CONNECTOR, LOCKING CLIP, .025 INCH SQUARE, TIN

1. Introduction

1.1 Purpose

Testing was performed on AMP® .025 Square Locking Clip Connector to determine its conformance to the requirements of AMP® Product Specification 108-36028-1 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the .025 Square Locking Clip Connector manufactured by Manufacturing and Business Equipment Group. The testing was performed between July 10, 1996 and September 27, 1996.

1.3 Conclusion

The .025 Square Locking Clip Connector, listed in paragraph 1.5, meet the electrical, mechanical, and environmental performance requirements of AMP® Product Specification 108-36028-1 Rev O.

1.4 Product Description

The .025 Locking clip connector is designed to be used as a single circuit or multiple position connector. The contacts are crimp type, snap-in design and are tin plating. The contacts are designed to mate with .025 inch square posts.

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
1,2,3,4	445	867052-1	Contact, tin
1	5	103321-1	1 Pos Header, unshrouded, breakaway, tin
2,4	6	1-87348-5	15 Pos Header, unshrouded, tin
4	3	1-103321-5	15 Pos Header, unshrouded, breakaway, tin
1,3	10	1-87543-0	20 Pos Header, unshrouded, tin
1	5	1-103322-0	20 Pos Header, unshrouded, breakaway, tin
1	20	87175-2	1 Pos Housing
2,4	14	87175-4	15 Pos Housing
1,3	23	87133-3	20 Pos Housing

1.6 Qualification Test Sequence

	Test Groups			
Test or Examination	1	2	3	4
Examination of Product	1,9	1,9	1,8	1,4
Termination Resistance, Dry Circuit	3,7	2,7		
Insulation Resistance			2,6	
Dielectric Withstand Voltage			3,7	
Temperature Rise vs Current		3,8		
Vibration	5	6		
Physical Shock	6			
Durability	4			
Contact Retention				2
Contact Locking Strength				3
Mating Force	2			
Unmating Force	8			
Thermal Shock			4	
Humidity-Temperature Cycling		4	5	
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 randomly selected from current production lots. A Certificate of Conformance was issued by the Product Assurance Department of the Manufacturing Business Equipment Group. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Termination Resistance, Dry Circuit - Groups 1,2

All termination resistance measurements, taken at 100 milliamperes maximum and 50 millivolts open circuit voltage had a change in resistance (ΔR) of less than 16 milliohms.

Test Group	Nbr of Data points	Condition	Termination Resistance Min	Max	Mean
1	64	After Mechanical	-0.34	+3.88	+0.851
3	45	After Current Verification	-0.27	+1.86	+0.584

All values in milliohms

2.3 Insulation Resistance - Group 3

All insulation resistance measurements were greater than 5,000 megohms.

2.4 Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred.

2.5 Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when tested using a baseline rated current of 2.0 amperes and the correct derating factor value based on the samples wiring configuration.

2.6 Vibration - Groups 1,2

No discontinuities 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 were detected during physical shock. Following physical shock testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.8 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 50 times.

2.9 Contact Retention - Group 4

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 5.5 pounds to the contacts.

2.10 Contact Locking Strength - Group 4

No contacts released from standard header posts (with locking springs clips operational) when an axial load of 5 pounds was applied. No contacts released from breakaway header posts (with locking springs clips operational) when an axial load of 3 pounds was applied.

2.11 Mating Force - Group 1

All mating force measurements were less than 3.0 pounds per contact.

2.12 Unmating Force - Group 1

All unmating force measurements were greater than 2 ounces per contact.

2.13 Thermal Shock - Group 3

No evidence of physical damage was visible as a result of exposure to thermal shock.

2.14 Humidity-Temperature Cycling - Group 3

No evidence of physical damage was visible as a result of exposure to humidity-temperature cycling.

2.15 Temperature Life - Groups 2,4

No evidence of physical damage was visible as a result of exposure to temperature life.

3. Test Methods

3.1 Examination of Product

Where specified, samples were visually examined for evidence of physical damage detrimental to product performance.

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 maximum with a 50 millivolt open circuit voltage.

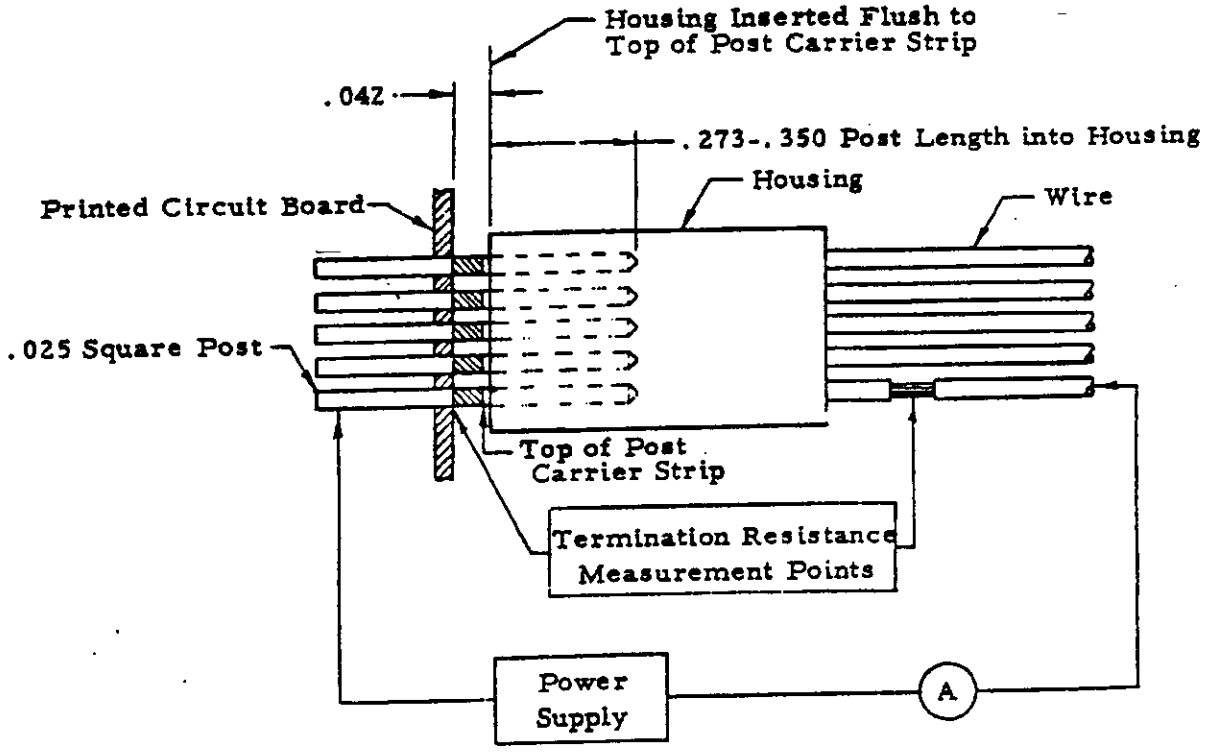

Figure 1
Typical Termination Resistance Measurement Points

3.3 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.

3.4 Dielectric Withstanding Voltage

A test potential of 750 volts AC, at sea level. 300 volts AC at 50,000 ft altitude, and 275 volts AC at 70,000 ft altitude was applied between the adjacent contacts. This potential was applied for one minute and then returned to zero.

3.5 Temperature Rise vs Specified Current

Temperature rise curves were produced by measuring individual contact temperatures at 5 different current levels. These measurements were plotted to product a temperature rise vs current curve. Thermocouples were attached to the contacts to measure their temperatures. The ambient temperature was then subtracted from this measured temperature to find the temperature rise. When the temperature rise of 3 consecutive readings taken at 5 minute intervals did not differ by more than 1°C the temperature measurement was recorded.

3.6 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 logrithmicaly between the limits of 10 and 500 Hz and returned to 10 Hz in 15 minute. This cycle was performed 12 times in each of three mutually perpendicular planes for a total vibration time of 9 hours. Connectors were monitored for discontinuities of one microsecond or greater using a current of 100 milliamperes DC (test group 1 only). Samples were energized at 18° level for 100% loading (test group 2).

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. Connectors were monitored for discontinuities of one microsecond or greater, using a current of 100 milliamperes DC.

3.8 Durability

Connectors were mated and unmated 50 times at a rate of 150 cycles per hour.

3.9 Contact Retention

An axial load of 5.5 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 Contact Locking Strength Retention

An axial load was applied to each contact and held for 60 seconds. The force was applied in a direction to cause locking clip springs to release..

3.11 Mating Force

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

3.12 Unmating Force

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

3.13 Thermal Shock

Mated connectors were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minutes dwell at -65 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%. (Figure 2)

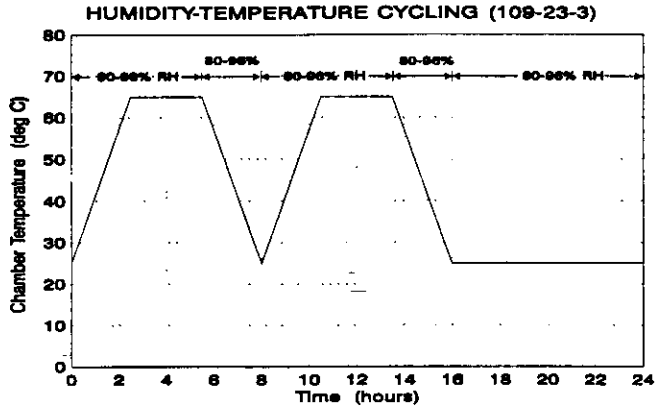

Figure 2
Typical Humidity-Temperature Cycling Profile

3.15 Temperature Life

Mated tin plated samples were exposed to a temperature of 85°C for 500 hours.

4. Validation

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