AMPLIMITE* HD-22 Front Metal Shell, PCB Mounted Connector

1. INTRODUCTION

1.1. Purpose

Testing was performed on AMPLIMITE* HD-22 connectors to determine their conformance to the requirements of Product Specification 108-1092 Revision C.

1.2. Scope

This report defines the electrical, mechanical, and environmental performance of AMPLIMITE HD-22 connectors. Testing was performed at Contech Research Inc. between 21Nov01 and 09Jan02. The test file number for this testing is 201608.

1.3. Conclusion

The AMPLIMITE HD-22 connectors listed in paragraph 1.4., conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-1092 Revision C.

1.4. Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1,2,3,4a,5	5 each	788624-1	15 position right angle receptacle assembly (gold flash)
1,2,4b,5,6	5 each	788649-1	15 position right angle receptacle assembly (15 μin gold)
1,2,4	5 each	1-788649-2	15 position right angle receptacle assembly (30 μin gold)
1,2,4,	5 each	788390-6	Receptacle contact

Figure 1

1.5. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

- Temperature: 15 to 35°C
- Relative Humidity: 25 to 75%

* Trademark
I Indicates change

LOC B

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)						
	1	2	3	4a	4b	5	6
	Test Sequence (b)						
Low level contact resistance	2,6	1,4	1	1,3	1,3		
Insulation resistance						1,5	
Withstanding voltage						2,6	
Temperature rise vs current			2				
Solderability							1
Vibration	4						
Mechanical shock	5						
Durability	3	2					
Mating force	1						
Unmating force	7						
Thermal shock						3	
Humidity-temperature cycling						4	
Temperature life		3					
Mixed flowing gas, Class IIA				2(c)(d)			
Mixed flowing gas, Class IIIA					2(c)(e)		

NOTE
(a) See paragraph 1.4.
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition specimens with 10 durability cycles.
(d) Perform low level contact resistance after 7 days exposure.
(e) Perform low level contact resistance after 10 days exposure.

Figure 2

2. SUMMARY OF TESTING

2.1. Low Level Contact Resistance - Test Groups 1, 2, 3, 4a and 4b

All low level contact resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage had a change in resistance (ΔR) of less than 15 milliohms after testing.

2.2. Insulation Resistance - Test Group 5

All insulation resistance measurements were greater than 5000 megohms initially, and 1000 megohms final.

2.3. Withstanding Voltage - Test Group 5

No dielectric breakdown or flashover occurred.

2.4. Temperature Rise vs Current - Test Group 3

All specimens had a temperature rise of less than 30°C above ambient when tested using a baseline rated current of 2 amperes and the correct derating factor value based on the specimens wiring configuration.

2.5. Solderability - Test Group 6

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

2.6. Vibration - Test Group 1

No discontinuities were detected during vibration testing. Following vibration testing, no cracks, breaks, or loose parts on the specimens were visible.

2.7. Mechanical Shock - Test Group 1

No discontinuities were detected during mechanical shock testing. Following mechanical shock testing, no cracks, breaks, or loose parts on the specimens were visible.

2.8. Durability - Test Groups 1 and 2

No physical damage occurred as a result of mating and unmating the specimens 100 times for gold flash specimens, 250 times for 15μin gold specimens, and 500 times for 30μin gold specimens.

2.9. Mating Force - Test Group 1

All mating force measurements were less than 33 pounds.

2.10. Unmating Force - Test Group 1

All unmating force measurements were less 33 pounds.

2.11. Thermal Shock - Test Group 5

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

2.12. Humidity-temperature Cycling - Test Group 5

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

2.13. Temperature Life - Test Group 2

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

2.14. Mixed Flowing Gas, Class IIA - Test Group 4a

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

2.15. Mixed Flowing Gas, Class IIIA - Test Group 4b

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

3. TEST METHODS

3.1. Low Level Contact Resistance

Low level contact resistance measurements were made using a 4 terminal measuring technique. The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

3.2. Insulation Resistance

Insulation resistance was measured between adjacent contacts of unmated specimens. A test voltage of 500 volts DC was applied for 2 minutes before the resistance was measured.

3.3. Withstanding Voltage

A test potential of 1000 volts AC was applied between the adjacent contacts and between contacts and the metal shell of unmated specimens. This potential was applied for 1 minute and then returned to zero.

3.4. Temperature Rise vs Current

Temperature rise curves were produced by measuring individual contact temperatures at 5 different current levels. These measurements were plotted to produce a temperature rise vs current curve. Thermocouples were attached to individual 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 15 minute intervals did not differ by more than 1°C, the temperature measurement was recorded.

3.5. Solderability

Specimen contact solder tails were subjected to a solderability test. The soldertails were immersed in activated rosin flux for 5 to 10 seconds, allowed to drain for 10 to 20 seconds, then held over molten solder without contact for 2 seconds. The solder tails were then immersed in the molten solder at a rate of approximately 12.7 mm [.5 in] per second, held for 4 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the specimens were visually examined for solder coverage. The solder used for testing was 67/37 tin lead composition and was maintained at a temperature of 245 ± 5°C.

3.6. Vibration, Random

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 50 and 2000 Hz. The power spectral density at 50 Hz was 0.01 G^2/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.04 G^2/Hz at 100 Hz. The spectrum was flat at 0.04 G^2/Hz from 100 to 1000 Hz. The spectrum sloped down at 6 dB per octave to the upper bound frequency of 2000 Hz at which the PSD was 0.01 G^2/Hz. The root-mean square amplitude of the excitation was 23.91 GRMS. This was performed for 20 minutes in each of 3 mutually perpendicular planes for a total vibration time of 1 hour. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes in the monitoring circuit.

3.7. Mechanical Shock, Half-sine

Mated specimens were subjected to a mechanical 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 3 mutually perpendicular planes for a total of 18 shocks. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Durability

Specimens were mated and unmated 100 times for gold flash specimens, 250 times for 15 μin gold specimens, and 500 times for 30 μin gold specimens at a maximum rate of 200 cycles per hour.

3.9. Mating Force

The force required to mate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 25.4 mm [1 in] per minute.

3.10. Unmating Force

The force required to unmate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 25.4 mm [1 in] per minute.

3.11. Thermal Shock

Mated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 105°C for regular housings, and -55 and 130°C for high temperature housings. The transition between temperatures was less than 1 minute.

3.12. Humidity-temperature Cycling

Mated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65°C twice while maintaining high humidity.

3.13. Temperature Life

Mated specimens were exposed to a temperature of 105°C for 500 hours.

3.14. Mixed Flowing Gas, Class IIA

Mated specimens were exposed for 14 days to a mixed flowing gas Class IIA exposure. Class IIA exposure is defined as a temperature of 30°C and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb, NO_2 at 200 ppb, H_2S at 10 ppb and SO_2 at 100 ppb.

3.15. Mixed Flowing Gas, Class IIIA

Mated specimens were exposed for 20 days to a mixed flowing gas Class IIIA exposure. Class IIIA 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, H_2S at 100 ppb and SO_2 at 200 ppb.