AMPLIMITE* HDP-22 Subminiature D Connector With Removable F Crimp Contacts

1. SCOPE

1.1. Content

This specification covers the performance, test and quality requirements for AMPLIMITE* HDP-22 subminiature D connectors with removable F crimp contacts for 22 thru 28 AWG wire. The assembly consists of a two-piece plastic housing which has integral plastic retention tines and two metal shells which secure the housing components.

1.2. Qualification

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

1.3. Successful qualification testing on the subject product line was completed on 31Jul91. The Qualification Test Report number for this testing is 501-156. 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. 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. TE Connectivity (TE) Documents

- 109-1: General Requirements for Test Specifications
- 109 Series: Test Specifications as indicated in Figure 1 (Comply with MIL-STD-202, MIL-STD-1344, and EIA RS-364)
- 114-10001: Application Specification (AMPLIMITE* HDP-22 Connectors and High-Density 22DF Contacts)
- 501-156: Qualification Test Report (AMPLIMITE* HDP-22 Subminiature D Connector With Removable F Crimp Contacts)

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. Material

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

| Indicates Change

3.3. Ratings

- Voltage: 250 volts AC
- Current: Fully loaded and energized connectors
  - 22 AWG: 1.9 amperes
  - 26 AWG: 1.1 amperes
  - 28 AWG: .95 amperes
- 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.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing and Application Specification 114-10001.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination resistance, specified current.	Wire Size (AWG) / Test Current (amperes) / Resistance (milliohms maximum) 22 / 1.9 / 15 26 / 1.1 / 15 28 / .95 / 15	TE Spec 109-25. Measure potential drop of mated contacts assembled in housing, Calculate resistance. See Figure 3.
Termination resistance, dry circuit.	15 milliohms maximum.	TE Spec 109-6-1. Subject mated contacts assembled in housing to 50 millivolt DC open circuit at 100 milliamperes DC maximum. See Figure 3.
Dielectric withstanding voltage.	One minute hold with no breakdown or flashover. One milliampere maximum leakage current.	TE Spec 109-29-1. 1000 volts AC at sea level. Test between adjacent contacts of unmated specimens.
Insulation resistance.	5000 megohms minimum initial. 500 megohms minimum final.	TE Spec 109-28-4. Test between adjacent contacts of unmated specimens.
Temperature rise vs current.	30°C maximum temperature rise at specified current. See paragraph 3.3. at a maximum ambient of 70°C.	TE Spec 109-45-1. Measure temperature rise vs current.
MECHANICAL		
Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-21-5, Test Level F. Subject mated specimens to 20.71 G rms with 100 milliamperes current applied. Twenty minutes in each of 3 mutually perpendicular planes. See Figure 4.

Figure 1 (continued)

Test Description	Requirement	Procedure
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-26-1. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 4.
Mating force.	Size / Positions / Ground Indents (lbs maximum) With / Without 1 / 15 / 5.6 / 33 2 / 26 / 9.8 / 38 3 / 44 / 16.5 / 46 4 / 62 / 23.3 / 52 5 / 78 / 29.3 / 58 Note: Ground indents are on the plug.	TE Spec 109-42, Condition A. Measure force necessary to mate specimens at a maximum rate of 1 inch per minute using a free-floating fixture.
Unmating force.	Size / Positions / Ground Indents (lbs maximum) With / Without 1 / 15 / 5.6 / 33 2 / 26 / 9.8 / 38 3 / 44 / 16.5 / 46 4 / 62 / 23.3 / 52 5 / 78 / 29.3 / 58 Note: Ground indents are on the plug.	TE Spec 109-42, Condition A. Measure force necessary to unmate specimens at a maximum rate of 1 inch per minute.
Contact insertion force.	Three pounds maximum per contact.	TE Spec 109-41. Measure force necessary to insert contact into housing.
Contact retention force.	Contacts shall not dislodge from the connector housing.	TE Spec 109-30. Apply axial load of 5 pounds to contacts and hold for 60 seconds.
Contact engaging force.	Eight ounces maximum per contact.	TE Spec 109-35. Measure force necessary to insert gage A to a depth of .200. See Figure 5.
Contact separating force.	.75 ounce minimum per contact.	TE Spec 109-35. Size 2 times using gage A, then measure force necessary to insert gage B to a depth of .200. Measure force to separate. See Figure 5.
Crimp tensile.	Wire Size (AWG) / Crimp Tensile (lbs minimum) 22 / 12 24 / 8 26 / 4.5 28 / 2.7	TE Spec 109-16. Determine crimp tensile at a maximum rate of 1 inch per minute.

Figure 1 (continued)

Test Description	Requirement	Procedure
Durability.	See Note.	TE Spec 109-27. Mate and unmate specimens for number of cycles indicated at a maximum rate of 200 cycles per hour. Plating Type — Cycles Gold flash — 100 30 µin gold — 500 Gold flash over palladium-nickel (30 µin total thickness) — 500
ENVIRONMENTAL		
Thermal shock.	See Note.	TE Spec 109-22. Subject mated specimens to 5 cycles between -55 and 105°C.
Humidity/temperature cycling.	See Note.	TE Spec 109-23-4, Condition B. Subject mated specimens to 10 humidity/temperature cycles between 25 and 65°C at 95% RH.
Industrial mixed flowing gas.	See Note.	TE Spec 109-85-3. Subject mated specimens to environmental class III for 20 days.
Temperature life.	See Note.	TE Spec 109-43. Subject mated specimens to temperature life at 105°C for 500 hours.

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 Tests and Sequence

Test or Examination	Test Group (a)							
	1	2	3	4	5	6	7	8
	Test Sequence (b)							
Examination of product	1,10	1,6	1,6	1,6	1,6	1,10	1,5	1,7
Termination resistance, specified current	8			5	5			
Termination resistance, dry circuit	3,7	2,5	2,5	2,4	2,4			
Dielectric withstanding voltage						4,8		
Insulation resistance						3,7		
Temperature rise vs current				3				
Random vibration	5							
Physical shock	6							
Mating force	2							2,5
Unmating force	9							3,6
Contact insertion force						2		
Contact retention force						9		
Contact engaging force							2	
Contact separating force							3	
Crimp tensile							4	
Durability	4	3	3					4
Thermal shock.						5		
Humidity/temperature cycling.			4			6		
Industrial mixed flowing gas.					3(c)			
Temperature life.		4						

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. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1, 2, 3 and 5 shall each consist of 3 mated pairs with contacts of gold flash, 30 µin gold, and gold flash over palladium-nickel (30 µin total thickness) in the contact area, crimped to 26 AWG wire. Test group 4 shall consist of 3 mated pairs each of largest size plug/receptacle connectors with gold flash contacts crimped on 22, 26 and 28 AWG wire. Test group 6 shall consist of connectors with gold flash contacts crimped on 26 AWG wire (loaded during testing). Test group 7 shall consist of 25 pairs of contacts crimped to each of 22, 24, 26 and 28 AWG wire sizes, without housings. Test group 8 shall consist of 5 mated pairs of each housing size, 15, 26, 44, 62 and 78 positions, loaded with gold flash contacts crimped to 26 AWG wire. Hardware clamps shall be used for all test group 1 connectors. Connectors for vibration and physical shock shall be secured using screw locks and male screws. Test groups 2 thru 6 shall use cable clamps on all connectors. No hardware will be required for group 7. Test group 8 cable clamps are optional.

B. Test Sequence

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

4.2. Requalification Testing

If changes significantly affecting form, fit, or function are made to the product or to the 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. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan will 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.

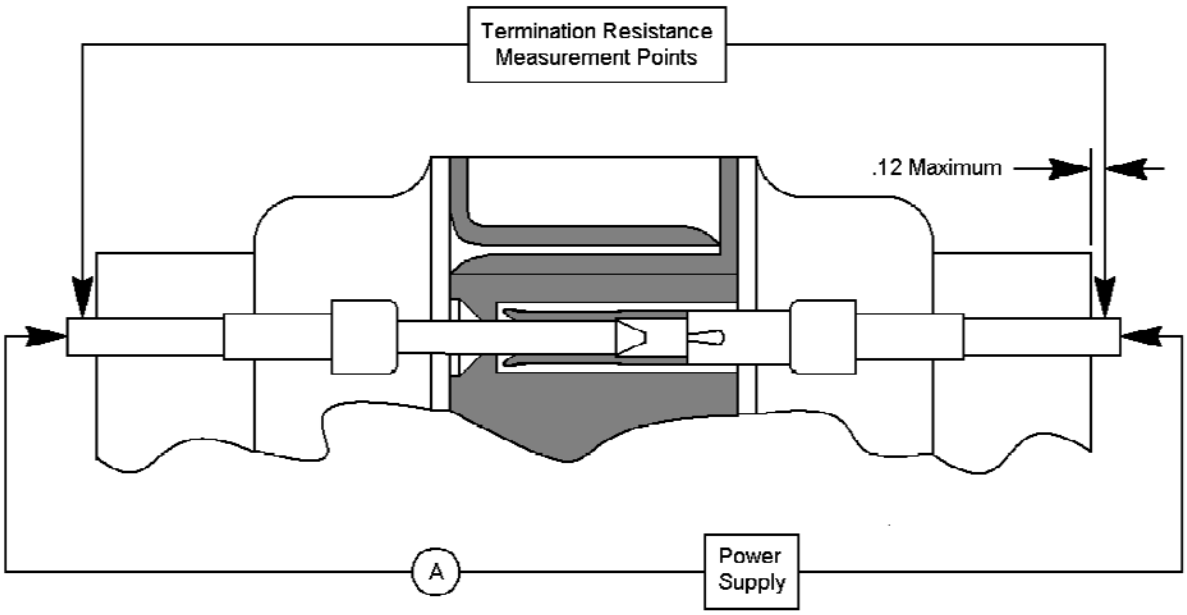


Figure 3
Termination Resistance Measurement Points

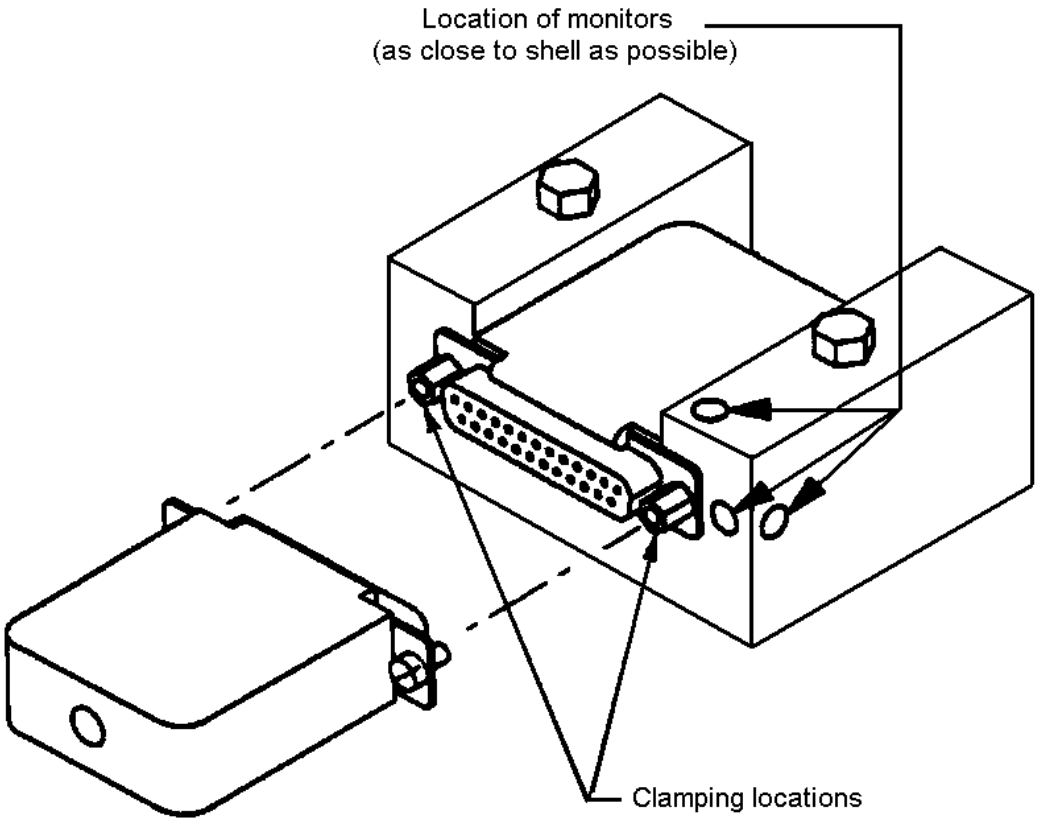
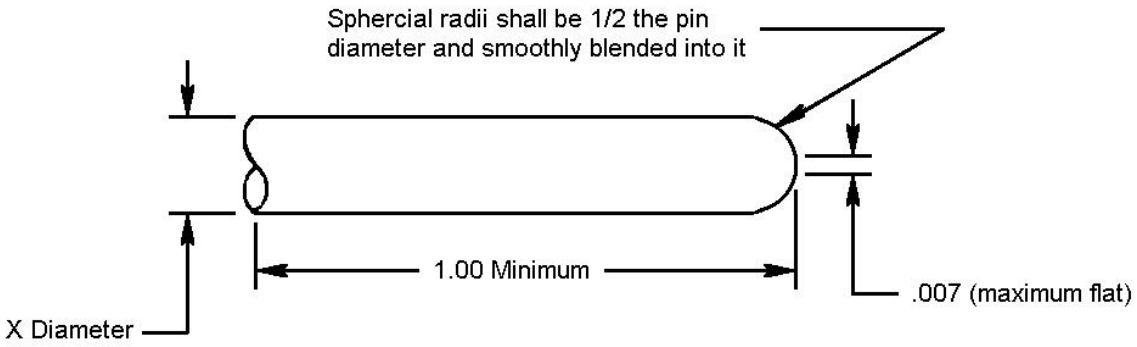


Figure 4
Vibration and Physical Shock Mounting and Clamping Locations



Gage ID	"X" Diameter
A	.0305 +.0000/-.0001
B	.0295 +.0001/-.0000

NOTE

1. *Gage Material: 100-97, UNS T11302 (AISIM2)*
2. *Heat Treat to RC 68-70*
3. *This gage is for contact size 22*
4. *Pin to comply with MS 3197*
5. *Finish: 6 to 10 microinches RMS*

Figure 5
Contact Engaging and Separating Force Gages