



AMPLIMITE* HD-20 Board Mount Connectors

1. INTRODUCTION

1.1 Purpose

Testing was performed on the TE Connectivity's AMLIMITE* PCB Mounted Connectors to determine their conformance to the requirements of TE Specification 108-130013 Rev A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the AMPLIMITE* PCB Mounted connector manufactured by the Data and Devices Business Unit. The testing was performed between August 25, 2-16 and September 20, 2016.

1.3. Conclusion

1.4. Product Description

AMPLIMITE* PCB Mounted Connectors are available in 9, 15, 25 and 37 position vertical Plug and receptacle and 9, 15, 25, and 37 position right angle plug and receptacle. All of the housings for the plug and receptacle connectors are molded black compound with 94V-0 rating. The metal shell is made from steel with nickel and tin plating

1.5. Test Samples

The test samples were randomly selected from Normal current production lots and the following part numbers were used.

Test Group	Sample Size	Part Number	Description
1, 2, 3, 4, 5, 6, 7	30	2301846-1	AMPLIMITE* REC, HD20, R/A, 25P, B/L,4-40 S/LOC
	30	2301835-1	AMPLIMITE* Plug HD20, Vertical 25P, B/L,4-40 INS
	30	2301845-2	AMPLIMITE* REC, HD20, R/A, 15P, B/L,4-40 S/LOC
	30	2301836-1	AMPLIMITE* Plug HD20, Vertical 37P, B/L,4-40 S/LOC
	30	2301842-1	AMPLIMITE* REC HD20, Vertical 37P, B/L,4-40 S/LOC
	30	2301843-2	AMPLIMITE* Plug HD20, R/A, 9P, B/L,4-40 S/LOC
	30	2301844-2	AMPLIMITE* REC, HD20, R/A, 9P, B/L,4-40 S/LOC
	30	2301847-1	AMPLIMITE* Plug HD20, Vertical 44P, B/L,4-40 INS
	30	2301828-1	AMPLIMITE* Plug HD20, Vertical 15P, B/L,4040 INS

1.6 Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)							
	1	2	3	4	5	6	7	
	TEST SEQUENCE (b)							
Initial examination of product	1	1	1	1	1	1	1	
Low Level Contact Resistance	2,5	2,5	2,4					
Dielectric Withstanding Voltage					4			
Insulation Resistance					5			
Temperature Rise				2				
Vibration, Random	3							
Physical Shock	4							
Mating Force	6						3	
Unmating Force	7						4	
Durability		3					2	
Solderability						2		
Thermal Shock					2			
Humidity					3			
Temperature Life		4						
Salt Spray			3					
Final examination of product	8	6	5	3	6	3	5	

The numbers indicate sequence in which tests were performed

2.0. 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 receiving location.

2.2. Low Level Contact Resistance – Groups 1,2, and 3

All samples were mated contacts assembled in housing to 20 millivolts open circuit at 100 milliamperes max. See chart below for the min and max before and after the subjected tests for each sample.

Product Type	Group	Specification Before/After	Min LLCR Before	Max LLCR Before	Test	Min LLCR After	Max LLCR After
9 Way D-Sub Plug	A	30m Ω Max	14.1	17.2	Vibration/Shock	14	16.8
	B	30m Ω Max	14.1	15.9	Durability/ Temperature	14.2	15.8
	C	30m Ω Max	14.1	16	Salt Spray	14	16.2
9 Way D-Sub Socket	A	30m Ω Max	14	17.2	Vibration/Shock	14	16.8
	B	30m Ω Max	14.1	15.9	Durability/ Temperature	14.2	15.8
	C	30m Ω Max	14	16.3	Salt Spray	14	16.2
15 Way D-sub Vertical Plug	A	30m Ω Max	13.3	16.3	Vibration/Shock	13.1	16.5
	B	30m Ω Max	13.1	16.1	Durability/ Temperature	13.1	16.4
	C	30m Ω Max	13	16.1	Salt Spray	13.1	16.5
15 Way D-Sub Socket	A	30m Ω Max	13.1	16.3	Vibration/Shock	13.1	16.5
	B	30m Ω Max	13.1	16.3	Durability/ Temperature	13.1	16.4
	C	30m Ω Max	13.1	16.2	Salt Spray	13.1	16.5
25 Way D-Sub Vertical Plug	A	30m Ω Max	7.6	12.1	Vibration/Shock	7.2	12.2
	B	30m Ω Max	8	11.8	Durability/ Temperature	8	11.8
	C	30m Ω Max	7	10.1	Salt Spray	7	10.3
25 Way D-Sub Socket	A	30m Ω Max	7.6	11.9	Vibration/Shock	7.6	12.2
	B	30m Ω Max	8	11.3	Durability/ Temperature	8	11.8
	C	30m Ω Max	8	12.3	Salt Spray	7	10.1
D-Sub Vertical 37P Plug	A	30m Ω Max	8	11	Vibration/Shock	8.5	11
	B	30m Ω Max	7.9	11	Durability/ Temperature	8.1	11
	C	30m Ω Max	7.9	10.9	Salt Spray	8.4	11
D-Sub Vertical 37P Socket	A	30m Ω Max	7.9	11	Vibration/Shock	8.4	11
	B	30m Ω Max	7.9	11	Durability/ Temperature	8.5	11

	C	30m Ω Max	7.9	11	Salt Spray	8.4	11
D-Sub Vertical 44P Plug	A	30m Ω Max	6.5	8.2	Vibration/Shock	6.4	8.8
	B	30m Ω Max	6.6	8.3	Durability/ Temperature	6.5	8.3
	C	30m Ω Max	6.6	8.1	Salt Spray	6.6	8.1

2.3 Dielectric Withstanding Voltage – Group 5

No dielectric breakdown or flashover occurred when a test voltage was applied between adjacent contacts.

2.4. Insulation Resistance – Group 5

All insulation resistance measurements were greater than the 5000 megaohms during the initial test and 1000 megaohms after test.

2.5. Temperature Rise - Group 4

All positions series wired individually forming a single circuit in each connector. All samples were tested at 250 VAC, 2A and 4A per pin at 30-degree C max. All samples were less than 1000.

2.6. Vibration, Random – Group 1

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

2.8. Mating Force – Group 1 and 7

All mating force requirements were less than the specified requirements.

2.9. Unmating Force – Group1 and7

All unmating force requirements were less than the specified requirements.

2.10. Durability – Group 2 and 7

No physical damage occurred to the samples as a result of mating and unmating the connectors the specified cycles. 100 cycles for gold flash and 15 micro-inches of gold plating. 500 cycles for 30 micro-inches' gold plating.

2.11. Solderability – Group 6

The contacts had a minimum of 95% solder coverage.

2.12. Thermal Shock – Group 5

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

2.13. Humidity – Group 5

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

2.14. Temperature Life – Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to elevated temperatures.

2.15. Salt Spray – Group 3

No evidence of damage or abnormal conditions to either the contacts or the connectors as a result of exposure to the salt spray.

2.16. Final Examination – All Groups

All samples were inspected and accepted by the product assurance department of receiving location.

3.0. Test Methods

3.1. Examination of product

Product drawings and inspection plans were used to inspect the samples. They were examined visually and functionally.

3.2 Low Level Contact Resistance

LLCR was measured at low level current using a four-terminal measuring technique. The test current was maintained at 100 milliamperes with an open circuit voltage at 20 millivolts.

3.3. Dielectric Withstanding Voltage

A test potential of 1000 V ac 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 of unmated connectors, using 500 volts DC for one minute.

3.5. Temperature Rise

Connector temperature was measured, while a single circuit was energized at the specific current. Thermocouples were attached to the connectors to measure their temperature.

3.6. Vibration, Random

Mated connectors were subjected to a random vibration test, specified per EIA 364-27. Each mated connector was tested for 15 minutes in each of the three mutually per plane.

3.7. Physical Shock

Mated connectors were subjected to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along three mutually perpendicular planes.

3.8. Mating Force

The force required to mate individual connectors were measured using a free-floating fixture with the rate of travel at 1 inch per minute.

3.9. Unmating Force

The force required to unmate individual connectors were measured using a free-floating fixture with the rate of travel at 1 inch per minute.

3.10. Solderability

Connector assemblies contact tails were subjected to wave solder temperature 245 degrees C +/-5 degrees C for 5 seconds. After one hour +/-5 minutes they were subjected to steam aging.

3.11. Thermal Shock

Subjected mated connector to 5 cycles between -55 degrees C and +105 degrees C with each cycle consisting of thirty minutes dwell time at -55 degrees C and 105 degrees C. The transition between temperatures was less than five minutes.

3.12. Humidity

Mated connectors were subjected to t96 hours at 40 degrees C with 90% to 95% relative humidity.

3.13. Temperature Life

Mated connectors were subjected to temperature life at 105 degrees C for 500 hours.

3.14. Salt Spray

Mated connectors were subjected to a salt concentration of 5% at 35 +/-2 degrees C for 8 hours.