Connector, IDC Commercial MATE-N-LOK*

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* MATE-N-LOK* Commercial IDC (Insulation Displacement Connector) Connector to determine its conformance to the requirements of AMP Product Specification 108-49000 Rev. O.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the MATE-N-LOK Commercial IDC Connector. Testing was performed at the Global Automotive Division, Americas North Laboratory between November 1996 and July 1997.

1.3. Conclusion

The MATE-N-LOK Commercial IDC Connectors listed in paragraph 1.5., met the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-49000 Rev O.

1.4. Product Description

The MATE-N-LOK Commercial IDC Connectors provided a means of multiple-lead connections in wire-to-wire and wire-to-board applications for entertainment center, appliances, vending machines, computers, and other commercial equipment.

1.5. Test Samples

The test samples were representative of normal production lots, and samples identified with the following part numbers were used for test:

Test Group	Quantity	Part Nbr	Description
1	8	641737-1	RT. Angle Header.(4 POS)
	16	1-480426-0	Pin Housing (4 POS)
	64	61118-1	Pin Contacts (18 AWG)
	8	770156-3	IDC Contacts (18 AWG)
	8	770232-1	IDC Dust Covers
2	32	61116-1	Pin Contacts (22 AWG)
	32	61118-1	Pin Contacts (16 AWG)
	32	1-480426-0	Pin Housing (4 POS)
	16	641737-1	RT. Angle Header.(4 POS)
	8	770156-2	IDC Contacts (22 AWG)
	8	770156-5	IDC Contacts (16 AWG)
	16	770232-1	IDC Dust Covers
3	40	770156-5	IDC Contacts (16 AWG)
	10	641737-1	RT. Angle Header.(4 POS)
	10	1-480426-0	Pin Housing (4 POS)

* Trademark
| Indicates change

1.6. Environmental Conditions

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

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

1.7. Qualification Test Sequence

Test or Examination	Test Groups		
	1	2	3
	Test Sequence (a)		
Examination of product	1,9	1,9	1,8
Termination resistance	3,7	2,7	
Insulation resistance			2,6
Dielectric withstanding voltage			3,7
Temperature rise vs current		3,8	
Vibration	5	6	
Mechanical shock	6		
Mating force	2		
Unmating force	8		
Durability	4		
Thermal shock			4
Humidity -temperature cycling		4(b)	5
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 representative of normal production lots. A Certificate of Conformance was issued by the Product Assurance Department of the Consumer/Commercial Products Group. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance - 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 10 milliohms after testing.

Test Group	Nbr of Data points	Condition	Termination Resistance Min	Max	Mean
1	64	Initial	1.24	2.93	1.959
		After Mechanical (ΔR)	-0.17	+1.86	0.493
2	64	Initial	0.61	2.35	1.294
		After Current Rating(ΔR)	+0.03	+2.03	+0.438

All values in milliohms

2.3. Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred.

2.4. Insulation Resistance - Group 3

All insulation resistance measurements were greater than 500 megohms.

2.5. Temperature Rise vs Current - Group 2

All wire-to-board samples had a temperature rise of less than or equal to 30°C above ambient when tested using a baseline rated current of 12.04 amperes.

All wire-to-wire samples had a temperature rise of less than or equal to 30°C above ambient when tested using a baseline rated current of 12.95 amperes.

2.6. Vibration - Groups 1 and 2

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

2.7. Mechanical Shock - Group 1

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

2.8. Mating Force - Group 1

All mating force measurements were less than 4 pounds maximum per contact.

2.9. Unmating Force - Group 1

All unmating force measurements were greater than 0.7 pound per contact.

2.10. Durability - Group 1

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

2.11. Thermal Shock - Group 3

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

2.12. Humidity-temperature Cycling - Groups 2 and 3

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

2.13. 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

Termination resistance measurements at low level current were made using a 4 terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

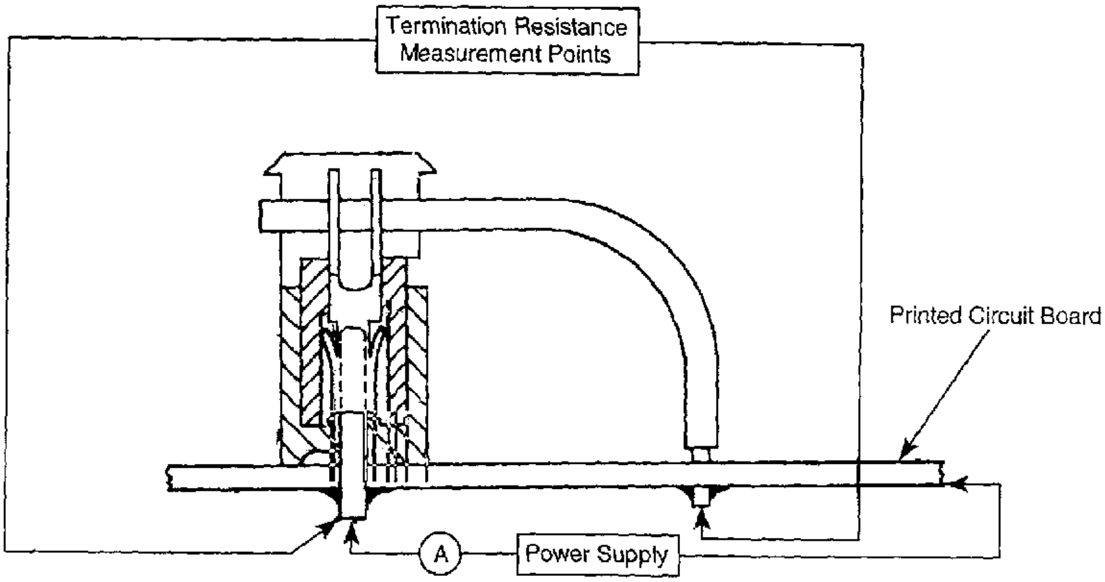

Figure 1
Typical Termination Resistance Measurement Points

3.3. Dielectric Withstanding Voltage

A test potential of 1500 volts AC was applied between the adjacent contacts of mated samples. This potential was applied for 1 minute and then returned to zero.

3.4. Insulation Resistance

Insulation resistance was measured between adjacent contacts of mated samples. A test voltage of 500 volts DC was applied for 1 minute before the resistance was measured.

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 10 microseconds or greater using a current of 100 milliamperes DC (Group 1 only). Wire to wire samples were energized with 9.0 amperes producing an approximate 18°C temperature rise. Wire to board samples were energized with 7.5 amperes.

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 10 microseconds or greater using a current of 100 milliamperes DC.

3.8. Mating Force

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

3.9. Unmating Force

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

3.10. Durability

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

3.11. Thermal Shock

Mated samples were subjected to 25 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 85°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 and 65°C twice while maintaining high humidity. (Figure 2) Samples were preconditioned with 5 cycles of durability. (Group 2 only)

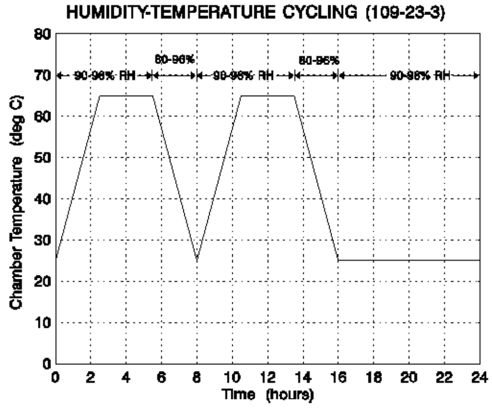

Figure 2
Typical Humidity-Temperature Cycling Profile

3.13. Temperature Life

Mated samples were exposed to a temperature of 105°C for 500 hours.

4. VALIDATION

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