Connector, MTA-100

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* MTA-100 Connector to determine its conformance to the requirements of AMP Product Specification 108-1050 Rev. F.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the MTA-100 Connector manufactured by Consumer/Commercial Business Division. The testing was performed between August 8, 1996 and January 20, 1997.

1.3. Conclusion

The MTA-100 Connector, listed in paragraph 1.5., meet the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1050 Rev F.

1.4. Product Description

The MTA-100 Connector system is mass terminated using insulation displacement technology on .100 inch centerlines and mates with 0.025 inch square posts. The standard system is available in 2 through 28 positions. The MTA-100 connector system is designed to terminate to 28 AWG to 22 AWG wire. The contacts are made of Phosphor bronze with both tin-lead and gold over nickel plating. The housing material is Nylon 6/6 or Nylon 6/12, UL 94V-2 and 94V-0.

1.5. Test Samples

The test samples were randomly selected from normal current production lots, and the following part numbers were used for test:

Test Group	Quantity	Part Nbr	Description
1	5	640440-6	06 Pos MTA-100 Connector, AWG 22, Tin
1	5	641237-6	06 Pos MTA-100 Connector, AWG 22, Gold
1,6	10	640456-6	06 Pos MTA-100 Header, Tin
1	5	641215-6	06 Pos MTA-100 Header, Gold
2,5	8	1-640443-0	10 Pos MTA-100 Connector, AWG 28, Tin
2,5	8	1-640440-0	10 Pos MTA-100 Connector, AWG 22, Tin
2,5	21	1-640456-0	10 Pos MTA-100 Header, Tin
3	3	1-641240-0	10 Pos MTA-100 Connector, AWG 28, Gold
3	3	1-641237-0	10 Pos MTA-100 Connector, AWG 22, Gold
4	5	2-640440-4	24 Pos MTA-100 Connector, AWG 22, Tin
4	5	2-640456-4	24 Pos MTA-100 Connector, Tin
5	5	1-640441-0	10 Pos MTA-100 Connector, AWG 24,Tin

* Trademark
I Indicates change

1.6. Qualification Test Sequence

Test or Examination	Test Groups					
	1	2	3	4	5	6
	Test Sequence (a)					
Examination of Product	1,9	1,9	1,5	1,8	1,3	1,3
Termination Resistance, Dry Circuit	3,7	2,7	2,4			
Dielectric Withstanding Voltage				3,7		
Insulation Resistance				2,6		
Temperature Rise vs Current		3,8				
Solderability						2
Terminal Tensile Strength					2	
Vibration	5	6				
Physical Shock	6					
Mating Force	2					
Unmating Force	8					
Durability	4					
Thermal Shock				4		
Humidity-Temperature Cycling		4(b)		5		
Mixed Flowing Gas			3(b)			
Temperature Life		5				

NOTE

(a) The numbers indicate sequence in which tests were performed.
(b) Precondition with 5 cycles of Durability.

2. SUMMARY OF TESTING

2.1. Examination of Product - All Groups

All samples submitted for testing were randomly selected from current production lots. A Certificate of Conformance was issued by the Product Assurance Department of Consumer/Commercial Business Division. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance, Dry Circuit - Groups 1,2,3

All termination resistance measurements, taken at 100 milliamperes maximum and 50 millivolts open circuit voltage were less than 6.0 milliohms initially and a maximum increase in resistance (ΔR) of 10 milliohms after testing.

Test Group	Nbr of Data points	Condition	Termination Resistance Min	Max	Mean
1	60	Initial	2.76	4.09	3.122
		After Mechanical (ΔR)	-0.96	+0.90	+0.109
2	30	Initial	3.00	3.55	3.255
		After Verification (ΔR)	+0.12	+2.20	+1.075
3	60	Initial	0.88	5.14	2.945
		After Mixed Gas (ΔR)	-0.84	+4.59	+0.825

All values in milliohms

2.3. Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred.

2.4. Insulation Resistance - Group 4

All insulation resistance measurements were greater than 5,000 megohms.

2.5. Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when tested using a baseline rated current of 8.25 amperes and the correct derating factor value based on the samples wiring configuration.

2.6. Solderability - Group 6

All contact leads had a minimum of 95% solder coverage.

2.7. Termination Tensile Strength (Perpendicular & Parallel) - Group 5

Slot tensile(Parallel) values were greater than: 4 pounds for samples prepared on 28 AWG wire, 8 pounds for samples prepared on 24 AWG wire, and 12 pounds for samples prepared on 22 AWG wire. Slot tensile(Perpendicularl) values were greater than: 1 pounds for samples prepared on 28 and 24 AWG wire, and 3 pounds for samples prepared on 22 AWG wire.

2.8. Vibration - Group 1

No discontinuities were detected during vibration (Group 1 only). Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.9. Physical Shock - Group 1

No discontinuities were detected during physical shock. Following physical shock testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.10. Mating Force - Group 1

All mating force measurements were less than 2 pounds maximum average per contact.

2.11. Unmating Force - Group 1

All unmating force measurements were greater than 0.8 pound minimum average per contact.

2.12. Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 25 times.

2.13. Thermal Shock - Group 4

No evidence of physical damage was visible as a result of exposure to thermal shock.

2.14. Humidity-Temperature Cycling - Group 4

No evidence of physical damage was visible as a result of exposure to humidity-temperature cycling.

2.15. Mixed Flowing Gas - Group 3

No evidence of physical damage was visible as a result of exposure to the pollutants of mixed flowing gas.

2.16. Temperature Life - Group 2

No evidence of physical damage was visible as a result of exposure to temperature life.

3. TEST METHODS

3.1. Examination of Product

Where specified, samples were visually examined for evidence of physical damage detrimental to product performance.

3.2. Termination Resistance, Low Level

Termination resistance measurements at low level current were made using a four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes maximum with a 50 millivolt open circuit voltage.

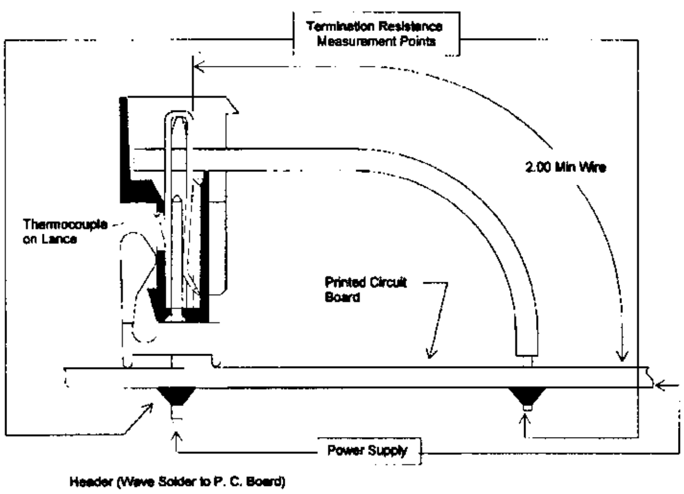

Figure 1
Typical Termination Resistance Measurement Points

3.3. Dielectric Withstanding Voltage

A test potential of 750 volts AC was applied between the adjacent contacts. This potential was applied for one minute and then returned to zero.

3.4. Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 500 volts DC. This voltage was applied for two minutes before the resistance was measured.

3.5. Temperature Rise vs Specified Current

Temperature rise curves were produced by measuring individual contact temperatures at 5 different current levels. These measurements were plotted to produce a temperature rise vs current curve. Thermocouples were attached to individual contacts to measure their temperatures. The ambient temperature was then subtracted from this measured temperature to find the temperature rise. When the temperature rise of 3 consecutive readings taken at 5 minute intervals did not differ by more than 1°C the temperature measurement was recorded.

3.6. Solderability

Connector assembly contact solder tails were subjected to a solderability test. The soldertails were immersed in a mildly activated rosin flux for 5 to 10 seconds, allowed to drain for 10 to 60 seconds, then held over molten solder without contact for 2 seconds. The solder tails were then immersed in the molten solder at a rate of approximately one inch per second, held for 3 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the samples were visually examined for solder coverage. The solder used for testing was 60/40 tin lead composition and was maintained at a temperature of 245±5°C.

3.7. Tensile Strength (Perpendicular & Parallel)

The force required to pull individual wires from there IDC slots was measured using a tensile/compression device with the rate of travel at 1.0 inch/minute. The direction of the force applied was parallel to the wire.

3.8. Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in one minute. This cycle was performed 120 times in each of three mutually perpendicular planes for a total vibration time of 6 hours. Connectors were monitored for discontinuities of one microsecond or greater using a current of 100 milliamperes DC.(test group 1 only). Connectors were energized with a test current of 4.0 amperes DC. (Test group 2 only).

3.9. Physical Shock

Mated connectors were subjected to a physical shock test having a half-sine waveform of 50 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular planes for a total of 18 shocks. Connectors were monitored for discontinuities of one microsecond or greater using a current of 100 milliamperes DC.

3.10. Mating Force

The force required to mate individual connectors was measured using a tensile/compression device with the rate of travel at 0.5 inch/minute and a free floating fixture. The force per contact was calculated.

3.11. Unmating Force

The force required to unmate individual connectors was measured using a tensile/compression device with the rate of travel at 0.5 inch/minute and a free floating fixture. The force per contact was calculated.

3.12. Durability

Connectors were mated and unmated 25 times at a rate of 200 cycles per hour.

3.13. Thermal Shock

Mated connectors were subjected to 25 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 65°C. The transition between temperatures was less than one minute.

3.14. Humidity-Temperature Cycling

Mated connectors were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while maintaining high humidity. (Figure 2)

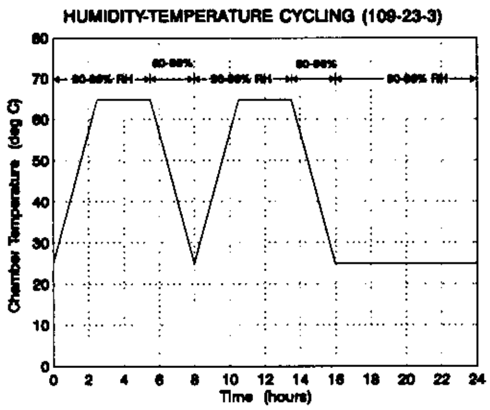

Figure 2
Typical Humidity-Temperature Cycling Profile

3.15. Mixed Flowing Gas, Class III

Mated connectors were exposed for 20 days to a mixed flowing gas Class III exposure. Class III exposure is defined as a temperature of 30°C and a relative humidity of 75% with the pollutants of $C1_2$ at 20 ppb, NO_2 at 200 ppb, and H_2S at 100 ppb. Samples were preconditioned with 5 cycles of durability.

3.16. Temperature Life

Mated samples were exposed to a temperature of 85°C for 1,000 hours.

4. VALIDATION

Prepared by:

______________________ 1/24/97

Terrance M. Shingara
Test Engineer
Product Qualification Team
Americas Regional Laboratory

Reviewed by:

______________________ 1/24/97

Robert S. Druckenmiller
Supervisor
Product Testing
Americas Regional Laboratory

Approved by:

______________________ 2/12/97

Charles Riffle
Manager
Quality Assurance
Consumer/Commercial Business

Form 404-34 20Nov96