QUALIFICATION TEST REPORT

HIGH CURRENT EDGE CONNECTOR

501-69 Rev. A

Product Specification:	108-9045 Rev. O
CTL No.:	CTL5282-001
Date:	May 5, 1988
Classification:	Unrestricted
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(R5283ts)

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMP* High Current Edge Connector to determine its conformance to the requirements of AMP Product Specification 108-9045 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the High Current Edge Connector manufactured by the Packaging Systems Product Group. The testing was performed between December 9, 1987 and January 15, 1988.

1.3 Conclusion

The High Current Edge Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-9045 Rev. O.

* Trademark

1.4 Product Description

The High Current Edge Connector is designed for a current capacity of up to 30 amperes. These connectors feature UL rated 94V-O, rugged glass-filled thermoplastic housings and high conductivity copper alloy contacts with bright tin over nickel plating. Connectors are available in 2, 3, 4, 5, 6, 8, 9, 10 and 12 contact positions and in a choice of board to board or board to wire applications.

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
1,2	6	530521-9	12 Pos. Edge Connector
2	2	530998-3	4 Pos. Edge Connector
1,2,3	20	530520-1	Contact/10 AWG

1.6 Qualification Test Sequence

	Test Groups		
Test or Examination	1	2	3
Examination of Product	1,16	1,17	1
Termination Resistance, Dry Circuit	2,9,13	3,11,14	
Termination Resistance, Rated Current	3,14	4,15	
Crimp Resistance			2,4
Dielectric Withstand Voltage	5,12	6	
Insulation Resistance	4,11	5	
Current Cycling			3
Vibration		12	
Physical Shock		13	
Mating Force		2	
Contact Engaging Force		7	
Contact Separation Force	8	8,10	
Contact Retention	15	16	
Crimp Tensile			5
Durability	7	9	
Thermal Shock	6		
Humidity, Steady State	10		

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 Packaging Systems Products 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.

Test Group	Nbr of Samples	Condition	Min	Max	Mean	Std Dev
1	28	Initial	0.20	0.30	0.27	0.044
		After Durability	0.40	0.90	0.78	0.123
		After Humidity	0.50	0.80	0.63	0.081
2	28	Initial	0.20	0.30	0.27	0.048
		After Durability	0.40	0.50	0.46	0.049
		After Mechanical	0.50	0.80	0.63	0.094

All values in milliohms

2.3 Termination Resistance, Specified Current - Groups 1,2

All termination resistance measurements taken at specified current were less than 2.0 milliohms.

Test Group	Nbr of Samples	Condition	Min	Max	Mean	Std Dev
1	28	Initial	0.20	0.40	0.29	0.038
		After Humidity	0.30	0.40	0.33	0.047
2	28	Initial	0.30	0.40	0.32	0.044
		After Mechanical	0.30	0.40	0.33	0.046

All values in milliohms

2.4 Crimp Resistance - Group 3

All crimp resistance measurements taken at specified current were less than 0.15 milliohms initially and 0.25 milliohms after testing.

Test Group	Nbr of Samples	Condition	Min	Max	Mean	Std Dev
3	20	Initial	0.10	0.12	0.11	0.0058
		After Current Cycling	0.11	0.13	0.12	0.0073

2.5 Dielectric Withstanding Voltage - Groups 1,2

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

2.6 Insulation Resistance - Groups 1,2

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

2.7 Current Cycling - Group 3

No evidence of physical damage was visible to the test samples after 50 cycles of cycling the current on and off at a current of 37.5 amperes. The cycling current represented 125% of the specified current.

3.8 Vibration - Group 2

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

2.9 Physical Shock - Group 2

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.

2.10 Mating Force - Group 2

All mating force measurements were less than 48 ounces per contact.

2.11 Contact Engaging Force - Group 2

All contact engaging forces were less than 40 ounces per contact.

2.12 Contact Separating Force - Groups 1,2

All contact separating forces were greater than 3 ounces per contact.

2.13 Contact Retention - Group 3

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.

2.14 Crimp Tensile - Group 3

All tensile values were greater than 90 pounds.

2.15 Durability - Group 2

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

2.16 Thermal Shock - Group 1

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

2.17 Humidity, Steady State - Group 1

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to a steady state humidity environment.

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.

3.3 Termination Resistance, Specified Current

Termination resistance measurements taken at the specified current of 30 amperes DC for AWG 10 samples and 13 amperes DC for AWG 16 samples were made, using a four terminal measuring technique (Figure 1).

3.4 Crimp Resistance, Specified Current

Crimp resistance measurements taken at the specified current of 30 amperes DC for AWG 10 samples were made, using a four terminal measuring technique (Figure 1). The measurement was made between the wire, 0.38 inches from the end of the contact and the end of the wire barrel nearest the contact transition.

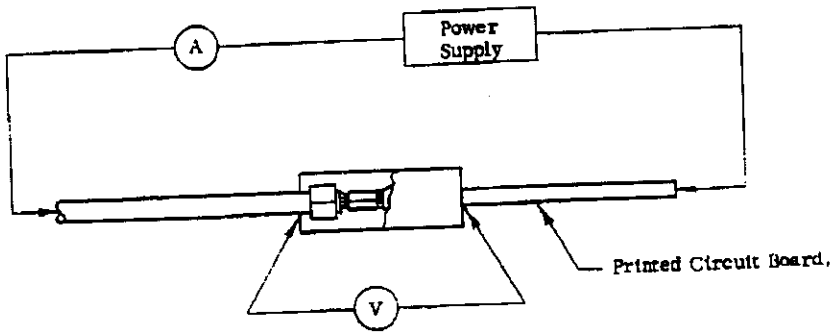

Figure 1
Typical Termination Resistance Measurement Points

3.5 Dielectric Withstanding Voltage

A test potential of 1,800 vac was applied between the adjacent contacts and between contacts and mounting hardware. This potential was applied for one minute and then returned to zero.

3.6 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.

3.7 Current Cycling

The connectors were cycled on and off at 125% of the specified current. Testing consisted of 50 cycles, with each cycle having current on for 30 minutes and current off for 15 minutes.

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 minutes. This cycle was performed for 2 hours in each of three mutually perpendicular planes, for a total vibration time of 6 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.9 Physical Shock

Mated connectors were subjected to a physical shock test, having a sawtooth waveform of 75 gravity units (g peak) and a duration of 6 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.

3.10 Mating Force

The force required to mate a 0.070 inch gage to the connector was measured, using a free floating fixture with a maximum rate of travel at 1.0 inch/minute.

3.11 Contact Engaging Force

Engaging forces were acquired by inserting a 0.070 inch gage in to the contact housing.

3.12 Contact Separating Force

Separating forces were acquired by withdrawing a 0.054 inch gage from the contact housing. The contact was sized 3 times with a 0.070 inch gage before measurement.

3.13 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.

3.14 Crimp Tensile

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

3.15 Durability

Connectors were mated and unmated 25 times using an 0.070 inch gage

3.16 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 -40°C and 95°C. The transition between temperatures was less than one minute.

3.17 Humidity, Steady State

Unmated connectors were subjected to a relative humidity of 95% and a temperature of 40°C for a period of 4 days.

4. Validation

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