AMP*

QUALIFICATION TEST REPORT

AMP Standard CHAMP* Connector

501-110 Rev. 0

Product Specification:	108-6005, Rev. V
CTL No.:	CTL1210-073-014
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Classification:	Unrestricted
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CORPORATE TEST LABORATORY

Qualification Test Report on the
AMP Standard CHAMP Connector

1. Introduction

1.1 Purpose

Testing was performed on the AMP Standard CHAMP Connector to determine if it meets the requirements of AMP Product Specification 108-6005, Rev. V.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Standard CHAMP Connector, manufactured by the Communications Product Division of the Signal Transmission Products Group. The testing was performed between August 8, 1989 and January 18, 1990.

1.3 Conclusion

The Standard CHAMP Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-6005, Rev. V.

1.4 Product Description

The AMP Standard CHAMP Connector provides a means of terminating discrete wire on jacketed cable, without pre-stripping of individual conductor insulation. The connector contacts are on .085 inch centers and are designed to interface with all miniature ribbon connectors. Housings are made of self-extinguishing pheylene oxide base resin. Contacts are phosphorous bronze copper alloy. The contact area is plated with a minimum of 30 microinches of gold over a minimum of 50 microinches of nickel. The connector housings can be loaded with four different styles of contacts, which can accept 22 through 26 AWG solid and 22 through 28 AWG/7 stranded wire.

1.5 Test Samples

The test samples were randomly selected from current production, and the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1	4	229974-1	Standard CHAMP, Plug
	4	229975-1	Standard CHAMP, Recept.
3,5,6,8	2	229974-1	Standard CHAMP, Plug
	2	229975-1	Standard CHAMP, Recept.
2,9	6	229974-1	Standard CHAMP, Plug
	6	229975-1	Standard CHAMP, Recept.
	4	552173-1	Standard CHAMP, Plug
	4	552064-1	Standard CHAMP, Recept.
	4	552390-1	Standard CHAMP, Plug
	4	552391-1	Standard CHAMP, Recept.
	4	556039-1	Standard CHAMP, Plug
	4	555227-1	Standard CHAMP, Recept.
	2	554599-1	Standard CHAMP, Plug
	2	554598-1	Standard CHAMP, Recept.

1.6 Qualification Test Sequence

	Test Groups						
Test or Examination	1	2	3	5	6	8	9
Examination of Product	1,9	1,6	1,6	1,5	1,8		
Termination Resistance, Dry Circuit	3,7	2,5	2,5	2,4			
Dielectric Withstanding Voltage					3,7		
Insulation Resistance					2,6		
Vibration	5						
Physical Shock	6						
Mating Force	2						
Unmating Force	8						
Contact Retention						1	
Tensile, Insulation Displacement Slot							1
Durability	4	3	3				
Thermal Shock					4		
Humidity-Temperature Cycling			4		5		
Industrial Mixed Flowing Gas				3			
Temperature Life		4					

The numbers indicate sequence in which tests were performed.

2. Summary of Testing

2.1 Examination of Product - Groups 1,2,3,5,6,8 & 9

All samples submitted for testing were selected from normal production lots. They were inspected and accepted by the Product Assurance Department of the Signal Transmission Products Group.

2.2 Termination Resistance, Dry Circuit - Groups 1,2,3 & 5

All termination resistance measurements, taken at 50 milliamperes dc. and 50 millivolts open circuit voltage, were less than the specification requirements of 20.0 milliohms initially and 26.5 milliohms after test.

2.2 Termination Resistance, Dry Circuit - Groups 1,2,3 & 5 (Cont.)

Test Group	Contact Type	Condition	Min.	Max.	Mean
1	B	Initial	8.93	10.44	9.42
	B	After Mechanical	8.88	10.37	9.46
2	B	Initial	8.83	18.38	10.00
	B	After Temperature Life	8.79	12.14	9.76
	C	Initial	7.37	11.62	7.98
	C	After Temperature Life	7.51	14.63	8.18
	E	Initial	8.89	15.21	10.69
	E	After Temperature Life	8.82	18.10	10.84
	F	Initial	5.94	10.06	6.80
	F	After Temperature Life	5.92	13.78	7.22
	T	Initial	9.80	18.28	12.55
	T	After Temperature Life	9.32	16.85	11.31
3	B	Initial	8.69	9.72	9.19
	B	After Humidity/ Temperature Cycling	8.62	9.65	9.09
5	B	Initial	8.78	9.80	9.34
		After IMFG	8.88	9.73	9.27

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 6

There was no dielectric breakdown or flashover between adjacent contacts, when a test voltage of 1000 volts ac was applied for one minute.

2.4 Insulation Resistance - Group 6

All insulation resistance measurements were greater than the specification requirement of 20,000 megohms for the initial measurement and 20,000 megohms for measurement taken after test.

2.5 Vibration - Group 1

There were no discontinuities of the contacts greater than one microsecond during vibration. Following vibration, there were no cracks, breaks, or loose parts on the connector assemblies.

2.6 Physical Shock - Group 1

There were no discontinuities of the contacts greater than one microsecond during physical shock. Following physical shock testing, there were no cracks, breaks, or loose parts on the connector assemblies.

2.7 Mating Force - Group 1

All mating force measurements were less than the specification requirement of 0.6 pound per contact.

2.8 Unmating Force - Group 1

All unmating force measurements were greater than the specification requirement of 0.15 pound per contact.

2.9 Contact Retention - Group 8

There was no physical damage to either the contacts or the housing, and no contacts dislodged from the housings, as a result of applying 3.0 pounds axial load to the contacts.

2.10 Tensile, Insulation Displacement Slot - Group 9

All samples met the minimum specified requirements for insulation displacement slot tensile.

Tensile in Pounds

Part Number	Wire Size & Type	Min.	Max.	Mean	Minimum Req.
229974-1	24 Solid	9.44	11.58	10.58	5.0
229975-1	24 Solid	10.83	12.22	11.62	5.0
229974-1	26 Solid	6.92	8.41	7.73	4.0
229975-1	26 Solid	6.98	8.58	7.81	4.0
229974-1	24 Stranded	9.69	13.69	12.62	4.0
229975-1	24 Stranded	9.52	13.33	11.38	4.0
552173-1	22 Solid	13.30	17.40	15.99	5.0
552064-1	22 Solid	15.63	17.15	16.38	5.0
552173-1	22 Stranded	13.31	17.23	15.54	4.0
552064-1	22 Stranded	10.56	17.24	15.06	4.0
552390-1	26 Stranded	6.07	7.84	7.03	2.6
552391-1	26 Stranded	5.11	8.58	7.50	2.6
552390-1	28 Stranded	4.25	5.62	4.86	2.6
552391-1	28 Stranded	4.13	5.48	4.81	2.6
556039-1	22 Solid	12.95	19.26	17.58	5.0
555227-1	22 Solid	16.78	18.63	17.52	5.0
556039-1	22 Stranded	13.09	18.66	15.65	4.0
555227-1	22 Stranded	14.60	20.13	17.54	4.0
554599-1	27 Stranded	3.30	5.16	4.38	2.6
554598-1	27 Stranded	3.51	4.94	4.01	2.6

2.11 Durability - Group 1,2 & 3

There was no physical damage to the samples, as a result of mating and unmating the connectors 200 times.

2.12 Thermal Shock - Group 6

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

2.13 Humidity-Temperature Cycling - Group 6

There was no evidence of physical damage to either the contacts or the connector, as a result of exposure to humidity temperature cycling.

2.14 Industrial Mixed Flowing Gas - Group 5

There was no evidence of physical damage to either the contacts or the connector, as a result of exposure to the pollutants of industrial mixed flowing gas.

2.15 Temperature Life - Group 2

There was no evidence of physical damage to either the contacts or the connector, as a result of exposure to a temperature of 70°C for 1000 hours.

3. Test Methods

3.1 Examination of Product

The 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 50 milliamperes dc, with an open circuit voltage of 50 millivolts dc.

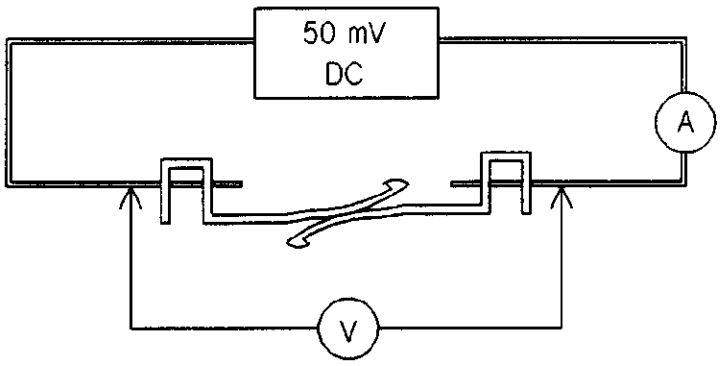

FIGURE 1
MILLIVOLT DROP TEST CIRCUIT

3.3 Dielectric Withstanding Voltage

A test potential of 1000 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 1000 volts dc. This voltage was applied for one minute, 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. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz, and returned to 10 Hz in one minute. This cycle was performed 120 times in each of three mutually perpendicular planes, for a total vibration time of 2 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit. Vibration fixturing used for testing is shown in Figure 2.

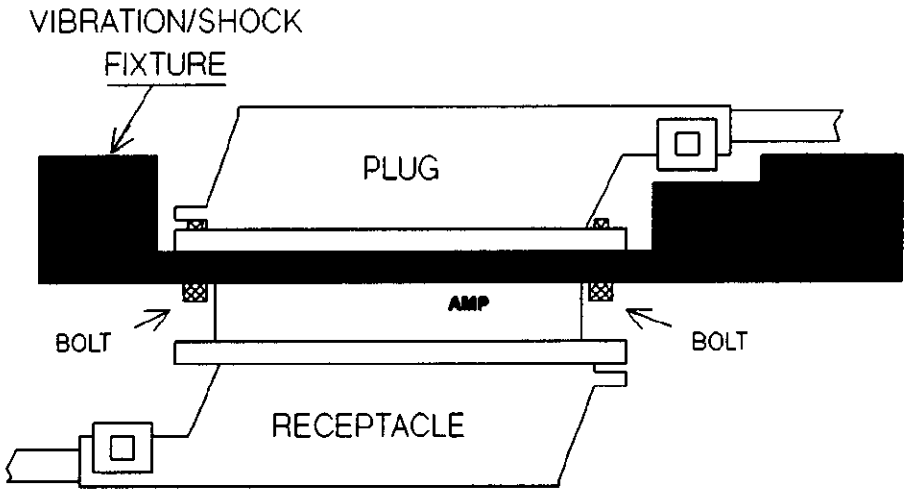

FIGURE 2
VIBRATION AND SHOCK SETUP (TOP VIEW)

3.6 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 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.

3.7 Mating Force

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

3.9 Contact Retention

An axial load of 3 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.

3.10 Tensile, Insulation Displacement Slot

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

3.11 Durability

Connectors were mated and unmated 200 times, at a rate not exceeding 600 per hour.

3.12 Thermal Shock

Mated connectors were subjected to five cycles of temperature extremes, with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -40°C and 60°C. The transition between temperatures was less than one minute.

3.13 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%. During five of the first nine cycles, the connectors were exposed to a cold shock at -10°C for 3 hours.

3.14 Industrial Mixed Flowing Gas, Class III

Mated connectors were exposed for 20 days in the industrial mixed flowing gas chamber. Class III exposure is defined as a temperature of 30°C, and a relative humidity of 75%. Pollutants are Cl_2 at 20 ppb, NO_2 at 200 ppb, and H_2S at 100 ppb.

3.15 Temperature Life

Mated samples were subjected to 1000 hours, at an elevated temperature of 70°C.

4. Validation

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