

AMP

ENVIRONMENTAL TESTING LABORATORY

Job Number: E96.01.02.	Project Number: 150403.	Date of issue: April 1996.
Description: Micro-MaTch, SMD. Female Top Entry (FTE) on-board. (Qualification test)		Part numbers: 2-188275-0 rev. B

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-188275-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 - 1846.
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SAMPLE DESCRIPTION:

Testgroups 1 and 3, in this report indicated as FTE1 and FTE3, consist of five (lot 1..5) 20 position Female top entry Micro-MaTch SMD connectors (type: on-board) soldered, with solder pasta used for reflow-process, on AMP test printed circuit boards.

-Micro-MaTch: P/N: 2-188275-0, revision code B.

-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 indicated as report FTE4 lot 1..5 and FTE6 lot 1..5, consist of five 20 position female top entry Micro-MaTch SMD connectors, type on-board.

-Micro-MaTch: P/N: 2-188275-0, revision code B.

Testgroup 5; the samples of testgroups 1 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 figure 1 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_{AC}.

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

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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.)

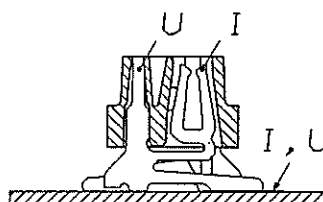


Figure 1.

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

This test is not applicable for on-board connectors, see product specification 108-19052.

**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 FTE1**

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 5,99 mΩ.

Insulation resistance initial:
minimum 1000 MΩ.

All tested connectors: > 1000 MΩ.

Termination resistance after climatic sequence:
maximum 10 mΩ

maximum 5,93 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 5,91 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 FTE3.

The test results of the termination resistance before and after the tests are listed on pages 12..15.

Termination resistance initial:
maximum 10 mΩ.

maximum 5,99 mΩ.

Termination resistance after rapid change of temperature:
maximum 10 mΩ

maximum 5,95 mΩ.

Termination resistance after vibration.
maximum 10 mΩ

maximum 5,84 mΩ.

Vibration:

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

Group FTE4.

The test results of the contact retention force are listed on page 16.

Contact retention in housing:
Minimum 10 N per individual contact

minimum 15 N.



Group FTE5:

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

Group FTE6:

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



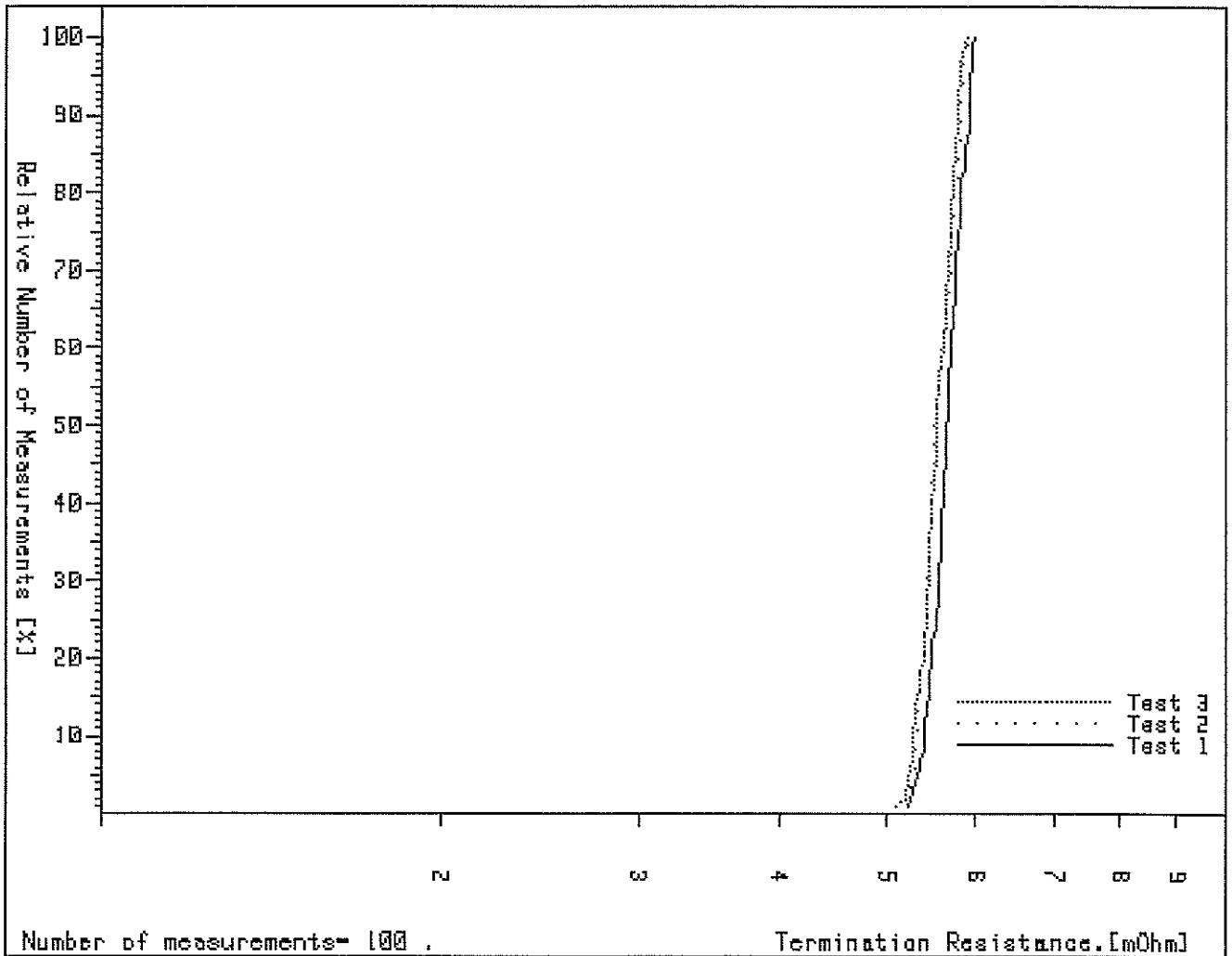
TESTRESULTS: Group FTE1

 Product: Micro-MaTch SMD

Test 1 : Termination resistance initial
 Test 2 : Climatic sequence
 Test 3 : Rapid change of temperature
 Group : FTE1
 Lot : 1 - 5

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

	Test 1	Test 2	delta R	Test 3	delta R
Max. :	5,99	5,93	0,29	5,91	0,27
Min. :	5,21	5,22	-0,58	5,10	-0,47
Mean :	5,66	5,56	-0,10	5,55	-0,11
StDv :	0,19	0,18	0,15	0,18	0,15





 Termination Resistances in milliOhms.

 Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test					
-1-: FTE1	1	Termination resistance initial					
-2-: FTE1	2	Termination resistance initial					
-3-: FTE1	3	Termination resistance initial					
-4-: FTE1	4	Termination resistance initial					
-5-: FTE1	5	Termination resistance initial					
			-1-	-2-	-3-	-4-	-5-
01	5,41	5,82	5,57	5,88	5,63		
02	5,25	5,80	5,60	5,94	5,59		
03	5,21	5,91	5,72	5,65	5,56		
04	5,49	5,94	5,81	5,71	5,47		
05	5,42	5,82	5,69	5,75	5,69		
06	5,35	5,99	5,80	5,82	5,78		
07	5,30	5,92	5,88	5,66	5,69		
08	5,40	5,56	5,87	5,92	5,45		
09	5,59	5,93	5,67	5,63	5,68		
10	5,44	5,94	5,74	5,96	5,74		
11	5,68	5,62	5,54	5,86	5,79		
12	5,64	5,52	5,41	5,75	5,97		
13	5,69	5,75	5,55	5,45	5,93		
14	5,94	5,69	5,60	5,53	5,96		
15	5,73	5,70	5,41	5,36	5,76		
16	5,76	5,63	5,51	5,57	5,76		
17	5,82	5,47	5,67	5,27	5,58		
18	5,79	5,47	5,31	5,58	5,92		
19	5,64	5,60	5,65	5,39	5,66		
20	5,55	5,49	5,46	5,61	5,63		
Max.:	5,94	5,99	5,88	5,96	5,97		
Min.:	5,21	5,47	5,31	5,27	5,45		
Mean:	5,55	5,73	5,62	5,67	5,71		



Termination Resistances in milliohms.

Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test
-1-: FTE1	1	Climatic sequence
-2-: FTE1	2	Climatic sequence
-3-: FTE1	3	Climatic sequence
-4-: FTE1	4	Climatic sequence
-5-: FTE1	5	Climatic sequence

	-1-	-2-	-3-	-4-	-5-
01	5,23	5,80	5,55	5,61	5,44
02	5,29	5,83	5,70	5,70	5,36
03	5,24	5,80	5,51	5,74	5,39
04	5,44	5,90	5,70	5,72	5,35
05	5,29	5,93	5,65	5,67	5,41
06	5,31	5,65	5,84	5,70	5,61
07	5,34	5,85	5,82	5,50	5,44
08	5,49	5,80	5,85	5,51	5,22
09	5,60	5,77	5,79	5,64	5,45
10	5,47	5,80	5,77	5,85	5,48
11	5,46	5,50	5,52	5,69	5,69
12	5,33	5,40	5,32	5,74	5,73
13	5,48	5,48	5,45	5,28	5,81
14	5,36	5,54	5,43	5,52	5,78
15	5,29	5,59	5,33	5,49	5,59
16	5,70	5,40	5,29	5,36	5,87
17	5,67	5,71	5,44	5,56	5,81
18	5,51	5,35	5,43	5,44	5,58
19	5,51	5,33	5,47	5,53	5,85
20	5,48	5,42	5,60	5,45	5,69

Max.:	5,70	5,93	5,85	5,85	5,87
Min.:	5,23	5,33	5,29	5,28	5,22
Mean:	5,42	5,64	5,57	5,58	5,58



 Termination Resistances in milliOhms.

 Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test
-1-: FTE1	1	Rapid change of temperature
-2-: FTE1	2	Rapid change of temperature
-3-: FTE1	3	Rapid change of temperature
-4-: FTE1	4	Rapid change of temperature
-5-: FTE1	5	Rapid change of temperature

	-1-	-2-	-3-	-4-	-5-
01	5,24	5,68	5,63	5,64	5,39
02	5,26	5,72	5,77	5,68	5,47
03	5,22	5,72	5,71	5,56	5,28
04	5,45	5,81	5,70	5,70	5,42
05	5,20	5,65	5,67	5,86	5,43
06	5,10	5,86	5,73	5,65	5,77
07	5,46	5,81	5,82	5,58	5,65
08	5,29	5,70	5,74	5,53	5,42
09	5,22	5,73	5,76	5,65	5,47
10	5,28	5,91	5,81	5,78	5,31
11	5,45	5,34	5,51	5,63	5,77
12	5,49	5,38	5,34	5,61	5,78
13	5,65	5,28	5,48	5,29	5,70
14	5,53	5,47	5,53	5,28	5,55
15	5,42	5,49	5,54	5,21	5,68
16	5,52	5,32	5,53	5,45	5,71
17	5,55	5,40	5,56	5,54	5,78
18	5,56	5,52	5,39	5,44	5,76
19	5,53	5,34	5,44	5,47	5,69
20	5,41	5,53	5,59	5,44	5,79

Max.:	5,65	5,91	5,82	5,86	5,79
Min.:	5,10	5,28	5,34	5,21	5,28
Mean:	5,39	5,58	5,61	5,55	5,59



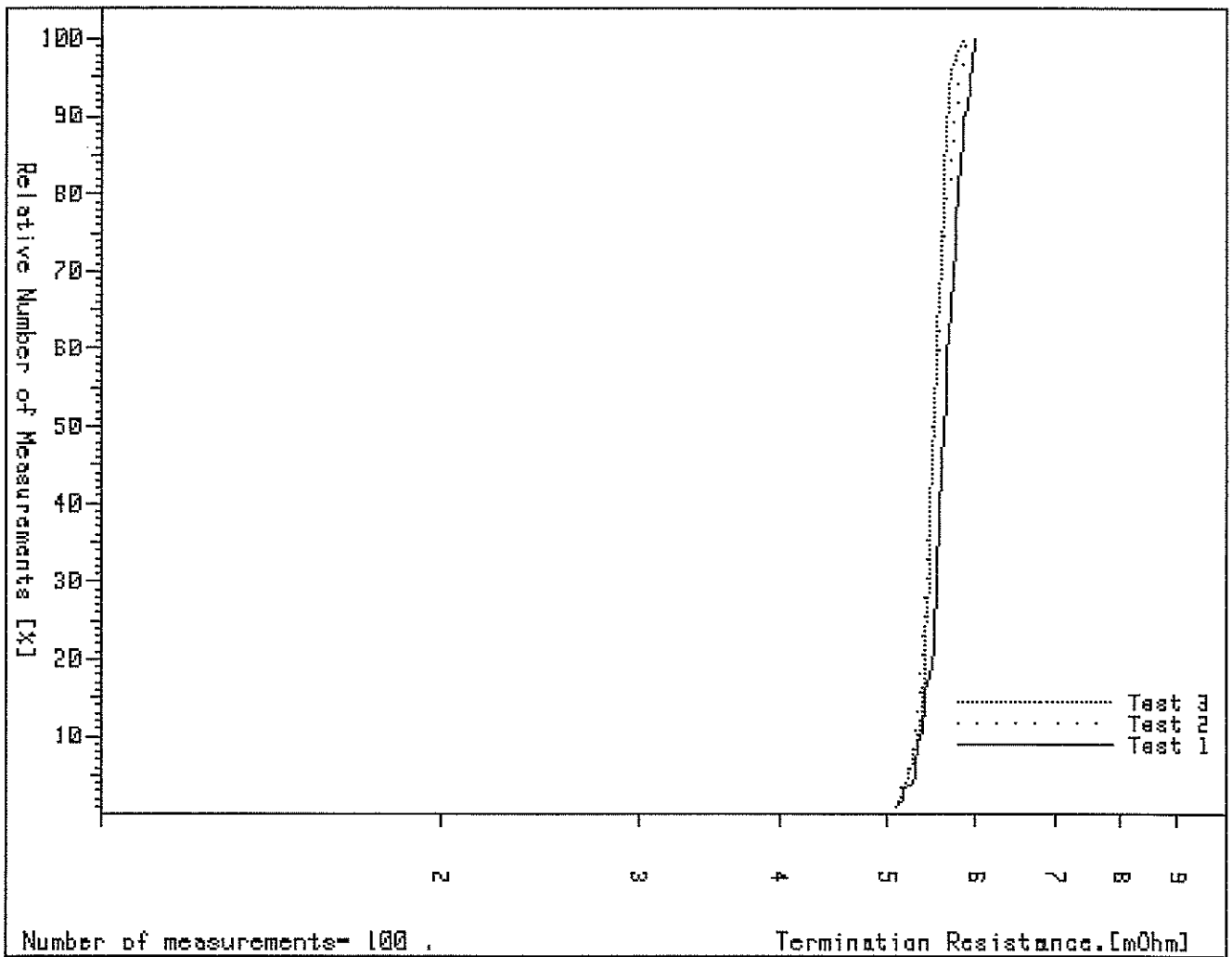
Group FTE3

Product: Micro-Match SMD

Test 1 : Termination resistance initial
 Test 2 : Rapid change of temperature
 Test 3 : Vibration
 Group : FTE3
 Lot : 1 - 5

All values in milliohms

	Test 1	Test 2	delta R	Test 3	delta R
Max. :	5,99	5,95	0,50	5,84	0,35
Min. :	5,09	5,09	-0,62	5,09	-0,61
Mean :	5,62	5,51	-0,11	5,50	-0,12
StDv :	0,19	0,18	0,19	0,14	0,17





Termination Resistances in milliOhms.

Product Tested: Micro-Match SMD

Col. Group	Lot	Test
-1-: FTE3	1	Termination resistance initial
-2-: FTE3	2	Termination resistance initial
-3-: FTE3	3	Termination resistance initial
-4-: FTE3	4	Termination resistance initial
-5-: FTE3	5	Termination resistance initial

	-1-	-2-	-3-	-4-	-5-
01	5,60	5,31	5,29	5,54	5,57
02	5,51	5,66	5,09	5,60	5,92
03	5,84	5,41	5,27	5,55	5,90
04	5,63	5,51	5,50	5,57	5,64
05	5,48	5,66	5,39	5,71	5,75
06	5,55	5,64	5,36	5,50	5,83
07	5,61	5,56	5,62	5,66	5,54
08	5,66	5,53	5,83	5,75	5,56
09	5,64	5,65	5,84	5,80	5,64
10	5,56	5,58	5,71	5,72	5,70
11	5,60	5,72	5,99	5,52	5,63
12	5,31	5,75	5,80	5,65	5,40
13	5,17	5,77	5,72	5,59	5,76
14	5,60	5,96	5,99	5,46	5,80
15	5,81	5,76	5,96	5,43	5,83
16	5,89	5,94	5,93	5,51	5,36
17	5,69	5,93	5,77	5,33	5,41
18	5,73	5,63	5,79	5,52	5,48
19	5,61	5,40	5,80	5,55	5,18
20	5,75	5,54	5,29	5,55	5,55

Max.:	5,89	5,96	5,99	5,80	5,92
Min.:	5,17	5,31	5,09	5,33	5,18
Mean:	5,61	5,65	5,65	5,58	5,62



Termination Resistances in milliOhms.

Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test
-1-: FTE3	1	Rapid change of temperature
-2-: FTE3	2	Rapid change of temperature
-3-: FTE3	3	Rapid change of temperature
-4-: FTE3	4	Rapid change of temperature
-5-: FTE3	5	Rapid change of temperature

	-1-	-2-	-3-	-4-	-5-
01	5,66	5,45	5,19	5,60	5,61
02	5,45	5,58	5,11	5,54	5,48
03	5,55	5,55	5,31	5,56	5,28
04	5,45	5,39	5,43	5,42	5,37
05	5,37	5,43	5,22	5,47	5,43
06	5,34	5,57	5,27	5,70	5,59
07	5,53	5,35	5,24	5,48	5,47
08	5,48	5,21	5,38	5,44	5,45
09	5,69	5,28	5,58	5,63	5,49
10	5,57	5,53	5,48	5,66	5,42
11	5,35	5,72	5,83	5,75	5,58
12	5,45	5,62	5,81	5,34	5,55
13	5,13	5,69	5,86	5,78	5,48
14	5,36	5,80	5,72	5,30	5,49
15	5,70	5,86	5,62	5,44	5,50
16	5,55	5,95	5,78	5,47	5,38
17	5,52	5,47	5,81	5,61	5,40
18	5,37	5,62	5,69	5,72	5,50
19	5,31	5,62	5,41	5,51	5,09
20	5,37	5,55	5,79	5,41	5,58

Max.:	5,70	5,95	5,86	5,78	5,61
Min.:	5,13	5,21	5,11	5,30	5,09
Mean:	5,46	5,56	5,53	5,54	5,46



Termination Resistances in milliOhms.

Product Tested: Micro-MaTch SMD

Col. Group	Lot	Test
-1-: FTE3	1	Vibration
-2-: FTE3	2	Vibration
-3-: FTE3	3	Vibration
-4-: FTE3	4	Vibration
-5-: FTE3	5	Vibration

	-1-	-2-	-3-	-4-	-5-
01	5,54	5,48	5,22	5,52	5,66
02	5,38	5,39	5,09	5,61	5,59
03	5,43	5,45	5,20	5,51	5,39
04	5,47	5,49	5,34	5,52	5,49
05	5,38	5,45	5,47	5,46	5,58
06	5,40	5,44	5,24	5,61	5,61
07	5,47	5,40	5,36	5,45	5,66
08	5,62	5,40	5,42	5,55	5,65
09	5,62	5,62	5,53	5,67	5,54
10	5,64	5,45	5,44	5,70	5,55
11	5,41	5,47	5,53	5,65	5,56
12	5,56	5,47	5,59	5,46	5,41
13	5,26	5,40	5,59	5,60	5,54
14	5,48	5,60	5,80	5,45	5,61
15	5,50	5,77	5,66	5,33	5,61
16	5,52	5,75	5,84	5,51	5,43
17	5,47	5,60	5,17	5,68	5,56
18	5,28	5,67	5,71	5,50	5,32
19	5,45	5,54	5,53	5,38	5,14
20	5,52	5,62	5,62	5,43	5,37

Max.:	5,64	5,77	5,84	5,70	5,66
Min.:	5,26	5,39	5,09	5,33	5,14
Mean:	5,47	5,52	5,47	5,53	5,51



Group FTE4

All values represented in NEWTONS.

Product Tested: Micro-MaTch, FTE

Col. Group	Lot	Test
-1-: FTE4	1	Contact retention force
-2-: FTE4	2	Contact retention force
-3-: FTE4	3	Contact retention force
-4-: FTE4	4	Contact retention force
-5-: FTE4	5	Contact retention force

	-1-	-2-	-3-	-4-	-5-
01	19	20	23	18	15
02	26	22	20	25	20
03	19	20	23	17	23
04	23	23	21	21	21
05	21	22	24	25	27
06	21	22	21	22	20
07	21	26	22	19	21
08	21	23	18	23	24
09	24	24	23	19	23
10	24	27	21	21	20
11	26	22	22	19	23
12	23	22	19	21	21
13	18	21	21	21	29
14	19	24	18	24	20
15	20	23	23	20	24
16	22	19	21	24	22
17	18	21	24	20	26
18	20	21	18	20	19
19	20	20	24	21	17
20	19	19	20	21	29

Max.:	26	27	24	25	29
Min.:	18	19	18	17	15
Mean:	21,2	22,1	21,3	21,1	22,2

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108-19052

RCX-0102/101

TEST METHODS OF SOLDERABILITY

2.4.2 Reflow soldering method

Reference This method is applied to the specimen which is soldered by reflow soldering.

(1) Preparation Solder paste shall be applied(*2) to the printed wiring boards such as glass base epoxy resin or paper base phenolic resin, or alumina boards, already applied with lands(*1), and then the specimen is mounted on the board.

Notes(*1) Dimension of lands shall be specified in the sectional specification.

(*2) Thickness of the applied solder paste shall be 150 to 250 μ m.

(2) Preheating Unless otherwise specified in the sectional specification, the specimen shall be preheated at a temperature of $150 \pm 10^\circ\text{C}$ for 60 to 120 sec in the reflow soldering bath.

(3) Soldering Temperature of the reflow soldering bath shall be raised(*3) immediately after the preheating is finished. When the temperature of the specimen is reached at $215 \pm 3^\circ\text{C}$, it shall be left for 10 ± 2 sec. (See Figure 5)

Notes(*3) Temperature of the specimen shall be measured at electrode parts or terminations.

Figure 5 Temperature profile of reflow soldering

