Connector, AMPLIMITE* 2000, PCB Mounted, Nonremovable Contacts

1. INTRODUCTION

1.1. Purpose

Testing was performed on AMPLIMITE* 2000 PCB mounted connectors with nonremovable contacts to determine its conformance to the requirements of AMP* Product Specification 108-1545 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the AMPLIMITE 2000 PCB mounted connectors with nonremovable contacts. Testing was performed at the Americas Regional Laboratory between 27Oct94 and 20Apr95, and between 06May98 and 26Jun98. The test file numbers for this testing are CTL 4701-023-002 and CTL 4701-007A. This documentation is on file at and available from the Americas Regional Laboratory.

1.3. Conclusion

The AMPLIMITE 2000 PCB mounted connectors with nonremovable contacts conformed to the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1545 Revision A.

1.4. Product Description

The AMPLIMITE 2000 PCB mounted connectors with nonremovable contacts are designed for printed circuit board applications. The nonremovable contacts are made from a copper alloy and are gold plated on the mating end. The housing material is Polyester, UL94V-0 rated. The connectors are available in 9, 15, and 25 positions.

1.5. Test Samples

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

Test Group	Quantity	Part Number	Description
2,3,4,5	5 each	787202-1	25 position receptacle
5	5 each	787203-1	9 position plug
2,3,4	5 each	207464-2	25 position plug housing
1,2,3,4	125 each	66506-3	Pin contacts
1	5 each	787202-2	25 position receptacle
1	5 each	207464-1	25 position plug housing

Figure 1

* Trademark
| Indicates change

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)				
	1	2	3	4	5
	Test Sequence (b)				
Examination of product	1,9	1,5	1,5	1,8	1,3
Termination resistance	3,7	2,4	2,4		
Insulation resistance				2,6	
Dielectric withstanding voltage				3,7	
Solderability					2
Vibration	5				
Mechanical shock	6				
Durability	4				
Mating force	2				
Unmating force	8				
Thermal shock				4	
Humidity-temperature cycling				5	
Temperature life		3(c)			
Mixed flowing gas			3(c)		

NOTE

(a) See Para 1.5.
(b) Numbers indicate sequence in which tests are performed.
(c) 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 selected from normal current production lots. A Certificate of Conformance was issued by Product Assurance. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

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

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage, were less than 15 milliohms initially and 20 milliohms after testing.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	60	Initial	6.07	8.19	6.884
		After mechanical	6.09	8.38	6.987
2	125	Initial	4.69	7.20	5.684
		After temperature life	4.94	8.94	6.334
3	125	Initial	4.73	6.70	5.639
		After mixed flowing gas	4.77	8.07	5.720

NOTE *All values in milliohms.*

Figure 3

2.3. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 5,000 megohms initially and 1,000 megohms after humidity exposure.

2.4. Dielectric Withstanding Voltage - Test Group 4

No dielectric breakdown or flashover occurred.

2.5. Solderability - Test Group 5

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

2.6. Vibration - Test Group 1

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

2.8. Durability - Test Group 1

No physical damage occurred to the samples as a result of mating and unmating the samples for 100 times for gold flash product and 250 cycles for .000015 inch thick gold plated product.

2.9. Mating Force - Test Group 1

All mating force measurements were less than 37 pounds.

2.10. Unmating Force - Test Group 1

All unmating force measurements were less than 37 pounds.

2.11. Thermal Shock - Test Group 4

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

2.12. Humidity-temperature Cycling - Test Group 4

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.

2.14. Mixed Flowing Gas - Test Group 3

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

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 4 terminal measuring technique (Figure 4). The test current was maintained at 100 milliamperes maximum with a 50 millivolt maximum open circuit voltage.

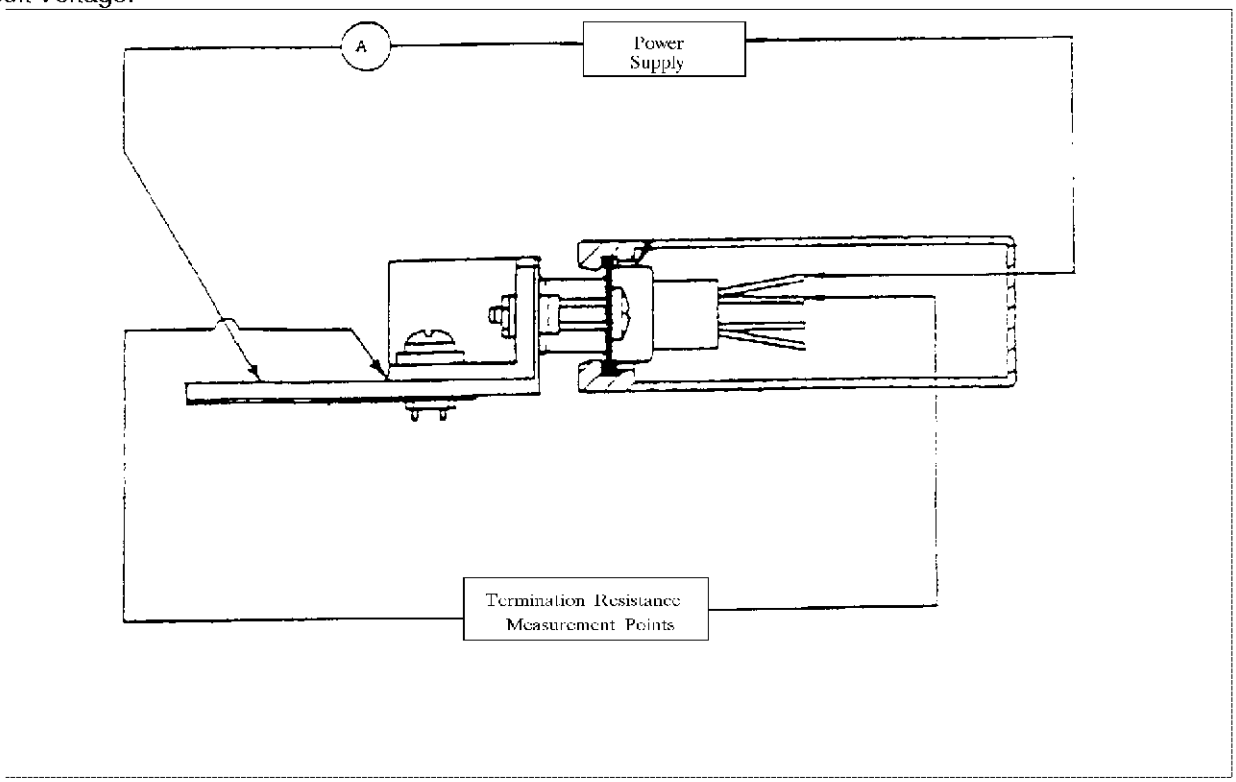

Figure 4
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

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

3.4. Dielectric Withstanding Voltage

A test potential of 1,000 volts AC was applied between the adjacent contacts of unmated samples. This potential was applied for 1 minute and then returned to zero.

3.5. 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 1 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 $\pm$ 5°C.

3.6. Vibration, Random

Mated samples were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 50 and 2000 Hz. The power spectral density at 50 Hz was 0.1 G^2/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.4 G^2/Hz at 100 Hz. The spectrum is flat at 0.4 G^2/Hz from 100 to 1000 Hz. The spectrum sloped down at 6 dB per octave to the upper bound frequency of 2000 Hz, at which the PSD was 0.1 G^2/Hz. The root-mean square amplitude of the excitation was 23.91 GRMS. This was performed for 20 minutes in each of 3 mutually perpendicular planes for a total vibration time of 60 minutes. Samples were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes in the monitoring circuit.

3.7. Mechanical Shock, Half-sine

Mated samples were subjected to a mechanical 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 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 in the monitoring circuit.

3.8. Durability

Samples were mated and unmated 100 times for gold flash product and 250 cycles for .000015 inch thick gold plated product at a rate not exceeding 200 cycles per hour.

3.9. Mating Force

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

3.10. Unmating Force

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

3.11. Thermal Shock

Mated samples were subjected to 100 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 and 65°C twice while maintaining high humidity. During 5 of the first 9 cycles, the samples were exposed to a cold shock at -10°C for 3 hours (Figure 5).

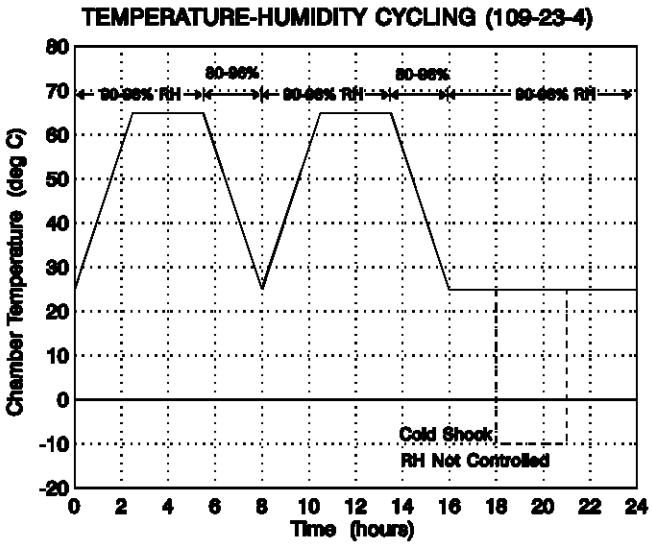

Figure 5
Typical Temperature Cycling/Humidity Curve

3.13. Temperature Life

Mated samples were exposed to a temperature of 105°C for 500 hours. Samples were preconditioned with 10 cycles of durability.

3.14. Mixed Flowing Gas, Class II

Mated samples were exposed for 14 days to a mixed flowing gas Class II exposure. Class II exposure is defined as a temperature of 30°C and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb, NO_2 at 200 ppb, and H_2S at 10 ppb. Samples were preconditioned with 10 cycles of durability.