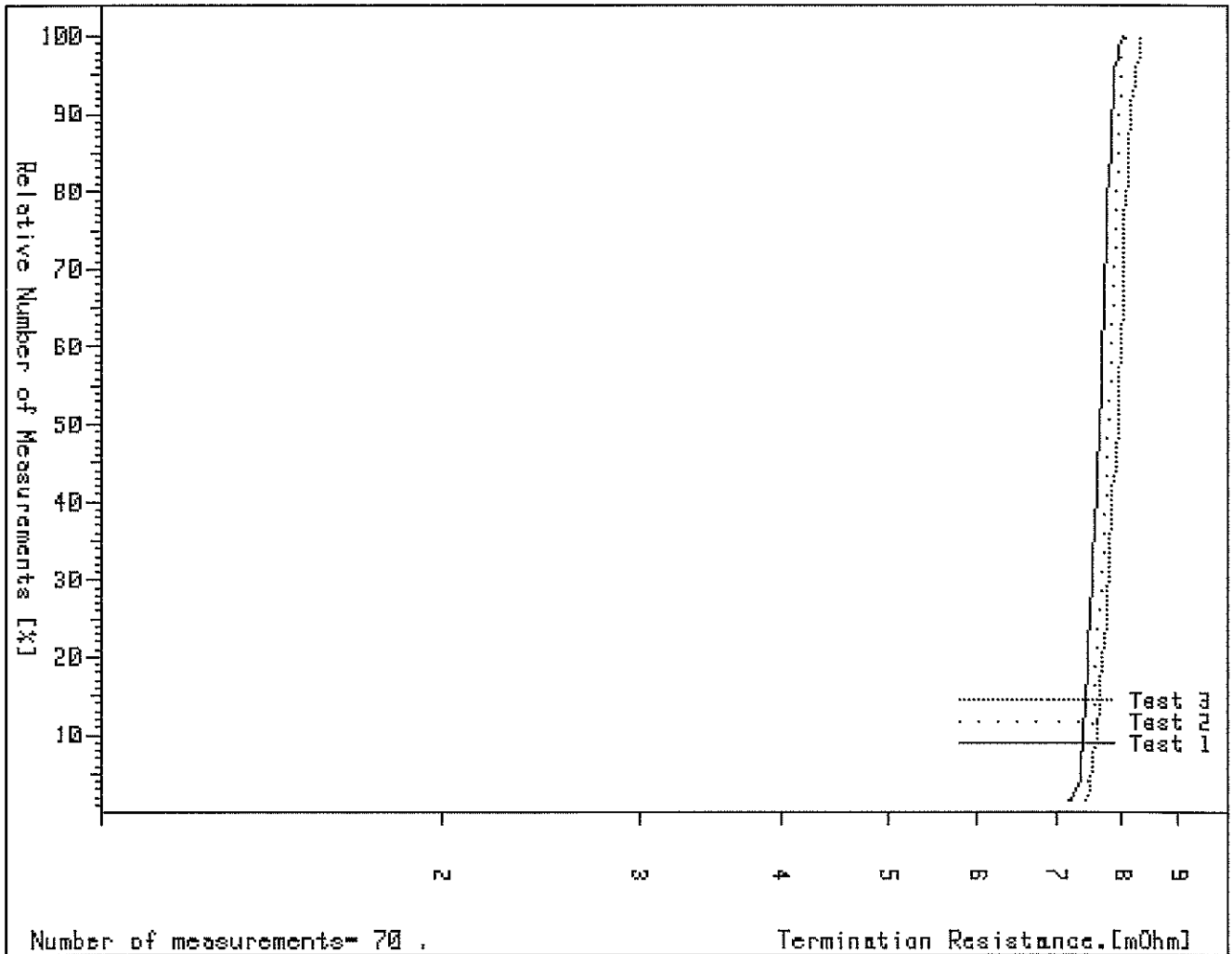
Group InB2

Product: Micro-MaTch SMD

Test 1 : First insertion force  
 Test 2 : After 20 mechanical cycles  
 Test 3 : Damp-heat cyclic  
 Group : InB2  
 Lot : 1 - 5

----- All values in milliohms -----

	Test 1	Test 2	delta R	Test 3	delta R
Max. :	8,01	8,06	0,58	8,31	0,79
Min. :	7,18	7,19	-0,49	7,44	-0,23
Mean :	7,63	7,77	0,13	7,90	0,27
Stdv :	0,18	0,17	0,21	0,21	0,25





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 Termination Resistances in milliOhms.  
 \*\*\*\*\*  
 Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test
-1-: InB2	1	First insertion force
-2-: InB2	2	First insertion force
-3-: InB2	3	First insertion force
-4-: InB2	4	First insertion force
-5-: InB2	5	First insertion force

	-1-	-2-	-3-	-4-	-5-
01	8,01	7,58	7,53	7,77	7,84
02	7,95	7,75	7,76	7,43	7,89
03	7,82	7,59	7,48	7,37	7,65
04	7,73	7,78	7,68	7,66	7,64
05	7,69	7,82	7,84	7,38	7,94
06	7,62	7,74	7,48	7,42	7,53
07	7,87	7,69	7,73	7,59	7,62
08	7,50	7,47	7,44	7,81	7,68
09	7,88	7,56	7,38	7,57	7,52
10	7,88	7,70	7,53	7,76	7,63
11	7,70	7,85	7,44	7,45	7,76
12	7,73	7,54	7,67	7,73	7,18
13	7,76	7,38	7,68	7,36	7,29
14	7,67	7,36	7,61	7,47	7,47

Max.:	8,01	7,85	7,84	7,81	7,94
Min.:	7,50	7,36	7,38	7,36	7,18
Mean:	7,77	7,63	7,59	7,55	7,62

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 Termination Resistances in milliOhms.  
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Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test				
-1-: InB2	1	After 20 mechanical cycles				
-2-: InB2	2	After 20 mechanical cycles				
-3-: InB2	3	After 20 mechanical cycles				
-4-: InB2	4	After 20 mechanical cycles				
-5-: InB2	5	After 20 mechanical cycles				
		-1-	-2-	-3-	-4-	-5-
01	8,06	7,93	7,57	7,85	7,71	
02	7,90	7,73	7,66	7,82	7,89	
03	7,96	7,70	7,76	7,79	7,67	
04	7,98	7,59	7,84	7,98	7,83	
05	7,73	7,96	7,96	7,67	7,96	
06	7,92	7,85	7,75	7,88	7,83	
07	7,94	7,76	7,61	7,56	7,59	
08	7,92	7,54	7,66	7,68	7,19	
09	8,04	7,74	7,82	7,88	7,34	
10	7,93	7,85	7,89	7,79	7,51	
11	7,86	7,99	7,54	7,82	7,62	
12	7,93	7,99	7,54	7,56	7,76	
13	7,58	7,73	7,52	7,52	7,85	
14	7,78	7,76	7,74	7,49	7,96	
Max.:	8,06	7,99	7,96	7,98	7,96	
Min.:	7,58	7,54	7,52	7,49	7,19	
Mean:	7,90	7,79	7,70	7,73	7,69	

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\*\*\*\*\*  
 Termination Resistances in milliOhms.  
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Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test				
-1-: InB2	5	Damp-heat cyclic				
-2-: InB2	2	Damp-heat cyclic				
-3-: InB2	3	Damp-heat cyclic				
-4-: InB2	4	Damp-heat cyclic				
-5-: InB2	1	Damp-heat cyclic				
		-1-	-2-	-3-	-4-	-5-
01	8,02	7,93	8,03	7,90	7,99	
02	8,00	8,23	8,04	8,11	8,19	
03	7,74	8,16	8,21	7,93	8,03	
04	7,77	8,31	8,02	8,04	8,10	
05	7,79	7,74	7,98	8,10	8,09	
06	8,29	7,51	8,04	7,90	7,93	
07	8,08	7,55	7,94	8,03	8,01	
08	7,95	7,69	7,82	8,08	8,30	
09	7,94	7,92	7,80	8,16	8,11	
10	8,02	7,51	7,81	7,74	8,16	
11	7,79	7,88	7,44	7,64	7,84	
12	7,80	7,63	7,60	7,65	7,66	
13	7,59	7,85	7,76	7,98	7,56	
14	7,80	7,68	7,94	7,53	7,71	
Max.:	8,29	8,31	8,21	8,16	8,30	
Min.:	7,59	7,51	7,44	7,53	7,56	
Mean:	7,90	7,83	7,89	7,91	7,98	

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Group InB3

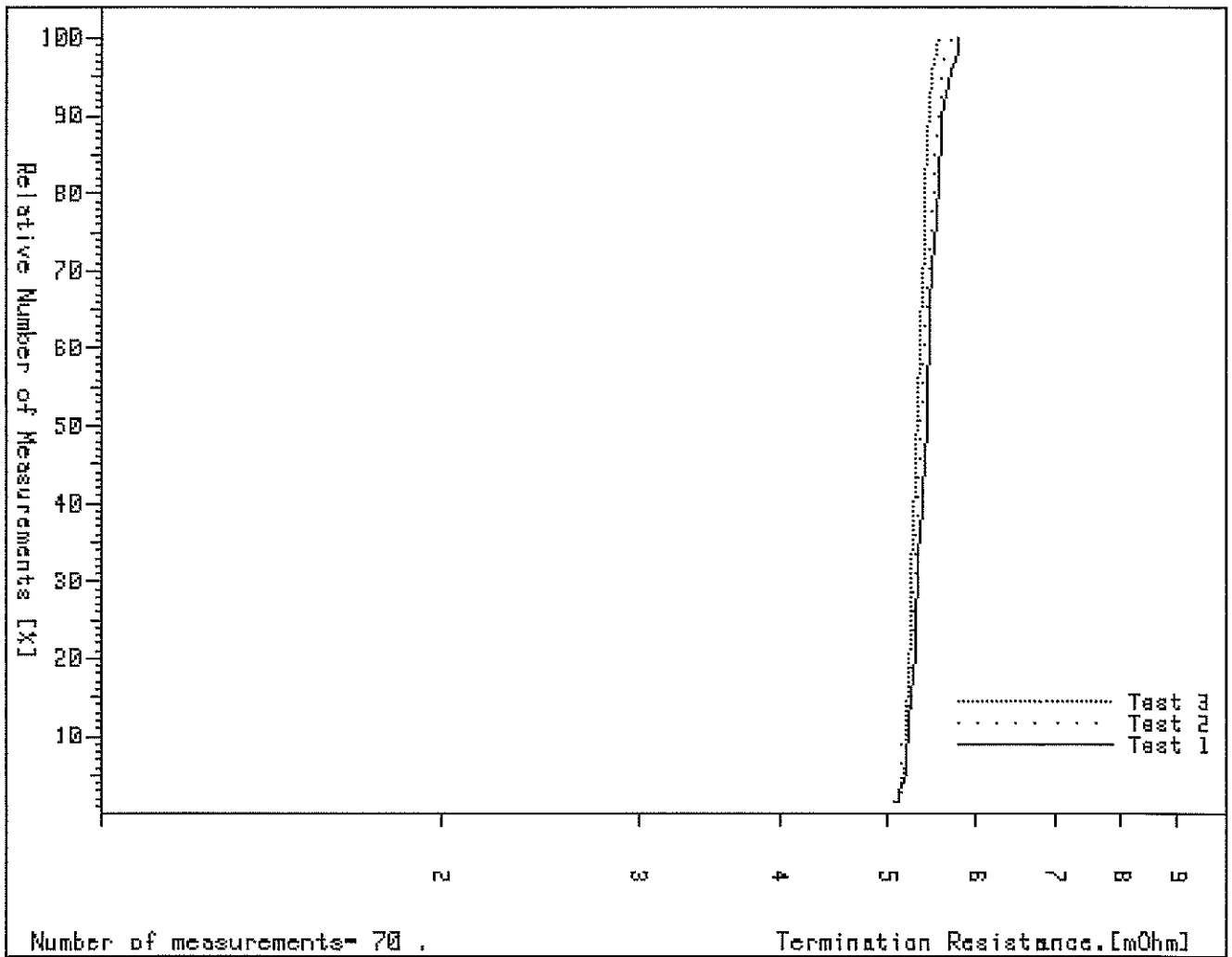
Product: Micro-Match SMD

Test 1 : Termination resistance initial  
 Test 2 : Rapid change of temperature  
 Test 3 : Vibration  
 Group : InB3  
 Lot : 1 - 5

----- All values in milliOhms -----

	Test 1	Test 2	delta R	Test 3	delta R
Max. :	5,80	5,71	0,35	5,55	0,37
Min. :	5,12	5,11	-0,64	5,08	-0,55
Mean :	5,42	5,37	-0,05	5,32	-0,10
StDv :	0,15	0,14	0,19	0,10	0,18

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 Termination Resistances in milliOhms.  
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Product Tested: Micro-Match SMD

Col. Group	Lot	Test				
-1-: InB3	1	Termination resistance initial				
-2-: InB3	2	Termination resistance initial				
-3-: InB3	3	Termination resistance initial				
-4-: InB3	4	Termination resistance initial				
-5-: InB3	5	Termination resistance initial				
		-1-	-2-	-3-	-4-	-5-
01	5,49	5,55	5,74	5,46	5,49	
02	5,44	5,33	5,70	5,25	5,58	
03	5,58	5,22	5,58	5,31	5,46	
04	5,31	5,45	5,51	5,56	5,41	
05	5,37	5,31	5,42	5,45	5,49	
06	5,44	5,52	5,46	5,27	5,57	
07	5,32	5,42	5,58	5,33	5,51	
08	5,43	5,41	5,29	5,38	5,20	
09	5,36	5,31	5,25	5,55	5,54	
10	5,65	5,20	5,12	5,61	5,45	
11	5,37	5,30	5,21	5,53	5,67	
12	5,32	5,42	5,78	5,37	5,42	
13	5,80	5,28	5,35	5,22	5,18	
14	5,42	5,17	5,41	5,12	5,32	
Max.:	5,80	5,55	5,78	5,61	5,67	
Min.:	5,31	5,17	5,12	5,12	5,18	
Mean:	5,45	5,35	5,46	5,39	5,45	

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Termination Resistances in milliOhms.

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Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test				
-1-: InB3	1	Rapid change of temperature				
-2-: InB3	2	Rapid change of temperature				
-3-: InB3	3	Rapid change of temperature				
-4-: InB3	4	Rapid change of temperature				
-5-: InB3	5	Rapid change of temperature				
		-1-	-2-	-3-	-4-	-5-
01	5,42	5,39	5,24	5,33	5,31	
02	5,28	5,48	5,34	5,38	5,40	
03	5,41	5,52	5,44	5,17	5,30	
04	5,24	5,23	5,15	5,33	5,25	
05	5,28	5,30	5,26	5,31	5,51	
06	5,34	5,51	5,71	5,36	5,55	
07	5,32	5,37	5,57	5,37	5,46	
08	5,20	5,36	5,40	5,16	5,51	
09	5,50	5,47	5,33	5,31	5,49	
10	5,68	5,47	5,47	5,58	5,58	
11	5,25	5,54	5,57	5,37	5,58	
12	5,24	5,43	5,61	5,28	5,27	
13	5,15	5,30	5,14	5,11	5,42	
14	5,24	5,38	5,22	5,14	5,35	
Max.:	5,68	5,54	5,71	5,58	5,58	
Min.:	5,15	5,23	5,14	5,11	5,25	
Mean:	5,33	5,41	5,39	5,30	5,43	

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 Termination Resistances in milliOhms.  
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Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test				
-1-: InB3	1	Vibration				
-2-: InB3	2	Vibration				
-3-: InB3	3	Vibration				
-4-: InB3	4	Vibration				
-5-: InB3	5	Vibration				
		-1-	-2-	-3-	-4-	-5-
01	5,30	5,32	5,20	5,17	5,26	
02	5,41	5,37	5,23	5,24	5,46	
03	5,34	5,41	5,22	5,41	5,48	
04	5,21	5,41	5,45	5,33	5,21	
05	5,29	5,27	5,32	5,41	5,36	
06	5,36	5,37	5,36	5,19	5,42	
07	5,21	5,36	5,41	5,48	5,25	
08	5,33	5,24	5,22	5,43	5,34	
09	5,28	5,24	5,41	5,08	5,52	
10	5,27	5,39	5,29	5,44	5,25	
11	5,40	5,37	5,22	5,26	5,53	
12	5,25	5,45	5,25	5,26	5,29	
13	5,29	5,20	5,44	5,20	5,55	
14	5,34	5,38	5,13	5,15	5,30	
Max.:	5,41	5,45	5,45	5,48	5,55	
Min.:	5,21	5,20	5,13	5,08	5,21	
Mean:	5,31	5,34	5,30	5,29	5,37	

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Group InB4

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All values represented in NEWTONS.

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Product Tested: Micro-MaTch, In Board

Col. Group	Lot	Test				
-1-: InB4	1	Contact retention force				
-2-: InB4	2	Contact retention force				
-3-: InB4	3	Contact retention force				
-4-: InB4	4	Contact retention force				
-5-: InB4	5	Contact retention force				
		-1-	-2-	-3-	-4-	-5-
01	18	13	16	19	13	
02	27	21	23	22	22	
03	18	22	16	19	22	
04	25	18	19	22	16	
05	21	18	19	17	22	
06	21	23	23	22	22	
07	18	20	23	17	24	
08	25	20	20	23	23	
09	23	18	21	21	18	
10	25	19	24	24	25	
11	19	19	20	17	20	
12	19	20	18	22	20	
13	21	17	25	19	18	
14	19	18	19	17	18	
Max.:	27	23	25	24	25	
Min.:	18	13	16	17	13	
Mean:	21,4	19,0	20,4	20,1	20,2	

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