

PRODUCT SPECIFICATION

NO 108-9034

1. SCOPE

This specification covers the performance requirements, test methods, and quality assurance provisions for AMPLIMATE* connectors. The connectors are designed to provide an interconnection of computer peripheral equipment within controlled environments and use posted or crimpable hermaphroditic contacts.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein.

A. AMP Specifications

109-6: DC Dry Circuit Measurements of Separable Electrical Connectors.

B. Military Standards

- (1) MIL-STD-105: Sampling Procedures and Tables for Inspection by Attributes.
- (2) MIL-STD-202: Test Methods for Electronic and Electrical Component Parts.
- (3) MIL-STD-1344: Test Methods for Electrical Connectors.

3. REQUIREMENTS

3.1. Customer Drawing

The individual item requirements shall be as specified herein and in accordance with the applicable customer drawing. The following information shall appear on each customer drawing:


- A. Material
- B. Marking
- C. Physical dimensions necessary for "Form and Fit"
- D. Instruction Sheet No for Connector Assembly Procedure
- E. Reference to contact application specification
- F. Reference to this specification

3.2. Procedure

In the event of conflict between this specification and the customer drawing, the drawing shall govern.

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	C	Revised per	<i>ef</i>	4-11-74	SHEET 1 OF 11
		ECN C-762			
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3.3. Qualification

Connectors and contacts qualified under this specification shall be products that have passed the examinations and tests specified in Figure 3, in the order shown.

3.4. Materials, Finishes, Design and Construction

The connectors and contacts shall be of the design, construction, material and finish as specified on the applicable customer drawing, see Para. 3.1. However, when a definite material or finish is not specified, a material or finish shall be used which will enable the connector or contacts to meet the performance requirements of this specification.

3.5. Interchangeability

All connectors and contacts having the same part number shall be completely interchangeable with each other with respect to installation (physical) and performance (function).

3.6. Marking

Connectors and contacts shall be marked in accordance with the applicable drawing, see Para 3.1. Markings shall be legible at the end of all specified tests.

3.7. Insertion and Removal Tools


Insertion and removal tools shall be of the part number specified on the applicable customer drawing, see Para 3.1., and shall be used in accordance with the applicable instruction sheet.

3.8. Crimping, Tools

The termination of wires to AMPLIMATE contacts shall be in accordance with the referenced specification, see Para 3.1.

3.9. Workmanship

Connectors and contacts shall be processed in such a manner as to be uniform in quality and shall be free from defects that will affect life, serviceability or appearance. There shall be no evidence of poor molding or fabrication, damaged contacts, peeling or chipping of the plating. Metal surfaces shall be free of nicks, burrs, or sharp corners and edges that would damage the wire insulation or the finish of the connectors.

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3.10. Performance


The connectors, contacts and accessories shall be designed to meet the performance requirements of this specification when tested in accordance with the specified method.

A. Examination of Product

- (1) The connectors, contacts and accessories shall be examined to insure conformance with the following requirements of this specification.
 - (a) Applicable Drawings, see Para 3.1.
 - (b) Materials, design and construction, see Para 3.4.
 - (c) Marking, see Para 3.6.
 - (d) Workmanship, see Para 3.9.
- (2) The connectors, contacts and accessories shall meet all physical and mechanical requirements of the applicable drawings. Visual examination shall be performed throughout the test program to note any changes in material color, marking, etc. All markings shall be legible after all tests.

B. Thermal Shock

- (1) Mated connectors shall be subjected to 5 continuous temperature cycles as follows:
 - (a) The connectors shall be placed in a chamber with an internal chamber temperature of 65°C (149°F) and maintained for a period of not less than 30 minutes.
 - (b) At the conclusion of this time period, the connectors shall be transferred, within 2 minutes, to a cold chamber with an internal temperature of -55°C (-67°F) and maintained for a period of not less than 30 minutes.
 - (c) At the conclusion of this time period the connectors shall be returned, within 2 minutes, to the high temperature chamber.
 - (d) Exposure to the high temperature limit and then the low temperature limit shall be considered 1 cycle.
 - (e) After completion of 5 cycles, the connectors shall be returned to laboratory ambient conditions, unmated and inspected for evidence of damage.
 - (f) Test chambers and connector mounting shall be in accordance with MIL-STD-202, Method 107.

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- (2) The connectors shall show no evidence of damage which will interfere with the mechanical or electrical performance requirements of the subsequent tests of Figure 3. Markings shall be legible.

C. Dielectric Withstanding Voltage


- (1) Unmated connector assemblies shall be tested in accordance with MIL-STD-1344, Method 3001. The following details shall apply:
 - (a) Nature of potential: AC
 - (b) Magnitude of test voltage: 1000 vrms
 - (c) Points of application of test voltage: Between contacts alternately connected and between contacts and accessories
 - (d) Leakage current: 2 milliamperes
 - (e) Barometric pressure: Sea level
- (2) Connector assemblies shall withstand the specified test voltage without flashover or breakdown. Leakage current shall not exceed 2 milliamperes.

D. Durability

- (1) Counterpart connectors shall be mated and unmated 500 times at a rate of 200 ± 100 cycles per hour. Center fasteners shall be removed for this test.
- (2) The connectors shall show no evidence of damage which will interfere with the mechanical or electrical performance requirements of the subsequent tests of Figure 3.

E. Vibration

- (1) Mated connector assemblies shall be tested in accordance with MIL-STD-202, Method 204. The following details shall apply:
 - (a) Test condition letter: A
 - (b) Electrical load: 100 ma, all contacts
 - (c) Allowable discontinuities: 1 microsecond
- (2) The connector assemblies shall show no cracking, breaking, or loosening of parts. There shall be no repeatable loss of electrical continuity of any contact circuit for more than 1 microsecond.

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F. Physical Shock

- (1) Mated connector assemblies shall be tested in accordance with MIL-STD-202, Method 213. The following details shall apply:
 - (a) Test condition letter: I
 - (b) Mounting method: In accordance with the mounting fixture in MIL-STD-1344, Method 2005
 - (c) Electrical load: 100 ma, all contacts
 - (d) Allowable discontinuities: 1 microsecond
- (2) The connector assemblies shall show no cracking, breaking or loosening of parts. There shall be no repeatable loss of electrical continuity of any contact circuit for more than 1 microsecond.

G. Moisture Resistance

- (1) Unmated connector assemblies shall be tested in accordance with MIL-STD-202, Method 106. The following details shall apply:
 - (a) Initial measurements: No measurements are required after initial conditioning.
 - (b) Step 7b is not required.
 - (c) Loading voltage: None required.
 - (d) Final measurements: After completion of step 6 of the final cycle, the connectors shall be removed from the chamber. Excess moisture shall be shaken off the surfaces. No wiping or forced drying shall be used. Insulation resistance shall be tested as specified in Para 3.10.H. The insulation resistance shall not be taken sooner than 1/2 and not later than 3 hr after removal from the chamber. If a measurement taken early in the specified time period results in a failure, the measurement may be retaken once during the time period specified and will be considered acceptable.
- (2) The insulation resistance shall not be less than 100 megohms. Markings shall be legible. Connectors shall meet the subsequent tests of Figure 3.

H. Insulation Resistance

- (1) Unmated connector assemblies shall be tested in accordance with MIL-STD-1344, Method 3003. The following details shall apply:
 - (a) Duration of application of test voltage: 1 min max

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(b) Points of application of test voltage: 4 measurements shall be made between contact and contact, 2 measurements between contact and cable clamp on each connector half. Measurements shall be distributed throughout the entire connector length.

(2) The insulation resistance shall not be less than 1000 megohms.

I. Salt Spray

(1) Unmated connector assemblies shall be tested in accordance with MIL-STD-202, Method 101. The following details shall apply:

- (a) Test condition letter: B
- (b) Applicable salt solution: 5%
- (c) Measurements after exposure: Immediately after exposure, the connectors and contacts shall be washed with tap water using a soft hair brush and dried for 10 ± 2 hr max in a circulating air oven at a temperature of $38^{\circ} \pm 3^{\circ}\text{C}$ ($100^{\circ} \pm 5^{\circ}\text{F}$).

(2) Connectors and contacts shall meet the subsequent tests of Figure 3. Markings shall be legible.

J. Termination Resistance, Low Level

(1) Mated connectors shall be tested in accordance with AMP Spec 109-6. The following details shall apply:


- (a) Test circuit: AMP Spec 109-6, Figure 1
- (b) Probe points: In accordance with Figure 1
- (c) Number of measurements: 10 contact pairs per connector

(2) The low level resistance of each mated contact pair shall not exceed 20 milliohms.

K. Termination Resistance, Rated Current

(1) Mated connectors shall be tested in accordance with the following details:

- (a) Method of connection: Voltmeter-ammeter method as shown in Figure 1. The circuit shall be calibrated to measure a .01 ohm precision resistor at a load current of 1 amp with $\pm 4\%$ accuracy.

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- (b) Test current: AC or dc may be used. Means shall be provided to limit the current to the applicable test current specified in Figure 2.
- (c) Probe points: In accordance with Figure 1
- (d) Number of measurements: The same contacts that were measured in Para 3.10.J

(2) The termination resistance of each mated contact pair, at the applicable test current, shall not exceed 20 milliohms.

L. Contact Retention

(1) Unmated connector assemblies shall be tested in accordance with MIL-STD-1344, Method 2007. The following details shall apply:

- (a) Number of samples: All connector assemblies wired with 22 gauge or larger wire.
- (b) Number of contacts: 10 random contacts in each connector.
- (c) Special requirements: The contacts selected shall be removed and reinserted 10 times using the specified tools in Para 3.1. On the 10th insertion the contact locking lance shall be reset to its original position.
- (d) Applied axial load: 6 lb
- (e) Axial direction: Pull on the wire.
- (f) Maximum allowable contact displacement: Not applicable.


(2) Contacts shall withstand the specified axial load without dislodging from their normal position.

M. Crimp Tensile

(1) Contacts shall be tested in accordance with MIL-STD-1344, Method 2003. The following detail shall apply:

- (a) Number of contacts: 20 randomly selected contacts of each wire gauge.

(2) Contacts shall withstand the minimum axial load specified in Figure 2 without the wire pulling out of the wire barrel or breaking within the wire barrel.

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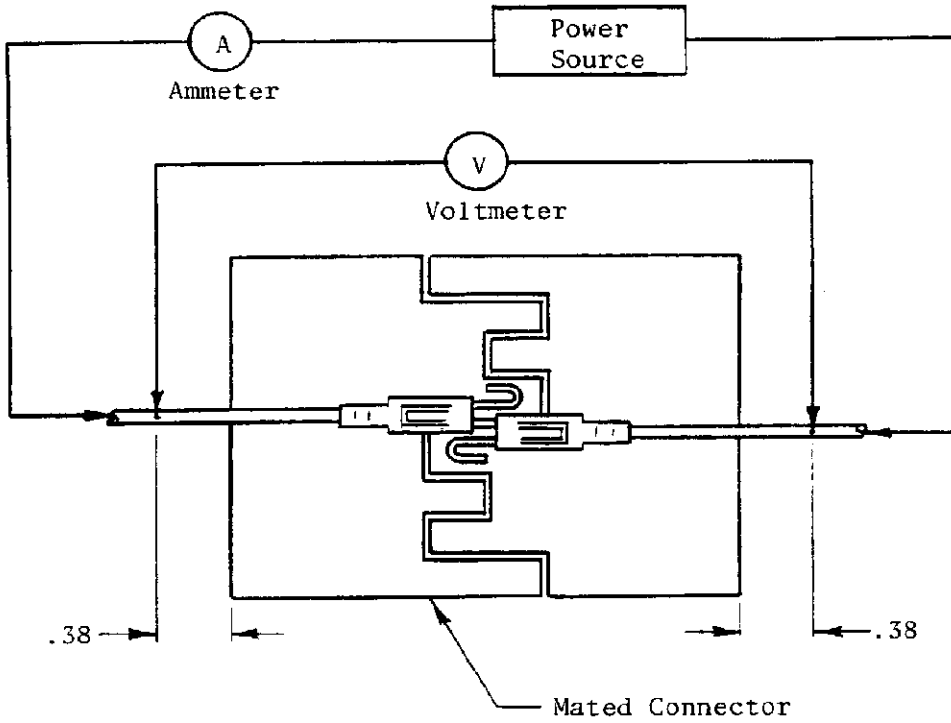



Figure 1
Termination Resistance

Wire Gauge	Test Current, amp (a)	Tensile Strength, lb
30	1.2	1.5
28	1.5	3.0
26	2.0	5.0
24	3.0	8.0
22	5.0	12.0
20	7.5	20.0
18	10.0	38.0

(a) Single contact free air test currents only, not to be construed as connector current rating currents, used only for testing.

Figure 2
Test Current and Tensile Strength

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4. QUALITY ASSURANCE PROVISIONS

4.1. Responsibility for Inspection

AMP Incorporated is responsible for the performance of all inspection requirements specified herein, and for controlling the quality of the delivered product.

A. Inspection Conditions

Unless otherwise specified, all inspection shall be made within the following ambient conditions:

- (1) Temperature: 15 - 35°C
- (2) Atmospheric Pressure: 650 - 800 millimeters of mercury
- (3) Relative Humidity: 30 - 80 percent

4.2. Classification of Inspection

The inspection of connectors shall be classified as follows:

- A. Qualification Inspection, see Para 4.3.
- B. Quality Conformance Inspection, see Para 4.4.

4.3. Qualification Inspection

Qualification inspection shall consist of the examinations and tests, performed in the sequence shown in Figure 3.

A. Selection of samples.


The connectors and contacts used for qualification inspection shall be produced with equipment and procedures representative of the production. A minimum of 2 connectors of each basic part number shall be selected.

B. Preparation of samples

All connectors shall be fully wired with 3 ft min lengths of wire. One connector of each part number shall be wired with wire of the largest size applicable to the contact wire barrel. The other connector of each part number shall be wired with wire of the smallest size applicable to the contact wire barrel.

C. Failures

There shall be no functional failures of the connectors or contacts during the tests of Figure 3.

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Test	Test Paragraph
Examination of Product	3.10.A
Thermal Shock	3.10.B
Insulation Resistance	3.10.H
Dielectric Withstanding Voltage	3.10.C
Durability	3.10.D
Vibration	3.10.E
Physical Shock	3.10.F
Moisture Resistance	3.10.G
Salt Spray	3.10.I
Termination Resistance, Low Level	3.10.J
Termination Resistance, Rated Current	3.10.K
Contact Retention	3.10.L
Crimp Tensile	3.10.M

Figure 3
Qualification and Periodic Test Sequence

4.4. Quality Conformance Inspection

A. Lot Inspection

Sample units from each lot of connectors produced shall be subjected to the inspection of Figure 4 in the sequence shown.

(1) Inspection Lot


An inspection lot shall consist of all connectors, covered by one drawing, produced under essentially the same conditions, and offered for inspection at one time.

(2) Sampling Plan

Statistical sampling and inspection shall be in accordance with MIL-STD-105.

(3) Rejected Lots

If an inspection lot is rejected, the lot will be withdrawn and reworked to correct the defects. The lot will then be reinspected using tightened inspection.

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Examination or Test	Paragraph	AQL %
Examination of Product	3.8.A.	-
Critical Characteristics	MIL-STD-105 Para. 2.1.1	1.5
Major Characteristics	MIL-STD-105 Para. 2.1.2	2.5
Minor Characteristics	MIL-STD-105 Para. 2.1.3	4.0

Figure 4

Lot Inspection

B. Periodic Inspection

At 24 month intervals, from the date of qualification, connectors and contacts shall be selected from production and subjected to the periodic inspection of Figure 3, in the sequence shown.

(1) Sampling Plan


A minimum of two connectors of each basic part number shall be selected from lots that have passed the inspection of Figure 4.

(2) Preparation of Samples

Samples shall be prepared in accordance with Para 4.5.B.

(3) Failures

There shall be no functional failures of the connectors during the tests of Figure 3. When periodic testing is discontinued due to performance failures, the Reliability Engineer shall be contacted for further instructions.

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