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**AMPLIMITE\* HD-20 Subminiature "D" Solder Cup Plug and Receptacle Connectors**

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**1. SCOPE**

## 1.1. Content

This specification covers the performance, tests and quality requirements for AMPLIMITE\* HD-20 subminiature D connectors with non-removable solder cup contacts. The assembly consists of a two piece plastic insert with pre-installed contacts and two metal shells.

## 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

## 1.3. Qualification Test Results

Successful qualification testing on the subject product line was originally completed on 23Oct89. Additional qualification testing was successfully completed on 06Aug03. The Qualification Test Report number for this testing is 501-102. This documentation is on file at and available from Engineering Practices and Standards (EPS).

**2. APPLICABLE DOCUMENTS**

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

## 2.1. Tyco Electronics Documents

- 109-197: AMP Test Specifications vs EIA and IEC Test Methods
- 501-102: Qualification Test Report

## 2.2. Industry Standard

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

**3. REQUIREMENTS**

## 3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

## 3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- Voltage: 250 volts AC
- Current: 3.0 amperes for 20 AWG wire, 1.2 amperes for 28 AWG wire
- Temperature: -55 to 105°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per EIA-364.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
<b>ELECTRICAL</b>		
Low level contact resistance.	10 milliohms maximum.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 3.
Insulation resistance.	5000 megohms minimum.	EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of unmated specimens.
Withstanding voltage.	1 minute hold with no breakdown or flashover. 0.5 milliampere maximum leakage current.	EIA-364-20, Condition I. 1000 volts AC at sea level. Test between adjacent contacts of unmated specimens.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C.
<b>MECHANICAL</b>		
Solderability, dip test.	Solderable area shall have a minimum of 95% solder coverage.	EIA-364-52, Category 3. Subject contacts to solderability.

Figure 1 (cont)

Test Description	Requirement	Procedure
Vibration, random.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition V, Condition F. Subject mated specimens to 20.71 G's rms between 50-2000 Hz. 15 minutes in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Method A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	EIA-364-9. Mate and unmate 30 $\mu$ m gold plated specimens for 500 cycles, and gold flash specimens for 100 cycles at a maximum rate of 200 cycles per hour.
Mating force.	133.45 N [30 lbf] maximum for 9 position specimens. 177.93 N [40 lbf] maximum for 37 position specimens.	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
Unmating force.	133.45 N [30 lbf] maximum for 9 position specimens. 177.93 N [40 lbf] maximum for 37 position specimens.	EIA-364-13. Measure force necessary to unmate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Test Condition VII. Subject mated specimens to 5 cycles between -55 and 105°C.
Humidity-temperature cycling.	See Note.	EIA-364-31, Method IV. Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH with -10°C cold shock.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 4, Test Time Condition C. Subject mated specimens to 105°C for 500 hours.

Figure 1 (cont)

Test Description	Requirement	Procedure
Mixed flowing gas.	See Note.	EIA-364-65, Class IIIA (4 gas). Subject mated specimens to environmental Class IIIA for 20 days.

**NOTE** *Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Initial examination of product	1	1	1	1	1	1
Low level contact resistance	3,7	2,4	2,4			2,4
Insulation resistance				2,6		
Withstanding voltage				3,7		
Temperature rise vs current						3
Solderability, dip test					2	
Vibration, random	5					
Mechanical shock	6					
Durability	4					
Mating force	2					
Unmating force	8					
Thermal shock				4		
Humidity-temperature cycling				5		
Temperature life		3(c)				
Mixed flowing gas			3(c)			
Final examination of product	9	5	5	8	3	5

**NOTE** (a) *See paragraph 4.1.A.*  
 (b) *Numbers indicate sequence in which tests are performed.*  
 (c) *Precondition specimens with 10 durability cycles.*

Figure 2

#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1. Qualification Testing

###### A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test group 1 shall consist of 5 specimens each of 9 and 37 position with both gold flash and 30  $\mu$ m gold plating, all terminated to 20 AWG wire. Test groups 2 and 4 shall each consist of 5, 37 position specimens with gold flash, all terminated to 20 AWG wire. Test group 3 shall consist of 5, 37 position specimens with both gold flash and 30  $\mu$ m gold plating, all terminated to 20 AWG wire. Test group 5 shall consist of 1 unterminated 37 position specimen with gold flash. Test group 6 shall consist of 10, 37 position specimens with gold flash, 5 specimens terminated to 20 AWG wire and 5 terminated to 28 AWG wire.

###### B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

##### 4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

##### 4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

##### 4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

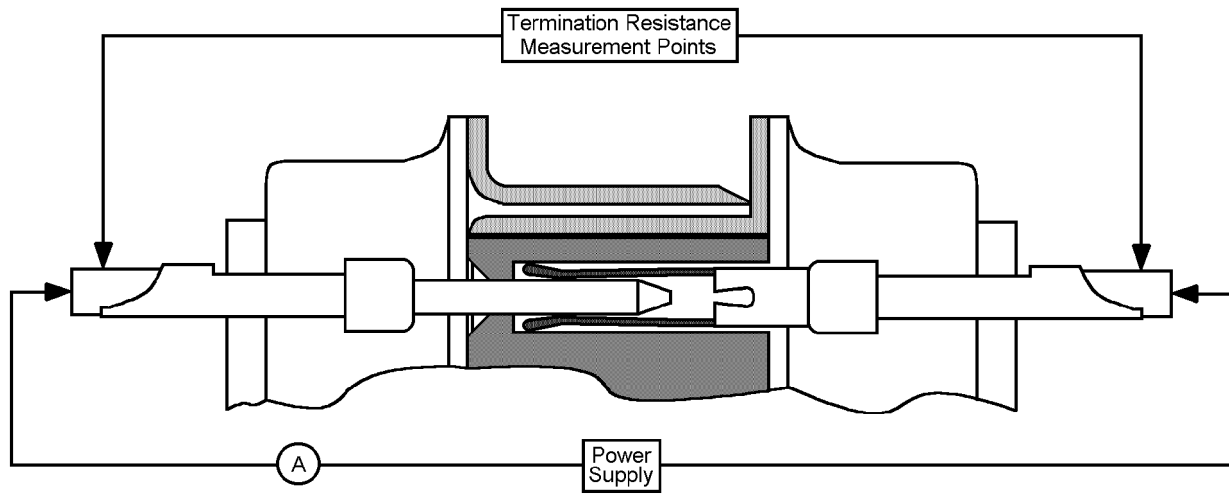


Figure 3  
Low Level Contact Resistance Measurement Points