Connector, .156 MATE-N-LOK*

1. INTRODUCTION

1.1. Purpose

Testing was performed on the .156 MATE-N-LOK* connector to determine its conformance to the requirements of AMP Product Specification 108-8002 Revision B.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the .156 MATE-N-LOK connector. Testing was performed at the Americas Global Automotive Division Product Reliability Center between Jun98 and Mar99. The test file numbers for this testing are ACL1340043a, 19980055ACL, and 19990042ACL. This documentation is on file at and available from the Americas Global Automotive Division Product Reliability Center.

1.3. Conclusion

The .156 MATE-N-LOK connector listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-8002 Revision B.

1.4. Test Samples

Test samples were representative of normal production lots. Samples identified with the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1,3	10 each	794116-1	4 position plug housing
	10 each	794117-1	4 position socket housing
	40 each	61233-1	Socket terminal
	40 each	61234-1	Pin terminal
2	32	794116-1	4 position plug housing
	32	794117-1	4 position socket housing
	8	61233-1	Socket terminal
	8	61234-1	Pin terminal

Figure 1

1.5. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15 to 35°C
Relative Humidity: 20 to 80%

* Trademark
I Indicates change

LOC B

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)		
	1	2	3
	Test Sequence (b)		
Examination of product	1,9	1,9	1,8
Dry circuit resistance	3,7	2,7	
Insulation resistance			2,6
Dielectric withstanding voltage			3,7
Temperature rise vs current		3,8	
Vibration	5	6(c)	
Mechanical shock	6		
Durability	4		
Mating force	2		
Unmating force	8		
Thermal shock			4
Humidity-temperature cycling		4(d)	5
Temperature life		5	

NOTE

(a) See paragraph 1.4.
(b) Numbers indicate sequence in which tests are performed.
(c) Discontinuities shall not be measured. Energize at 18°C level for 100% loadings per AMP Specification 109-151. Vibration duration in each axis shall be 1 hour.
(d) Precondition samples with 10 cycles durability.

Figure 2

2. SUMMARY OF TESTING

2.1. Examination of Product - All Test Groups

All samples submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by the Product Assurance Department. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance - Test Groups 1 and 2

All termination resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 3.5 milliohms initially and had a change in resistance (ΔR) of less than ± 3.0 milliohms after testing.

2.3. Insulation Resistance - Test Group 3

All insulation resistance measurements were greater than 1000 megohms.

2.4. Dielectric Withstanding Voltage - Test Group 3

No dielectric breakdown or flashover occurred.

2.5. Temperature Rise vs Current - Test Group 2

All samples had a temperature rise of less than 30°C above ambient when tested using a baseline rated current of 32.48 amperes and the correct derating factor value based on the samples wiring configuration.

2.6. Vibration - Test Groups 1 and 2

No discontinuities were detected during vibration. Following vibration, no cracks, breaks, or loose parts on the samples were visible.

2.7. Mechanical Shock - Test Group 1

No discontinuities were detected during mechanical shock. Following mechanical shock, no cracks, breaks, or loose parts on the samples were visible.

2.8. Durability - Test Group 1

No physical damage occurred as a result of mating and unmating the samples 50 times.

2.9. Mating Force - Test Group 1

All mating force measurements were less than 8.0 pounds.

2.10. Unmating Force - Test Group 1

All unmating force measurements were greater than 2.0 pounds.

2.11. Thermal Shock - Test Group 3

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

2.12. Humidity-temperature Cycling - Test Groups 2 and 3

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

2.13. Temperature Life - Test 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

Termination resistance measurements at low level current were made using a 4 terminal measuring technique (Figure 3). The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

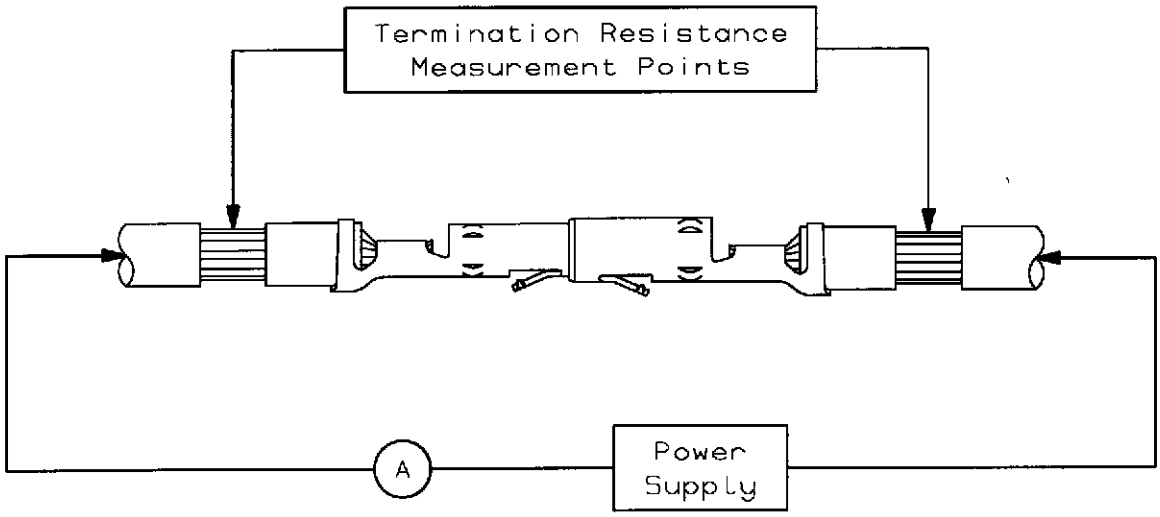

Figure 3
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of mated samples. A test voltage of 500 volts AC was applied for 2 minutes before the resistance was measured.

3.4. Dielectric Withstanding Voltage

A test potential of 5000 volts AC (rms) was applied between the adjacent contacts of mated samples. This potential was applied for 1 minute and then returned to zero.

3.5. Temperature Rise vs 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. Vibration, Sinusoidal

Mated samples 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 1 minute. This cycle was performed 120 times in each of 3 mutually perpendicular planes for a total vibration time of 6 hours. Samples were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.7. Mechanical Shock, Half-sine

Mated samples were subjected to a mechanical shock test having a half-sine waveform of 30 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes for a total of 18 shocks. Samples were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Durability

Samples were mated and unmated 50 times at a maximum rate of 600 cycles per hour.

3.9. Mating Force

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

3.10. Unmating Force

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

3.11. Thermal Shock

Mated samples were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 105°C. The transition between temperatures was less than 1 minute.

3.12. Humidity-temperature Cycling

Mated samples 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 4).

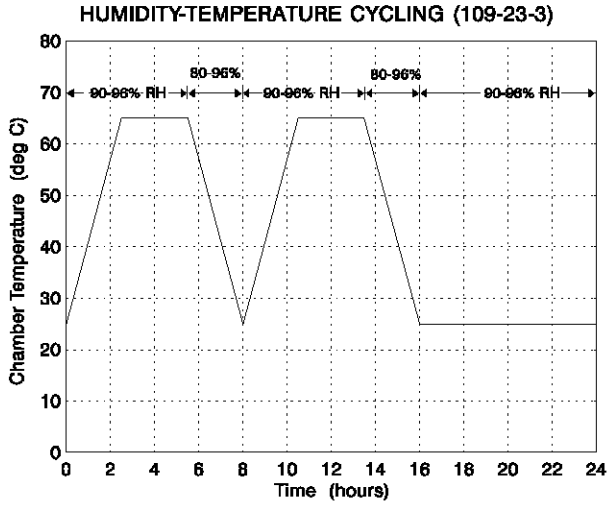

Figure 4
Typical Humidity-Temperature Cycling Profile

3.13. Temperature Life

Mated samples were exposed to a temperature of 85°C for 500 hours.