Header, AMP-DUAC*

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP-DUAC* (Dual Action Receptacle Contact) header to determine its conformance to the requirements of AMP* Product Specification 108-1699 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the AMP-DUAC Connector. Testing was performed at the Americas Regional Laboratory between 11Aug97 and 01May98. The test file number for this testing is CTL 8221-000-004A. This documentation is on file at and available from the Americas Regional Laboratory.

1.3. Conclusion

The AMP- DUAC Connectors listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1699 Revision A.

1.4. Product Description

The AMP- DUAC Connector is a 2 to 24 position vertical header designed for power applications and uses female contacts in the receptacle connector mating half. 1.14 mm [0.045 inch] square posts are used in the header which has a polarized housing to prevent improper insertion of the mating half.

1.5. Test Samples

The 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	6	794311-1	AMP-DUAC Header
	1	6	2-106527-0	AMP-DUAC Receptacle housing
	1	120	106529-2	AMP-DUAC Contacts/ 18AWG wire
I	2	6	794311-1	AMP-DUAC Header
I	2	6	2-106527-0	AMP-DUAC Receptacle housing
	2	60	106529-2	AMP-DUAC Contacts/ 18AWG wire
I	2	60	106528-2	AMP-DUAC Contacts/ 26AWG wire (T-rise only)
	3	5	794311-1	AMP-DUAC Header

Figure 1

* Trademark
I 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 Group (a)		
	1	2	3
	Test Sequence (b)		
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(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 Para 1.5.
(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.
(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 10 milliohms.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	60	Initial	2.31	2.84	2.507
		After Mechanical	2.66	3.86	2.977
2	30	Initial	2.48	2.87	2.617
		After Current Verification	2.78	5.72	3.917

NOTE *All values in milliohms*

Figure 3

2.3. Insulation Resistance - Test Group 3

All insulation resistance measurements were greater than 1,000 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 10.12 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 (Test Group 1 only). 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 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 30 times.

2.9. Mating Force - Test Group 1

All mating force measurements were less than 6.9 Newtons [1.54 pounds] average per contact.

2.10. Unmating Force - Test Group 1

All unmating force measurements were greater than 0.5 Newton [0.11 pound] average per contact.

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

N o 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. The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

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 1,500 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. 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 1.5mm [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 with sufficient AC current to produce an 18°C temperature rise (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. Durability

Samples were mated and unmated 30 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 the rate of travel at 12.7mm [0.5 inch] per minute and a free floating fixture. The 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 the rate of travel at 12.7mm [0.5 inch] per minute and a free floating fixture. The locking latches were disengaged. The average force per contact was calculated.

3.11. Thermal Shock

Unmated 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 (Test Group 2) and unmated (Test Group 3) 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 4). Samples in Test Group 2 were preconditioned with 10 cycles of durability.

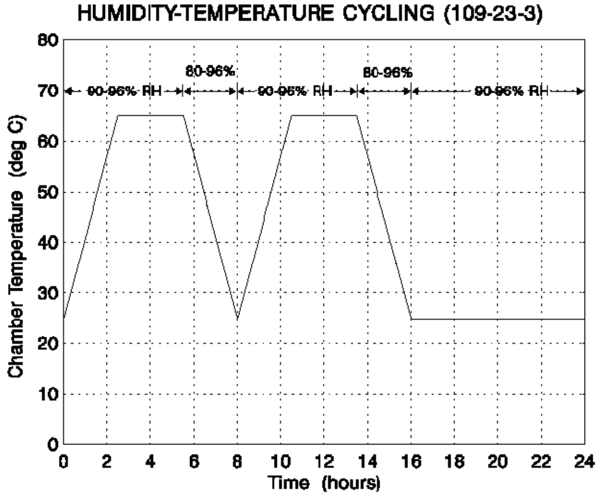

Figure 4
Typical Humidity-Temperature Cycling Profile

3.13. Temperature Life

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