Connector, .125 Inch AMPLIVAR* Blade & Receptacle

1. INTRODUCTION

1.1. Purpose

Testing was performed on AMPLIVAR* .125 inch Blade & Receptacle Connectors to determine their conformance to the requirements of AMP* Product Specification 108-1718 Rev. O.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the AMPLIVAR .125 inch Blade & Receptacle Connectors. Testing was performed at the Americas Regional Laboratory between 09Apr96 and 24Oct97.

1.3. Conclusion

The AMPLIVAR .125 inch Blade & Receptacle Connectors , listed in paragraph 1.5., met the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1718 Rev O.

1.4. Product Description

The AMPLIVAR blade contacts are designed for use on unstripped magnet wire while the receptacles are designed for use on stripped stranded, fused stranded, or solid wire. The contacts are tin plated brass, the housing material is 6/66 nylon, UL94V-0 rated.

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
2,3,5,6,7	146	63870-1	.125 blade terminal with AWG 14 Cu magnet wire (max gage)
1,2,7	90	63870-1	.125 blade terminal with AWG 19 Cu magnet wire (min gage)
2,3,5,6,7	146	63889-1	.125 blade terminal with AWG 19 Cu magnet wire (max gage)
1,2,7	90	63889-1	.125 blade terminal with AWG 25 Cu magnet wire (min gage)
2,3,5,6,7	146	63871-1	.125 blade terminal with AWG 22 Cu magnet wire (max gage)
1,2,7	90	63871-1	.125 blade terminal with AWG 28 Cu magnet wire (min gage)
1,2,3,4,5,6	142	521108-1	4 pos plug housing
1,2,3,4,5,6	142	521109-1	4 pos cap housing
1,2,3,5,6	528	61603-1	Timer receptacle terminals with AWG18 stranded wire

1.6. Environmental Conditions

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

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

* Trademark
| Indicates change

1.7. Qualification Test Sequence

Test or Examination	Test Groups						
	1	2	3	4	5	6	7
	Test Sequence (a)						
Examination of Product	1,9	1,10	1,8	1,3	1,4	1,5	1,3
Termination Resistance, Dry Circuit	3,7	2,8				2,4	
Insulation Resistance			2,6				
Dielectric Withstanding Voltage			3,7				
Temperature Rise vs Current		3,9					
Current Cycling						3	
Crimp Tensile							2
Vibration	5	7					
Physical Shock	6						
Durability	4						
Contact Retention					3		
Contact Insertion Force					2		
Mating Force	2						
Unmating Force	8						
Housing Lock Strength				2			
Thermal Shock		4(b)	4				
Humidity-Temperature Cycling		6	5				
Temperature Life		5					

NOTE

(a) The numbers indicate sequence in which tests were performed.
(b) Precondition with 3 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 Consumer/Commercial Business 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, 2, and 6

All termination resistance measurements, taken at 100 milliamperes maximum and 50 millivolts open circuit voltage had a change in resistance(ΔR) of 5 milliohms or less after testing.

Test Group	Nbr of Data points	Condition	Termination Resistance Min	Max	Mean
1	83	After Mechanical	-0.67	+0.31	-0.002
2	192	After Current Verif.	-0.56	+2.19	+0.424
6	84	After Current Cyc.	+0.16	+1.22	+0.632

All values in milliohms

2.3. Insulation Resistance - Group 3

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

2.4. Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred.

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

2.6. Current Cycling - Group 6

No evidence of physical damage was visible as a result of 500 cycles of current cycling.

2.7. Crimp Tensile - Group 7

All tensile values were greater than: 50 pounds for samples crimped on AWG 14 wire, 15 pounds for AWG 19, 8 pounds for AWG 22, 4 pounds for AWG 25, and 2 pounds for AWG 28.

2.8. Vibration - Groups 1 and 2

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

2.9. 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.

2.10. Durability - Group 1

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

2.11. 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 10 pounds to the contacts.

2.12. Contact Insertion Force - Group 5

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

2.13. Mating Force - Group 1

All mating force measurements were less than 28 pounds per connector (4 position).

2.14. Unmating Force - Group 1

All unmating force measurements were greater than 3 pounds per connector (4 position).

2.15. Housing Lock Strength - Group 4

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

2.16. Thermal Shock - Groups 2 and 3

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

2.17. Humidity-Temperature Cycling - Groups 2 and 3

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

2.18. 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, Low Level

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.

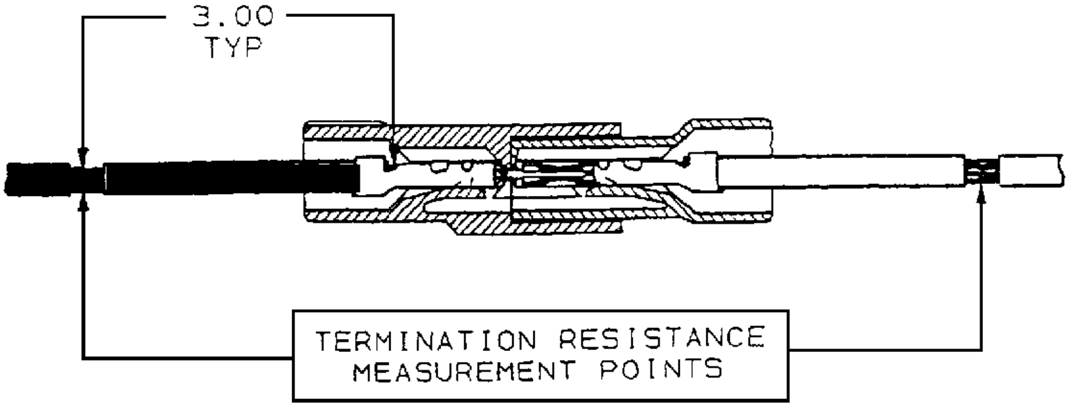

Figure 1
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of mated connectors, 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 2,200 volts AC was applied between the adjacent contacts of mated connectors. 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 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. Current Cycling

Testing consisted of 500 cycles of current cycling, with each cycle having current on for 45 minutes and current off for 15 minutes. The test current was 200% of current rating.

3.7. Crimp Tensile

An axial load was applied (at a crosshead rate of 1.0 inches per minute) to each sample in a direction as to pull the wire out of the contact crimp.

3.8. Vibration, Sine

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 2 mutually perpendicular planes for a total vibration time of 4 hours. Connectors were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.(Group 1 only). Connectors were energized with AC current sufficient to produce about 18°C temperature rise above ambient (Group 2 only).

3.9. 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 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.

3.10. Durability

Connectors were mated and unmated 5 times at a rate of 300 cycles per hour.

3.11. Contact Retention

An axial load of 10 pounds 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.

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3.12. Contact Insertion

Contact Insertion force was measured by applying an increasing force to each contact until the contact was properly seated in the housing.

3.13. 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 locking latches were not disabled.

3.14. 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 locking latches were not disabled.

3.15. Housing Lock Strength

An axial load of 25 pounds was applied to mated connector assemblies. This force was applied in a direction which would cause the connector locking latches to disengage.

3.16. Thermal Shock

Mated connectors were subjected to 25 cycles of thermal shock with each cycle consisting of 30 minute dwells at - 40 and 105°C. The transition between temperatures was less than 1 minute. Samples were preconditioned with 3 cycles of durability (Group 2 only).

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 and 65°C twice while maintaining high humidity. (Figure 2)

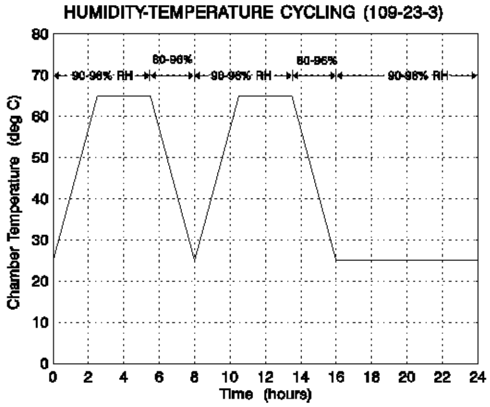

Figure 2
Typical Humidity-Temperature Cycling Profile

3.18. Temperature Life

Mated samples were exposed to a temperature of 105°C for 580 hours.

4. VALIDATION

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10/31/97

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