Connector, AMPINNERGY*, Wire-To-Board

1. INTRODUCTION

1.1. Purpose

Testing was performed on AMPINNERGY* wire to board connectors to determine its conformance to the requirements of AMP* Product Specification 108-1349 Rev. O.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the AMPINNERGY wire to board connectors. Testing was performed at the Americas Regional Laboratory between 17Aug95 and 06Aug96 and between 18Jul97 and 02Dec97.

1.3. Conclusion

The AMPINNERGY wire to board connectors, listed in paragraph 1.5., meet the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1349 Rev O.

1.4. Product Description

The AMPINNERGY wire to board connector system consists of vertical and right angle receptacle assemblies designed to be soldered to printed circuit boards. The plug housing contains dual beam crimp contacts for wire application. The plug contacts are tin plated copper alloy and the receptacle contacts are tin plated copper.

1.5. Test Samples

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

Test Group	Quantity	Part Nbr	Description
1,2,3	4 ea.	556881-8	8 Position vertical receptacle assembly
1,2,3	4 ea.	556879-8	8 Position plug housing
1,2	32 ea.	556880-2	Terminal on AWG 10 wire
3	32	556883-2	Terminal on AWG 18 wire

1.6. Environmental Conditions

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

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

* Trademark
| Indicates change

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 100 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 Manufacturing Business Equipment Unit. 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 50 millivolts maximum open circuit voltage had a maximum change in resistance (ΔR) of 1.0 milliohms or less.

Test Group	Nbr of Data points	Condition	Termination Resistance (ΔR) Min	Max	Mean
1	32	After Mechanical	-0.07	+0.40	+0.101
2	30	After Current rating	-0.02	+0.03	+0.003

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 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 31.87 amperes and the correct derating factor value based on the samples wiring configuration.

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 6 pounds maximum average per contact.

2.9. Unmating Force - Group 1

All unmating force measurements were greater than 1 pound minimum average per contact and less than 6 pounds maximum average per contact.

2.10. Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the samples 100 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 50 millivolt open circuit voltage.

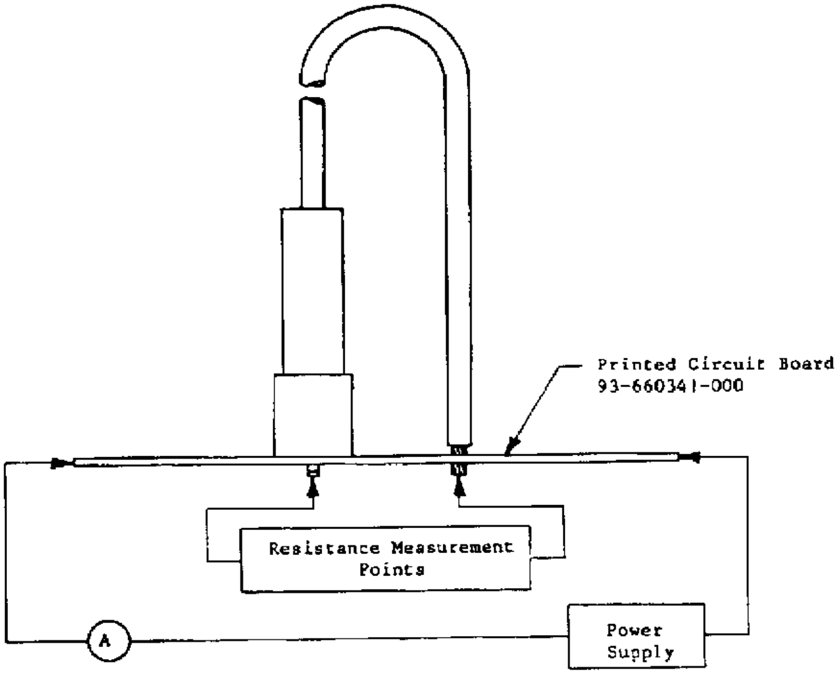

Figure 1
Typical Termination Resistance Measurement Points

3.3. Dielectric Withstanding Voltage

A test potential of 2,200 volts AC was applied between the adjacent contacts. This potential was applied for 1 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 2 minutes 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 1 microsecond or greater using a current of 100 milliamperes DC (Test Group 1 only). Samples were energized at 23.8 amperes (Test Group 2 only).

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 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 1.0 inch/minute and a free floating fixture. The maximum average force per contact was calculated.

3.9. Unmating Force

The force required to unmate individual samples was measured using a tensile/compression device with the rate of travel at 1.0 inch/minute and a free floating fixture. The maximum and minimum average forces per contact were calculated.

3.10. Durability

Samples were mated and unmated 100 times at a maximum rate of 500 cycles per hour.

3.11. Thermal Shock

Mated samples were subjected to 10 cycles of thermal shock with each cycle consisting of 30 minute dwells at 0 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. (Figure 2) Samples were preconditioned with 100 cycles of durability.

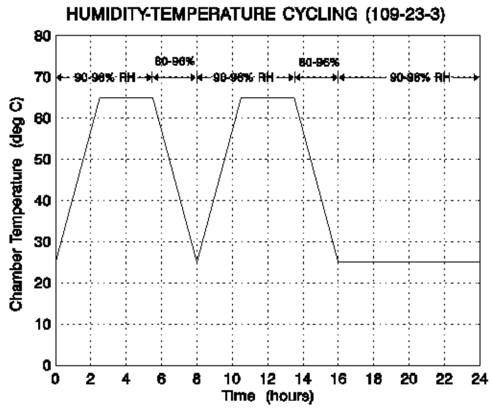

Figure 2
Typical Humidity-Temperature Cycling Profile

3.13. Temperature Life

Mated samples were exposed to a temperature of 118°C for 792 hours.

4. VALIDATION

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