QUALIFICATION TEST REPORT

SERIES 2, POWER LOCK CONNECTOR

501-295 Rev. O

Product Specification:	108-11043 Rev.O
ACL No.:	ACL3402-043
	ACL3402-046
Date:	March 15, 1995
Classification:	Unrestricted
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Table of Contents

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMP* Series 2, Power Lock Connector to determine it's conformance to the requirements of AMP Product Specification 108-11043 Rev.O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Series 2, Power Lock Connectors manufactured by the Communication Products Division of the Utility, Networking & Communications Products Group. The testing was performed between March 10, 1994 and October 28, 1995. Test Groups 1 and 3 were performed at the Corporate Test Laboratory and Test Group 2 was performed at the Automotive/Consumer Test Laboratory (reference to test #'s CTL3402-043-015AR and ACL3402-046).

1.3 Conclusion

The Series 2, Power Lock Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-11043 Rev. O.

1.4 Product Description

The AMP Series 2, Power Lock Connectors are comprised of an assembled insulating housing and electrical contacts and are intended to provide connect/disconnect capabilities for commercial power handling applications.They are designed to accommodate wire sizes 10 through 6 AWG.

* Trademark

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
1	15	53884-1	15 mated housing assemblies
1	30	53880-2	30 silver contacts w/ 6 AWG
2	30	53884-1	30 mated housing assemblies
2	60	53880-2	60 silver contacts w/ 6 AWG
2	24	53884-1	24 mated housing assemblies
2	48	53880-2	48 silver contacts w/ 10 AWG
3	15	53884-1	15 mated housing assemblies
3	30	53880-2	30 silver contacts w/ 6 AWG

1.6 Qualification Test Sequence

	Test Groups		
Test or Examination	1	2	3
Examination of Product	1,11	1,9	1,8
Termination Resistance, Specified Current	3,7	2,7	
Dielectric Withstanding Voltage			3,7
Insulation Resistance			2,6
T-rise vs Current		3,8	
Vibration	5	6	
Physical Shock	6		
Mating Force	2		
Unmating Force	8		
Contact Retention	9		
Crimp Tensile	10		
Durability	4		
Thermal Shock			4
Humidity-Temperature Cycling			5
Mixed Flowing Gas		4	
Temperature Life		5	

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 Communications Products Division.

2.2 Termination Resistance, specified current - Groups 1,2

All termination resistance measurements taken at the specified current of 1 amperes DC were less than 2.5 milliohms.

Test Group	Nbr of Data points	Condition	Min	Max	Mean
1	15	Initial	.230	.490	.401
		After Mechanical	.380	.550	.452
2	30	Initial	.170	.240	.200
		After Current Verif.	.270	.900	.499

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 Vibration - Groups 1,2

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

2.6 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.

2.7 Mating Force - Group 1

All mating force measurements were less than 12.6 lbs.

2.8 Unmating Force - Group 1

All unmating force measurements were greater than 7.9 lbs.

2.9 Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when the base rated current of 53 amperes DC was applied. The base rated current is a resultant of testing a single mated contact with the maximum wire size (6 awg).

Current Carrying Capability

LOADING	6 AWG	8 AWG	10 AWG
Single	1.0000	0.8058	0.6815
X X X X	0.9590	0.7727	0.6536
X X	0.9803	0.7899	0.6681
X X X	0.9514	0.7666	0.6484
X X X X	0.9345	0.7530	0.6369
X X X X X	0.9205	0.7417	0.6273
X X X X X X	0.9108	0.7339	0.6207
X X X X X X X	0.9023	0.7271	0.6149
X X X X X X X X	0.8959	0.7219	0.6105

NOTE: To determine acceptable current carrying capacity for connector configuration and wire gage indicated, use Multiplication Factor (F) from above chart and multiply it times the Base Rated Current for a single circuit at maximum ambient operating temperature.

2.10 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 20 times.

2.11 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 supplying an axial load of 40 lbs. to the contacts for a period of ten seconds.

2.12 Crimp Tensile - Group 1

All tensile values were greater than 138 lbs.

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, Specified Current

Termination resistance measurements were taken at the specified current of 1 ampere DC, using a four terminal measuring technique (figure 1).

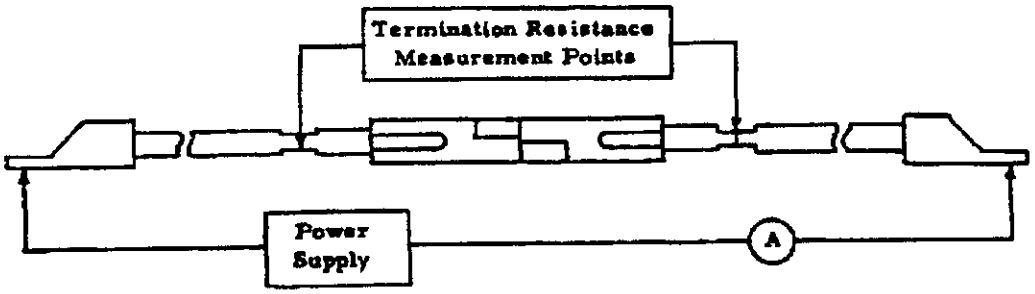

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

Two types of tests were performed on the test samples. (1)Test potential applied across the adjacent contacts. (2)Test potential applied between the contacts commoned together and a foil plate surrounding the connector housing. A test potential of 1500 vac was applied for one minute and then returned to zero.

3.4 Insulation Resistance

Two types of tests were performed on the test samples. (1)Insulation resistance was measured using a test voltage of 500 volts DC between adjacent contacts and (2) Insulation resistance was measured using a test voltage of 500 volts DC between the contacts commoned together and a foil plate wrapped around the connector housing.This voltage was applied for two minutes before the resistance was measured.

3.5 Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude or 10 G's (whichever is less). 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 two planes, the vertical and the perpendicular plane, for a total vibration time of 4 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit. The parallel plane was not used.

3.6 Physical Shock

Mated connectors were subjected to a physical shock test, having a half-sine waveform of 75 gravity units (g peak) and a duration of 6 milliseconds. One shock in each direction was applied along the three mutually perpendicular planes, for a total of 6 shocks. The connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.7 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.

3.8 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.

3.9 Temperature Rise vs Current

Connector temperature was measured, while energized in both forward and reverse-current modes at the specified current of 53 amperes DC. 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 did not differ more than 1°C, the readings were recorded.

3.10 Durability

Connectors were mated and unmated 20 times at a rate not exceeding 300 per hour.

3.11 Contact Retention

After inserting and removing the contacts from their housing, an axial load of 40 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.

3.12 Crimp Tensile

An axial load of 50 pounds of force was applied to each sample at a cross-head rate of 1.0 inch per minute.

3.13 Thermal Shock

Unmated 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 85°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. Samples were preconditioned with 5 cycles of durability.

3.16 Temperature Life

Mated samples were exposed to a temperature of 85°C for 96 hours.

4. Validation

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