Hooded SL 156 Connectors, Gold

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP Hooded SL 156 Connector with Gold plated contacts to determine its conformance to the requirements of Product Specification 108-1049-1 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the Hooded SL 156 Connector with Gold plated contacts manufactured by Consumer/Commercial Business Division. The testing was performed between 12Jul96 and 11Oct96. Additional testing was performed on 10Jul09.

1.3. Conclusion

The AMP Hooded SL 156 Connector with Gold plated contacts, listed in paragraph 1.5, meet the electrical, mechanical, and environmental performance requirements of Product Specification 108-1049-1 Revision A.

1.4. Product Description

The AMP SL 156 hooded connector is a dual wipe connector system. This system is used for wire to board interconnection and mates with .045 inch square or round posts. The contacts are phosphor bronze, gold plated. The housing material is Nylon, unreinforced, UL94V-0.

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 Number	Description
3	5	1-641202-0	Header, square, 10 position, gold
1	5	641209-6	Header, round, 6 position, gold
1	5	641202-6	Header, square, 6 position, gold
1	90	770476-2	Crimp Contact, Gold
1	10	640250-6	Housing, 6 position
2,3	8	1-640250-0	Housing, 10 position
4	15	350980-2	SL 156 Lo Force contacts crimped to 24 AWG wire on 3" leads
	15	350980-2	SL 156 Lo Force contacts crimped to 22 AWG wire on 3" leads
	15	350980-2	SL 156 Lo Force contacts crimped to 20 AWG wire on 3" leads
	15	350980-2	SL 156 Lo Force contacts crimped to 18 AWG wire on 3" leads
	15	3-647466-1	SL 156 Hooded contacts crimped to 16 AWG wire on 3" leads

Figure 1

* Trademark
| Indicates change

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	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		
Sinusoidal vibration	5	6(c)		
Physical shock	6			
Durability	4			
Mating force	2			
Unmating force	8			
Crimp tensile				1
Thermal shock			4	
Humidity/temperature cycling			5	
Temperature life		5		
Mixed flowing gas		4(d)		

NOTE

(a) See paragraph 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 Test Specification 109-151.
(d) Precondition samples with 5 cycles durability.

Figure 2

2. SUMMARY OF TESTING

2.1. Examination of Product - All Test Groups

All samples submitted for testing were randomly selected from current 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 50 millivolts open circuit voltage were less than 3.0 milliohms initially and had a maximum change in resistance (ΔR) of 10 milliohms after testing.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	60	Initial	1.58	2.32	1.882
		After mechanical (ΔR)	-0.45	4.32	1.063
2	30	Initial	1.63	2.66	1.939
		After current verification (ΔR)	-0.52	1.91	0.570

NOTE *All values in milliohms.*

Figure 3

2.3. Insulation Resistance - Test Group 3

All insulation resistance measurements were greater than 1000 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 10.0 amperes and the correct derating factor value based on the samples wiring configuration.

2.6. Sinusoidal 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 connector assemblies were visible.

2.7. Physical Shock - Test 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 - Test Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 25 times.

2.9. Mating Force - Test Group 1

All mating force measurements were less than 3.0 pounds per contact using .045 round mating posts and less than 2.0 pounds per contact using .045 square mating posts.

2.10. Unmating Force - Test Group 1

All unmating force measurements were greater than 0.25 pounds per contact using .045 round mating posts and greater than 0.25 pounds per contact using .045 square mating posts.

2.11. Crimp Tensile - Test Group 4

All crimp tensile measurements were greater than 10 pounds for 24 AWG wire, 15 pounds for 22 AWG wire, 25 pounds for 20 AWG wire, 35 pounds for 18 AWG wire and 40 pounds for 16 AWG wire.

2.12. Thermal Shock - Test Group 3

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

2.13. Humidity/temperature Cycling - Test Group 3

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

2.14. Temperature Life - Test Group 2

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

2.15. Mixed Flowing Gas - Test Group 2

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

Termination resistance measurements at low level current were made using a four terminal measuring technique (Figure 4). The test current was maintained at 100 milliamperes maximum with a 50 millivolt open circuit voltage.

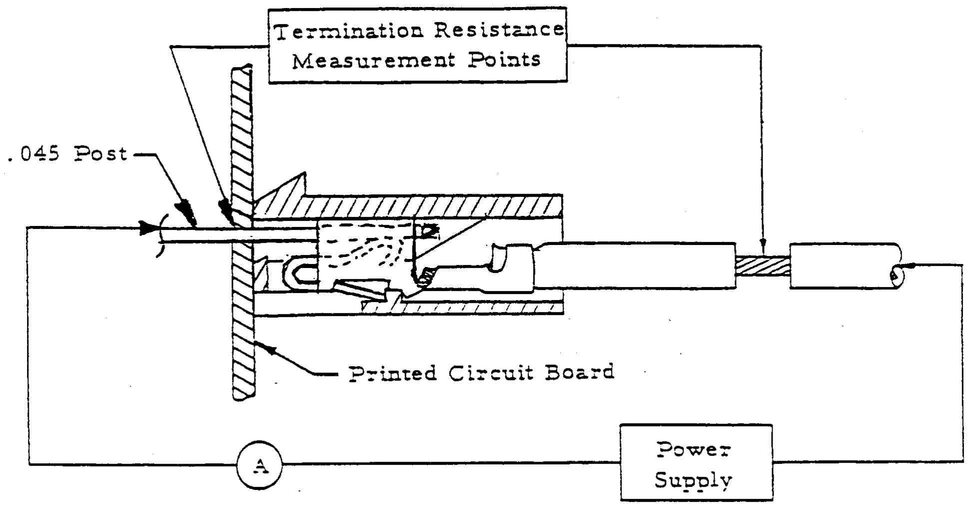

Figure 4
Typical Termination Resistance Measurement Points

3.3. 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.

3.4. Dielectric Withstanding Voltage

A test potential of 2000 volts AC was applied between the adjacent contacts. This potential was applied for 1 minute and then returned to zero.

3.5. Temperature Rise vs Specified 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 the 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. Sinusoidal Vibration

Mated connectors 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. Connectors were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC (Test Group 1). Samples were 100% energized with 7 amperes which was the predetermined 18°C temperature rise current (Test Group 2).

3.7. Physical Shock

Mated connectors were subjected to a physical 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. Connectors were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Durability

Connectors were mated and unmated 25 times by hand at a maximum rate of 300 cycles per hour.

3.9. Mating Force

The force required to mate individual connectors was measured using a tensile/compression device with the rate of travel at .5 inch per minute and a free floating fixture. The force per contact was calculated.

3.10. Unmating Force

The force required to unmate individual connectors was measured using a tensile/compression device with the rate of travel at .5 inch per minute and a free floating fixture.

3.11. Crimp Tensile

The force load was applied to each specimen using a tensile/compression device with the rate of travel at 1 inch per minute.

3.12. Thermal Shock

Unmated connectors were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minutes dwell at -55 and 105°C. The transition between temperatures was less than 1 minute.

3.13. Humidity/temperature Cycling

Unmated connectors 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 the relative humidity was held at 95% (Figure 5).

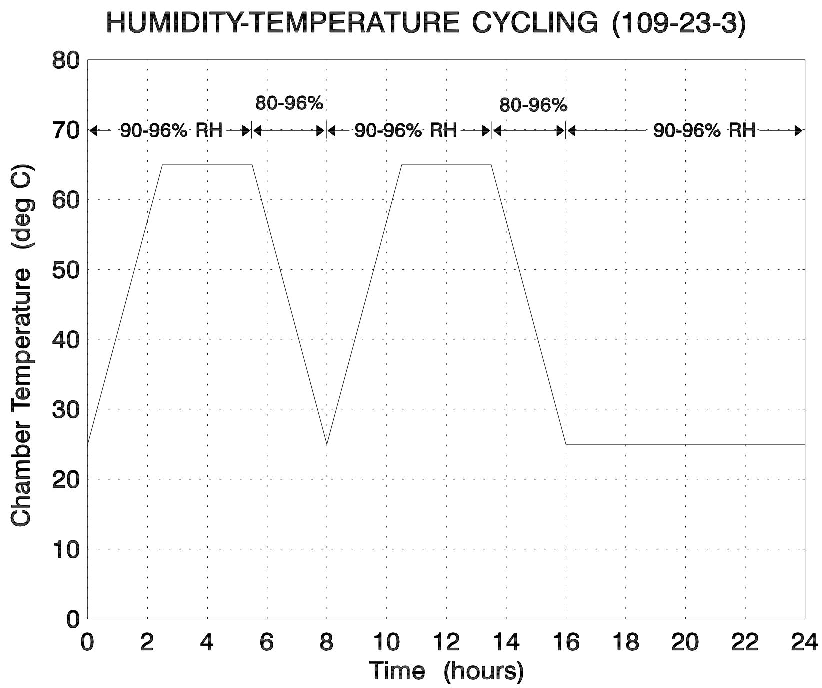

Figure 5
Typical Humidity-Temperature Cycling Profile

3.14. Temperature Life

Mated samples were exposed to a temperature of 105°C for 1000 hours.

3.15. Mixed Flowing Gas, Class II

Mated connectors 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.