AMP

QUALIFICATION TEST REPORT

CONNECTOR, AMPLIMITE*,
POWER VIII

501-282 Rev. O

Product Specification:	108-10045 Rev. O
CTL No.:	CTL5064-136-033
	CTL5064-012-019
	NBD5064-129
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Table of Contents

(R5064ts)

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMPLIMITE Power VIII Connectors to determine its conformance to the requirements of AMP Product Specification 108-10045 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the AMPLIMITE Power VIII Connectors manufactured by the Federal Systems Business Group a division of the Aerospace & Government Systems Sector. The testing was performed between June 27, 1994 and November 8, 1994.

1.3 Conclusion

The AMPLIMITE Power VIII Connectors meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-10045 Rev. O.

1.4 Product Description

The Size VIII Power contacts are designed for wire ranges AWG 8 through AWG 18. The contacts are a copper alloy with gold over nickel plating. The AMPLIMITE 109 Series subminiature 'D' housings offer a mix of power/coaxial cavities with size 20 signal contacts. The 5C5 housing has 5 power/coax cavities. The housing material is either blue diallyl phthalate or blue polyester.

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
2,4	10	211159-1	Size 8 Pin AWG 8
1,3	10	211159-2	Size 8 Pin AWG 10
1	5	212007-1	Size 8 Pin AWG 14
1,4	5	212013-1	Size 8 Pin AWG 16
2,4	10	211161-1	Size 8 Socket AWG 8
1,3	10	211161-2	Size 8 Socket AWG 10
1	5	212008-1	Size 8 Socket AWG 14
1,4	5	212014-1	Size 8 Socket AWG 16
1,2,3	5	212491-1	5C5 Pin Housing
1,2,3	5	212059-1	5C5 Socket Housing
4	5	211159-1	Size 8 Pin AWG 10
4	5	211161-1	Size 8 Socket AWG 10

1.6 Qualification Test Sequence

	Test Groups			
Test or Examination	1	2	3	4
Examination of Product	1,10	1,9	1,8	1
Termination Resistance, Dry Circuit	3,7	2,7		
Dielectric Withstanding Voltage			3,7	
Insulation Resistance			2,6	
Temperature Rise vs Current		3,8		
Vibration	5	6		
Physical Shock	6			
Mating Force	2			
Unmating Force	8			
Contact Retention	9			
Crimp Tensile				2
Durability	4			
Thermal Shock			4	
Humidity-Temperature Cycling			5	
Mixed Flowing Gas		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 Federal Systems Business Group.

2.2 Termination Resistance, Dry Circuit - Groups 1,2

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage were less than 2.0 milliohms initially and had a change in resistance (ΔR) of less than 1.0 milliohm after testing.

Test Group	Nbr of Samples	Condition	Min	Max	Mean
1	45	Initial	0.50	1.55	1.034
		After Mechanical (ΔR)	-0.11	+0.26	+0.090
2	15	Initial	0.50	0.61	0.555
		After Current Ver.(ΔR)	+0.17	+0.61	+0.368

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 5,000 megohms.

2.5 Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when 32 amperes AC was applied to samples prepared on AWG 8 wire.

2.6 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.

2.7 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.

2.8 Mating Force - Group 1

All mating force measurements were less than 80 ounces per contact.

2.9 Unmating Force - Group 1

All unmating force measurements were greater than 5.0 ounces per contact.

2.10 Contact Retention - Group 1

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housings as a result of applying an axial load of 15 pounds to the contacts.

2.11 Crimp Tensile - Group 4

All tensile values were greater than 198 pounds for samples prepared on AWG 8 wire. All tensile values were greater than 120 pounds for samples prepared on AWG 10 wire. All tensile values were greater than 50 pounds for samples prepared on AWG 16 wire.

2.12 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connectors 500 times.

2.13 Thermal Shock - Group 3

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

2.14 Humidity-Temperature Cycling - Group 3

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

2.15 Mixed Flowing Gas - Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to the pollutants of mixed flowing gas.

2.16 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.

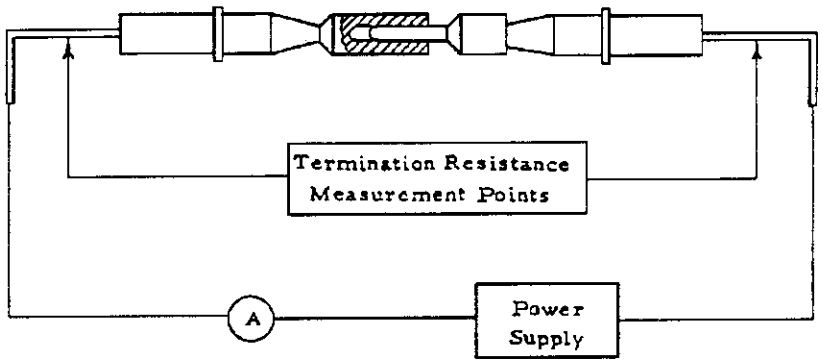

Figure 1
Typical Termination Resistance Measurement Points
housing not shown

3.3 Dielectric Withstanding Voltage

A test potential of 1,000 vac 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 Temperature Rise vs Specified Current

Connector temperature was measured, while energized at the specified current. 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.

3.6 Vibration, Random

Mated connectors were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 50 and 2000 hertz. The power spectral density at 50 hz is 0.25 G^2/Hz. The spectrum slopes up at 6 dB per octave to a PSD of 1.0 G^2/Hz at 100 Hz. The spectrum is flat at 1.0 G^2/Hz from 100 to 2000 Hz. The root-mean square amplitude of the excitation was 43.92 GRMS. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit (group 1 only). Connectors were energized with enough current to produce about 18°C temperature rise above ambient(group 2 only).

3.7 Physical Shock

Mated connectors were subjected to a physical shock test, having a half-sine waveform of 300 gravity units (g peak) and a duration of 3 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.

3.8 Mating Force

The force required to mate individual connectors was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.9 Unmating Force

The force required to unmate individual connectors was measured using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.10 Contact Retention

An increasing axial load was applied to each contact. The force was applied in a direction to cause removal of the contacts from the housing.

3.11 Crimp Tensile

An increasing axial load was applied to each crimped contact at a crosshead rate of 1.0 inch per minute.

3.12 Durability

Connectors were mated and unmated 500 times at a rate not exceeding 300 per hour.

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°C and 125°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%.

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 $C1_2$ at 10 ppb, NO_2 at 200 ppb, and H_2S at 10 ppb.

3.14 Temperature Life

Mated samples were exposed to a temperature of 125°C for 1000 hours.