CONNECTOR, .125 INCH BLADE & RECEPTACLE

1. Introduction

1.1 Purpose

Testing was performed on AMP® .125 Blade & Receptacle Connector to determine its conformance to the requirements of AMP Product Specification 108-1530 Rev. A.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the .125 Inch Blade & Receptacle Connector manufactured by the Consumer Products Business Unit of the Automotive/Consumer Business Group. Initial testing was performed between August 15, 1994 and February 6, 1995. Retesting to qualify Nylon housings was performed between January 31, 1996 and May 2, 1996

1.3 Conclusion

The .125 Blade & Receptacle Connectors, listed in paragraph 1.5, meet the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1530 Rev A.

1.4 Product Description

The .125 inch Blade and Receptacle Connectors are designed for general consumer product usage. The contacts are pre-tin plated Brass. The housing material is PBT, UL94V-2 rated or 6/6 Nylon, UL94V-2 rated.

1.5 Test Samples

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

Test Group	Quantity	Part Nbr	Description
	INITIAL QUALIFICATION		
1,2	56	63627-1	.125 Blade contact 18 AWG wire
2,3,5,6	112	63627-1	.125 Blade contact 14 AWG wire
1,2	56	770642-1	.125 Recept contact 18 AWG wire
2,3,5,6	112	770642-1	.125 Recept contact 14 AWG wire
1,2,3,4,5,6	42	521048-1	Cap Housing
1,2,3,4,5,6	42	521047-1	Plug Housing
	SUPPLIMENTAL QUALIFICATION		
1	28	63627-1	.125 Blade contact 18 AWG wire
3,5	56	63627-1	.125 Blade contact 14 AWG wire
1	28	770642-1	.125 Recept contact 18 AWG wire
3,5	56	770642-1	.125 Recept contact 14 AWG wire
1,3,4,5	28	521048-2	Cap Housing
1,3,4,5	28	521047-2	Plug Housing

1.6 Qualification Test Sequence

	Test Groups					
Test or Examination	1	2	3	4	5	6
Examination of Product	1,9	1,9	1,8	1,3	1,5	1,5
Termination Resistance, Dry Circuit	3,7	2,7				2,4
Dielectric Withstanding Voltage			3,7			
Insulation Resistance			2,6			
Current Cycling						3
Temperature Rise vs Current		3,8				
Vibration	5	6				
Physical Shock	6					
Mating Force	2					
Unmating Force	8					
Contact Insertion					2	
Contact Retention					3	
Crimp Tensile					4	
Durability	4					
Housing Lock Strength				2		
Thermal Shock			4			
Humidity-Temperature Cycling		5	5			
Temperature Life		4				

The numbers indicate sequence in which tests were performed.

2. Summary of Testing

2.1 Examination of Product - All Groups

All samples submitted for testing were selected from normal current production lots. They were inspected and accepted by the Product Assurance Department of the Automotive/Consumer Business Group.

2.2 Termination Resistance, Dry Circuit - Groups 1,2 6

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage were less than 4 milliohms initially and a maximum increase (ΔR) of less than 5 milliohms after testing.

Termination Resistance

Test Group	Nbr of Data points	Condition	Min	Max	Mean
1(I)	28	Initial	2.79	2.94	2.877
		After Mechanical(ΔR)	+0.13	+0.66	+0.422
1(S)	28	Initial	2.89	3.08	2.960
		After Mechanical(ΔR)	+0.10	+0.32	+0.189
2(I)	56	Initial	1.83	2.95	2.398
		After Current Verif.(ΔR)	+0.47	+3.37	+1.765
6(I)	28	Initial	1.83	1.95	1.875
		After Current Cycling(ΔR)	+0.18	+1.15	+0.430

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred when a test voltage was applied between adjacent contacts.

2.4 Insulation Resistance - Group 3

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

2.5 Current Cycling - Group 6

No evidence of physical damage was visible to the test samples after 500 cycles of cycling the current on and off at a current of 17.5 amperes. The cycling current represented 200% of the specified current.

2.6 Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when a specified current was applied.

2.7 Vibration - Groups 1,2

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

2.8 Physical Shock - Group 1

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

2.9 Mating Force - Group 1

All mating force measurements were less than 12 pounds per connector.

2.10 Unmating Force - Group 1

All unmating force measurements were greater than 3 pounds per connector.

2.11 Contact Insertion Force - Group 5

The force required to insert each contact into its housing cavity was less than 2 pounds per contact.

2.12 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 18 pounds to the contacts in PBT housings and 10 pounds to contacts in Nylon housings.

2.13 Crimp Tensile - Group 5

All tensile values were greater than 20 pounds for samples crimped on AWG 18 wire, 30 pounds for samples crimped on AWG 16 wire, and 50 pounds for samples crimped on AWG 14 wire.

2.14 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 5 times.

2.15 Housing Lock Strength - Group 4

Mated connectors did not unmate with a 25 pound axial load applied.

2.16 Thermal Shock - Group 3

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to thermal shock.

2.17 Humidity-Temperature Cycling - Groups 2,3

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to humidity-temperature cycling.

2.18 Temperature Life - Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to an elevated temperature.

3. Test Methods

3.1 Examination of Product

Product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

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 an open circuit voltage of 50 millivolts DC.

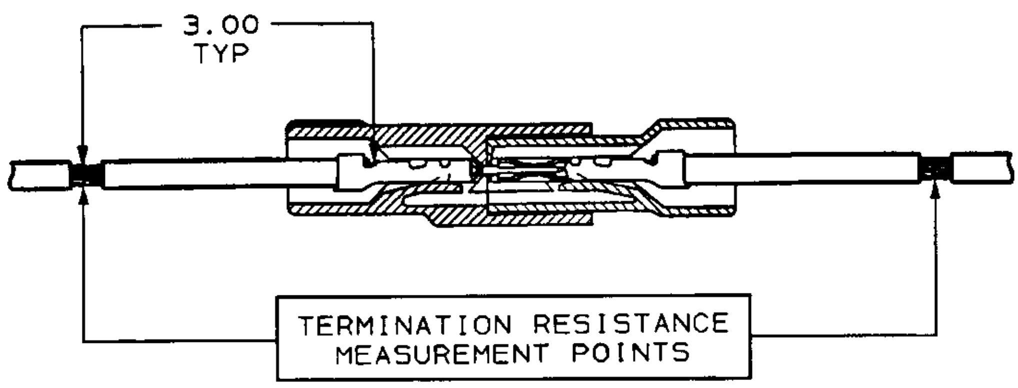

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 2,200 volts AC was applied between the adjacent contacts. This potential was applied for one 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 two minutes before the resistance was measured.

3.5 Current Cycling

The connectors were cycled on and off at 24 amperes (200% of the specified current). Testing consisted of 500 cycles, with each cycle having current on for 45 minutes and current off for 15 minutes.

3.6 Temperature Rise vs Specified Current

Connector temperature was measured, while energized at the specified current of 12 amperes AC for single contact, AWG 14 sample. Thermocouples were attached to the connectors to measure their temperatures. This temperature was then subtracted from the ambient temperature to find the temperature rise. When three readings at five minute intervals were the same, the readings were recorded.

3.7 Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in one minute. This cycle was performed 120 times in each of three mutually perpendicular planes, for a total vibration time of 6 hours. Connectors were monitored for discontinuities of one microsecond or greater, using a current of 100 milliamperes in the monitoring circuit (Group 1). Connectors were energized with enough current to provide an 18°C initial temperature rise during vibration (Group 2).

3.8 Physical Shock

Mated connectors were subjected to a physical shock test, having a saw-tooth waveform of 50 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 greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.9 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..

3.10 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..

3.11 Contact Insertion

An axial load was applied to each contact. This force was applied in a direction to cause insertion of the contact into its housing cavity.

3.12 Contact Retention

An axial load was applied to each contact and held for 60 seconds. The force was applied in a direction to cause removal of the contacts from the housing.

3.13 Crimp Tensile

An axial load was applied to each sample at a crosshead rate of 1.0 inch per minute. This load was increased until sample failure occurred. Sample failure being: wire break, contact break, or combination of both.

3.14 Durability

Connectors were mated and unmated 5 times at a rate not exceeding 300 per hour.

3.15 Housing Lock Strength

An axial load of 25 pounds was applied to mated connector assemblies. The force was applied in a direction that would cause the housing locks to fail.

3.16 Thermal Shock

Mated connectors were subjected to 25 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -40°C and 105°C. The transition between temperatures was less than one minute.

3.17 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)

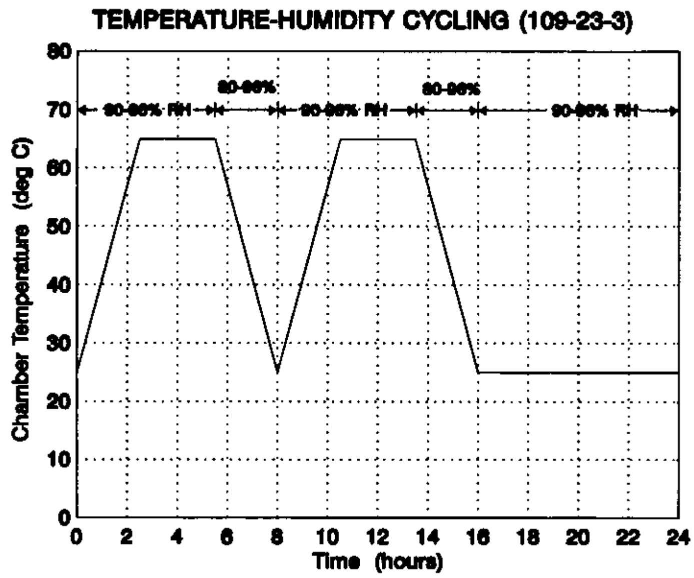

Figure 2
Typical Humidity-Temperature Cycling Profile

3.18 Temperature Life

Mated connectors were exposed to a temperature of 105°C for 580 hours. Connectors were pre-conditioned with 3 cycles of durability.

4. Validation

Prepared by:

Terrance M. Shingara 5/6/96

Terrance M. Shingara
Test Engineer
Product Qualification Team
Americas Regional Laboratory

Reviewed by:

Robert S. Druckenmiller 5/6/96

Robert S. Druckenmiller
Supervisor
Product Testing
Americas Regional Laboratory

Approved by:

Kurt Peiffer 5/17/96

Kurt Peiffer
Manager
Quality Assurance
Consumer Products Business Unit