AMP

QUALIFICATION TEST REPORT

CONNECTOR, AMPLIMITE* HD-20
SURFACE MOUNT

501-239 Rev. O

Product Specification:	108-1222 Rev. O
CTL No.:	CTL5718-057-005
Date:	December 20, 1993
Classification:	Unrestricted
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* Trademark

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(R5718TS)

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report
AMPLIMITE HD-20, Surface Mount

1. Introduction

1.1 Purpose

Testing was performed on AMPLIMITE HD-20, Surface Mount to determine its conformance to the requirements of AMP Product Specification 108-1222 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the AMPLIMITE HD-20, Surface Mount manufactured by the Interconnection Components & Assemblies Product Division of the Capital Goods Business Unit. The testing was performed at the Capital Goods Business Unit Test Lab between April 23, 1990 and December 13, 1993.

1.3 Conclusion

The AMPLIMITE HD-20, Surface Mount meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1222 Rev. O.

1.4 Product Description

The AMPLIMITE HD-20 surface mount receptacle is a right-angle connector with Gull-Wing style solder contacts. It is available in 9,15,25, and 37 positions. The contacts are gold plated phosphor bronze. The housings are high temperature thermoplastic UL94V-O rated

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
1,3,4	5 ea.	786263-1	Size 3 Receptacle 30 Au
1	5	207464-1	Size 3 Plug Housing
1	125	745254-2	Crimp Snap-in Pin Contact 30 Au
2	3	749420-1	Size 4 Receptacle 30 Au
2	3	205210-2	Size 4 Plug Housing
2	111	745229-2	Crimp Snap-in Pin Contacts 30 Au
5	5	747150-2	Size 1 Receptacle (9 Position)
5	5	747299-2	Size 2 Receptacle (15 Position)
5	5	745967-2	Size 3 Receptacle (25 Position)
5	5	747301-2	Size 4 Receptacle (37 Position)
5	5	205204-4	Size 1 Plug with indents
5	5	205206-3	Size 2 Plug with indents
5	5	207464-2	Size 3 Plug with indents
5	5	205210-3	Size 4 Plug with indents

1.6 Qualification Test Sequence

	Test Groups				
Test or Examination	1	2	3	4	5
Examination of Product	1,9	1,10	1,8	1,3	1,5
Termination Resistance, Dry Circuit	3,7	2,8			
Dielectric Withstanding Voltage			3,7		
Insulation Resistance			2,6		
Temperature Rise vs Current		3,9			
Vibration	5	7			
Physical Shock	6				
Mating Force	2				2
Unmating Force	8				4
Durability	4	4			3
Solderability				2	
Thermal Shock			4		
Humidity-Temperature Cycling			5		
Mixed Flowing Gas		5			
Temperature Life		6			

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 Capital Goods Business Unit.

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 15 milliohms initially and less than 20 milliohms after testing.

Test Group	Nbr of Samples	Condition	Min	Max	Mean
1	125	Initial	8.57	10.71	9.521
		After Mechanical	8.82	11.55	9.920
2	30	Initial	10.65	13.65	12.355
		After Temp Life	10.78	15.82	13.025

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 5,000 megohms initially and greater than 100 megohms after humidity.

2.5 Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when a specified current of 3.0 amperes DC was applied.

2.6 Vibration - Groups 1,2

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

2.8 Mating Force - Group 1,5

All mating force measurements, using mating halves without grounding indents, were less than 0.5 pounds per contact. Samples with grounding indents were less than 30 pounds for 9 position, 33 pounds for 15 position, 37 pounds for 25 position and 40 pounds for 37 position.

2.9 Unmating Force - Group 1

All unmating force measurements, using mating halves without grounding indents, were less than 0.5 pounds per contact. Samples with grounding indents were less than 30 pounds for 9 position, 33 pounds for 15 position, 37 pounds for 25 position and 40 pounds for 37 position.

2.10 Durability - Groups 1,2

No physical damage occurred to the samples as a result of mating and unmating the connector 500 times.

2.11 Solderability - Group 4

The contact leads had a minimum of 95% solder coverage.

2.12 Thermal Shock - Group 3

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

2.13 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.

2.14 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.

2.15 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, 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.

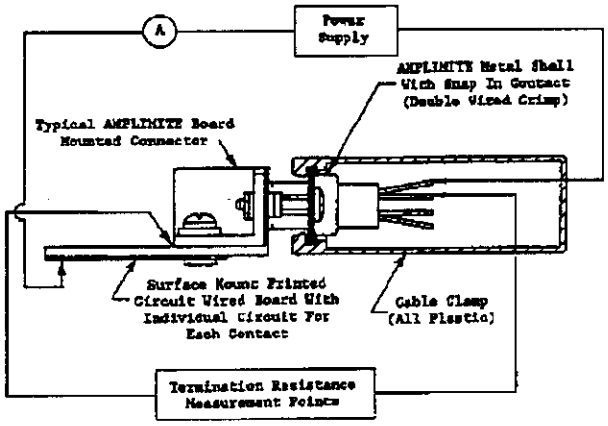

Figure 1
Typical Termination Resistance Measuring Pionts

3.3 Dielectric Withstanding Voltage

A test potential of 1,000 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 500 volts DC. This voltage was applied for two minutes before the resistance was measured.

3.5 Temperature Rise vs Specified Current

Connector temperature was measured, while energized at the specified current of 3.0 amperes AC. 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.

3.6 Vibration, Random

Mated connectors were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 50 and 2000 hertz. The power spectral density at 50 hz is 0.1 G^2/Hz. The spectrum slopes up at 6 dB per octave to a PSD of 0.4 G^2/Hz at 100 Hz. The spectrum is flat at 0.4 G^2/Hz from 100 to 1000 Hz. The spectrum slopes down at 6 dB per octave to the upper bound frequency of 2000 Hz, at which the PSD is 0.1 G^2/Hz. The root-mean square amplitude of the excitation was 23.91 GRMS.

3.7 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.

3.8 Mating Force

The force required to mate individual connectors was measured, using a free floating fixture with the rate of travel at 1.0 inch/minute. The force per contact was calculated.

3.9 Unmating Force

The force required to unmate individual connectors was measured using a free floating fixture with the rate of travel at 1.0 inch/minute. The force per contact was calculated.

3.10 Durability

Connectors were mated and unmated 500 times at a rate not exceeding 600 per hour.

3.11 Solderability

Connector assembly contact solder tails were subjected to a solderability test by immersing them in a mildly active Rosin flux for 5 to 10 seconds, allowed to drain for 10 to 60 seconds, then held over molten solder without contact for 2 seconds. The solder tails were then immersed in the molden solder at a rate of approximately one inch per second, held for 3 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the samples were visually examined for solder coverage. The solder used for testing was 60/40 tin lead composition and was maintained at a temperature of 245°C.

3.12 Thermal Shock

Unmated connectors were subjected to 100 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55°C and 105°C. The transition between temperatures was less than one minute.

3.13 Humidity-Temperature Cycling

Unmated 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 Mixed Flowing Gas, Class III

Mated connectors were exposed for 20 days to a 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 $C1_2$ at 20 ppb, NO_2 at 200 ppb, and H_2S at 100 ppb.

3.15 Temperature Life

Mated samples were exposed to a temperature of 105°C for 1000 hours.

4. Validation

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12/20/93

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