AMP*

QUALIFICATION TEST REPORT

Contact, Type XII

501-143 Rev. 0

Product Specification:	108-10037 Rev. 0
CTL No.:	CTL5016-007-027
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(R5016TS2)

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Test Report
Type XII Contacts
in 'G' Series Housings

1. Introduction

1.1 Purpose

Testing was performed on AMP's Type XII Contacts to determine its conformance to the requirements of AMP Product Specification 108-10037 Rev. 0.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Type XII Contact manufactured by the Federal Systems Division of the Aerospace and Government Systems Sector. The testing was performed between March 28, 1990 and January 25, 1991.

1.3 Conclusion

The Type XII Contacts meet the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-10037 Rev.0.

1.4 Product Description

The Type XII contact is a crimp Snap-In, power contact. The contact design includes male and female contact assemblies which consist of two heavy duty spring members. This heavy duty spring action assures proper electrical contact and withdrawal forces. The contact provides positive insulation support and has an integral nylon latch for contact retention within the contact housing. Type XII contacts are available for wire size ranges #16-12 AWG and #10 AWG. Contacts are made of high conductivity copper and have gold over nickel, silver or tin plating.

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 Number	Description
1,2,3	28	66261-1	Sn Pin
1,2,3	28	66740-8	Sn Socket
2,3	22	66261-2	Au Pin
2,3	22	66740-6	Au Socket
1,2,3	28	66261-4	Ag Pin
1,2,3	28	66740-2	Ag Socket
1,3	16	66259-1	Sn Pin
1,3	16	66741-8	Sn Socket
1,3	16	66259-2	Au Pin
1,3	16	66741-6	Au Socket
1,3	16	66259-4	Ag Pin
1,3	16	66741-2	Ag Socket

1.6 Qualification Test Sequence

Test or Examination	Test Groups 1	2	3
Examination of Product	1,9	1,9	1,6
Termination Resistance, Specified Current			2,4
Termination Resistance, Dry Circuit	3,7	2,7	
T-Rise vs. Current		3,8	
Current Cycling			3
Vibration	5	6	
Physical Shock	6		
Contact Engaging Force	2		
Contact Separating Force	8		
Crimp Tensile			5
Durability	4		
Humidity-Temperature Cycling		4[1]	
Industrial Mixed Flowing Gas		4[1]	
Temperature Life		5	

The numbers indicate sequence in which tests were performed.
[1] Humidity for Tin parts IMFG for Gold/Silver parts

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 Aerospace and Government Systems Sector.

2.2 Termination Resistance, Specified Current - Group 3

All termination resistance measurements taken at the specified current were less than 1.0 milliohms.

Condition	No. of Samples	Test Current	Min.	Max.	Mean
Initial	30	13.0	0.29	0.36	0.334
	30	25.0	0.16	0.19	0.174
Final	30	13.0	0.26	0.37	0.321

All values in milliohms

2.3 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 0.5 milliohms initially and 0.6 milliohms for Gold & Silver and 4.0 milliohms for Tin.

Test Group	No. of Samples	Condition	Min.	Max.	Mean
1	16	Initial Sn	0.12	0.23	0.156
	16	Initial Au	0.17	0.22	0.159
	16	Initial Ag	0.11	0.18	0.139
	16	Final Sn	0.22	1.60	0.972
	16	Final Au	0.14	0.29	0.227
	16	Final Ag	0.16	0.24	0.202
2	12	Initial Sn	0.10	0.14	0.120
	18	Initial Au	0.12	0.22	0.160
	12	Initial Ag	0.09	0.26	0.146
	12	Final Sn	0.04	0.49	0.236
	18	Final Au	0.18	0.35	0.280
	12	Final Ag	0.16	0.31	0.300

All values in milliohms

2.4 Temperature Rise vs. Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when a specified was applied.

Test Group	No. of Samples	Condition	Wire Size	Test Current	Temp Rise Max.
2	6	Initial Sn	12	18.0	13.9°[1]
	12	Initial Au	12	18.0	16.4°[1]
	6	Initial Ag	12	18.0	13.4°[1]
	6	Initial Sn	10	25.0	18.8°[1]
	6	Initial Au	10	25.0	20.0°
	6	Initial Ag	10	25.0	19.7°
	6	Final Sn	12	18.0	23.6°
	12	Final Au	12	18.0	19.1°
	6	Final Ag	12	18.0	14.1°
	6	Final Sn	10	25.0	28.6°
	6	Final Au	10	25.0	22.4°
	6	Final Ag	10	25.0	22.8°

All Temperatures in Degrees Celsius
[1]temperature not measured, calculated from data

2.5 Current Cycling - Group 2

No evidence of physical damage was visible to the test samples, after 500 cycles of cycling the current on and off. The cycling current represented 125% of the specified current.

2.6 Vibration - Groups 1,2

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

2.8 Contact Engaging Force - Group 1

All contact engaging forces were less than 5.5 pounds per contact.

2.9 Contact Separating Force - Group 1

All contact separating forces were greater than 0.25 pounds per contact.

2.10 Crimp Tensile - Group 3

All tensile values were greater than 150 pounds for #10 AWG wire and 50 pounds for #16 AWG wire.

2.11 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 500 times for Gold & Silver and 250 times for Tin.

2.12 Humidity-Temperature Cycling - Group 2

No evidence of physical damage to the contacts as a result of exposure to humidity- temperature cycling.

2.13 Industrial Mixed Flowing Gas - Group 2

No evidence of physical damage to the contacts as a result of exposure to the pollutants of industrial mixed flowing gas.

2.14 Temperature Life - Group 2

No evidence of physical damage to the contacts 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 taken at the specified current were made, using a four terminal measuring technique (Figure 1).

3.3 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.

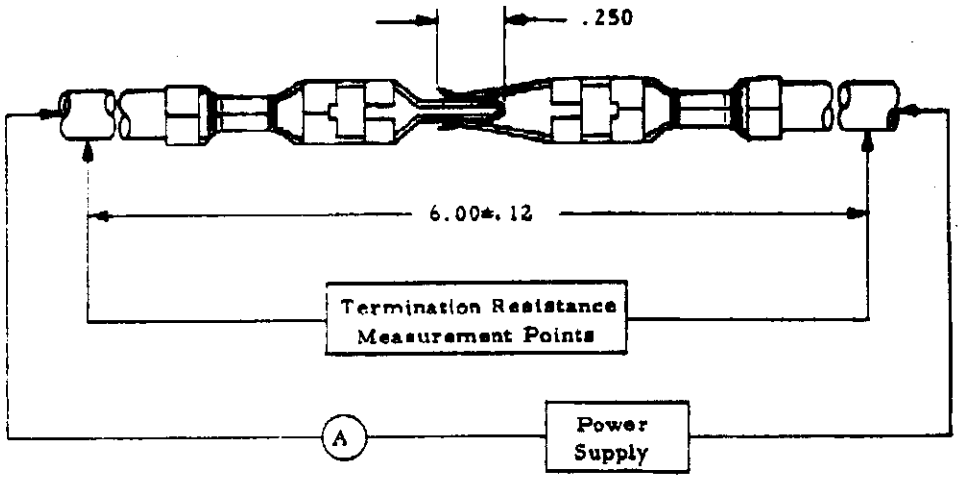

Figure 1
Typical Termination Resistance Measurement Points

3.4 Temperature Rise vs Specified Current

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

3.5 Current Cycling

The connectors were cycled on and off at 125% of the specified current. Testing consisted of 500 cycles, with each cycle having current on for 15 minutes and current off for 15 minutes.

3.6 Vibration, Sine

Mated Gold & Silver contacts, in housings were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied logarithmically between the limits of 10 and 2000 Hz and returned to 10 Hz in 20 minutes. This cycle was performed 12 times in each of three mutually perpendicular planes, for a total vibration time of 12 hours.
Mated Tin contacts in housings 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 120 times 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.

3.7 Physical Shock

Mated connectors were subjected to a physical shock test, having a sawtooth waveform of 100 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.

3.8 Contact Engaging Force

Engaging forces were acquired by inserting a .110 inch gage into the socket.

3.9 Contact Separating Force

Separating forces were acquired by withdrawing a .100 inch gage from the socket.

3.10 Crimp Tensile

An axial load was applied to each sample at a crosshead rate of 1.0 inch per minute. This load was applied until the sample parted from the wire.

3.11 Durability

Contacts were mated and unmated 500 times for Gold & Silver and 250 times for Tin. A rate of 300 cycles per hour was used.

3.12 Humidity-Temperature Cycling

Mated samples 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.

3.13 Industrial Mixed Flowing Gas, Class III

Mated samples were exposed for 20 days to an industrial mixed flowing gas Class III exposure. Class III exposure is defined as a temperature of 30°C and a relative humidity of 75%, with the pollutants of Cl_2 at 20 ppb, NO_2 at 200 ppb, and H_2S at 100 ppb.

3.14 Temperature Life

Mated samples were exposed to a temperature of 125°C for Gold & Sliver and 105°C for Tin. The exposure time was 240 hours.

4. Validation

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