CONNECTOR, BLIND MATE, CHASSIS MOUNT CABLE TO CABLE

1. Introduction

1.1 Purpose

Testing was performed on AMP™ Chassis mount cable to cable Blind Mate Connectors to determine its conformance to the requirements of AMP Product Specification 108-1559 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Chassis mount cable to cable Blind Mate Connectors manufactured by the Interconnection Components and Assembly Division of the Capital Goods Business Unit. The testing was performed between January 22, 1996 and March 22, 1996.

1.3 Conclusion

The Chassis mount cable to cable Blind Mate Connectors, listed in paragraph 1.5, met the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1559 Rev O.

1.4 Product Description

The Blind Mate header and receptacle connectors are designed for chassis mount cable to cable applications. The header contacts are Brass with gold over palladium-nickel plating on the contact area, tin-lead plating on the crimp area, all over nickel plating. The receptacle contacts are phosphor bronze with gold over palladium-nickel plating on the contact area, tin-lead plating on the crimp area, all over nickel plating. The Housing material is black Polyester, 125°C, UL94V-0 rated.

1.5 Test Samples

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

Test Group	Quantity	Part Nbr	Description
1,2,3,4,5	5 ea.	787499-1	12 Pos. Header Housing
1,2,3,4,	5 ea.	787500-1	12 Pos. Receptacle Housing
1,2,3,4,5	60 ea.	787509-2	Header Contact
1,2,3,4	60 ea.	787510-2	Receptacle Contact
6	60	787509-2	Header Contact on AWG 22 wire
6	60	787509-2	Header Contact on AWG 24 wire
6	60	787509-2	Header Contact on AWG 26 wire
6	60	787510-2	Receptacle Contact on AWG 22 wire
6	60	787510-2	Receptacle Contact on AWG 24 wire
6	60	787510-2	Receptacle Contact on AWG 26 wire

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1.6 Qualification Test Sequence

	Test Groups					
Test or Examination	1	2	3	4	5	6
Examination of Product	1,9	1,5	1,5	1,8	1,4	1,3
Termination Resistance, Dry Circuit	3,7	2,4	2,4			
Insulation Resistance				2,6		
Dielectric Withstand Voltage				3,7		
Crimp Tensile						2
Vibration	5					
Physical Shock	6					
Durability	4					
Contact Retention Force					3	
Contact Insertion Force					2	
Mating Force	2					
Unmating Force	8					
Thermal Shock				4		
Humidity -Temperature Cycling				5		
Temperature Life		3(a)				
Mixed Flowing Gas			3(a)			

The numbers indicate sequence in which tests were performed.

(a) Precondition with 10 cycles of Durability

2. Summary of Testing

2.1 Examination of Product - All Groups

All samples submitted for testing were randomly selected from current production lots. A Certificate of Conformance was issued by the Product Assurance Department of the Capital Goods Business Unit. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Termination Resistance, Dry Circuit - Groups 1,2,3

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage were less than 8 milliohms.

Test Group	Nbr of Data points	Condition	Min	Max	Mean
1	60	Initial	2.77	3.21	2.930
		After Mechanical	2.74	3.44	2.933
2	60	Initial	2.52	2.94	2.690
		After Temp Life	2.60	3.14	2.790
3	60	Initial	2.01	2.99	2.659
		After Mixed Gas	2.19	3.48	2.861

All values in milliohms
Bulk resistance was subtracted from measurements

2.3 Insulation Resistance - Group 4

All insulation resistance measurements were greater than 1,000 megohms.

2.4 Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred.

2.5 Crimp Tensile - Group 6

All tensile values were greater than 10 pounds for samples prepared on AWG 22 wire, 8 pounds for samples on AWG 24 wire, and 6 pounds for samples on AWG 26 wire..

2.6 Vibration - Group 1

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

2.7 Physical Shock - Group 1

No discontinuities were detected during physical shock. Following physical shock testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.8 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector halves 2,500 times.

2.9 Contact Retention - Group 5

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housings as a result of supplying an axial load of 6.0 pounds to each contact.

2.10 Contact Insertion Force - Group 5

The force required to insert each contact into its housing cavity was less than 5.5 pounds.

2.11 Mating Force - Group 1

All mating force measurements were less than 8.5 ounces per contact.

2.12 Unmating Force - Group 1

All unmating force measurements were greater than 2.0 ounces per contact.

2.13 Thermal Shock - Group 4

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

2.14 Humidity-Temperature Cycling - Group 4

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

2.15 Temperature Life - Group 2

No evidence of physical damage was visible as a result of exposure to an elevated temperature.

2.16 Mixed Flowing Gas - 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 four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes DC with a 50 millivolt open circuit voltage.

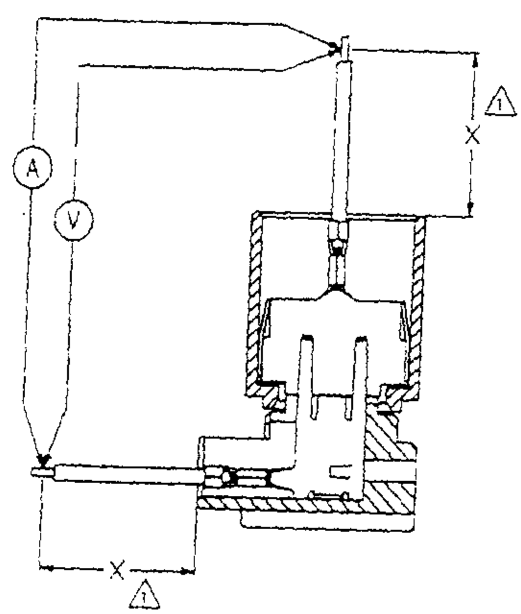

Figure 1
Typical Termination Resistance Measurement Points
(1) Bulk Resistance (Area defined by 'X') to be removed from measurement

3.3 Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 500 volts DC. This voltage was applied for two minutes before the resistance was measured.

3.4 Dielectric Withstanding Voltage

A test potential of 500 volts AC was applied between the adjacent contacts. This potential was applied for one minute and then returned to zero.

3.5 Crimp Tensile

An increasing axial force was applied to each sample at a crosshead rate of 1.0 inch per minute. This force was applied until sample failed.

3.6 Vibration, Random

Mated connectors were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 5 and 500 hertz. The power spectral density at 5 Hz was 0.000312 G^2/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.04 G^2/Hz at 16 Hz. The spectrum was flat at 0.04 G^2/Hz from 16 to 500 Hz. The root-mean square amplitude of the excitation was 4.41 GRMS. This was performed for 20 minutes in each of three mutually perpendicular planes, for a total vibration time of 60 minutes. Connectors were monitored for discontinuities of one microsecond or greater, using a current of 100 milliamperes DC.

3.7 Physical Shock

Mated connectors were subjected to a physical 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 three mutually perpendicular planes, for a total of 18 shocks. The connectors were monitored for discontinuities of one microsecond or greater, using a current of 100 milliamperes DC.

3.8 Durability

Connectors were mated and unmated 2,500 times at a rate of 500 per hour.

3.9 Contact Retention

An axial load of 6.0 pounds was applied to each contact and held for 7 seconds. The force was applied in a direction to cause removal of the contacts from the housing.

3.10 Contact Insertion

The force required to seat a contact into its cavity was measured.

3.11 Mating Force

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

3.12 Unmating Force

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

3.13 Thermal Shock

Mated connectors were subjected to 5 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55 and 105°C. The transition between temperatures was less than one minute.

3.14 Humidity-Temperature Cycling

Mated connectors 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 the relative humidity was held at 95%. (Figure 2)

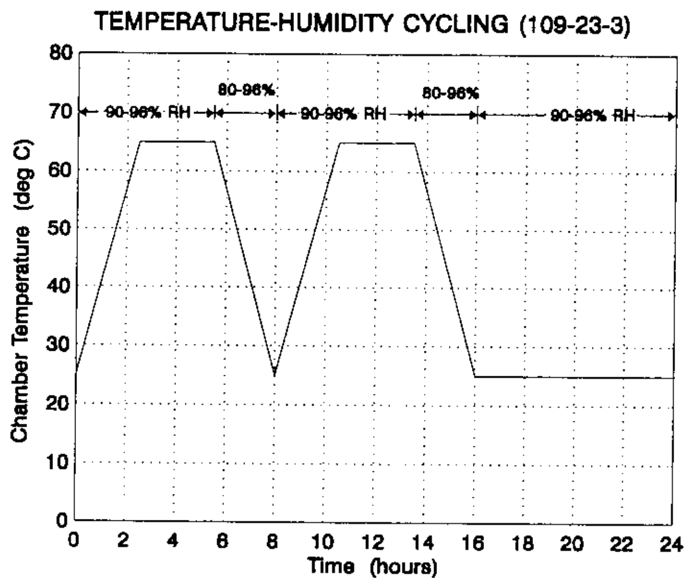

Figure 2
Typical Humidity-Temperature Cycling Profile

3.15 Temperature Life

Mated samples were exposed to a temperature of 105°C for 315 hours.

3.16 Mixed Flowing Gas, Class III

Mated connectors were exposed for 10 days to a mixed flowing gas Class III exposure. Class III exposure is defined as a temperature of 30°C and a relative humidity of 75% with the pollutants of $C1_2$ at 20 ppb, NO_2 at 200 ppb, and H_2S at 100 ppb. Samples were preconditioned with 10 cycles of durability.

4. Validation

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