
AMPLIMITE* HDF-20 Low Profile Connector

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for AMPLIMITE* HDF-20 Low Profile (90° Cable Exit) connector, with non-removable insulation displacement contacts for mass termination of .050 centerline #26 and 28 AWG solid and #26 and 28 AWG stranded round conductor planar ribbon cable. Connector varieties include an all plastic version as well as one with a front metal shell.

1.2. Qualification

When tests are performed on the subject product line, the procedures specified in 109-Series Test Specifications shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

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

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1.
- C. 114-40005: Application Specification
- D. 501-129 : Test Report

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

- A. Contact: Phosphor bronze
- B. Housing: Thermoplastic, UL94V-0
- C. Shell: Steel

3.3. Ratings

- A. Voltage: 30 vac rms per CSA; 250 vac rms per UL
- B. Current: 1.25 amperes maximum
- C. Temperature: -55° to 105°C

3.4. Performance and Test Description

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. All tests are performed at ambient temperature unless otherwise specified.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure																		
Examination of Product	Meets requirements of product drawing and Application Specification 114-40005.	Visual, dimensional and functional per applicable quality inspection plan.																		
ELECTRICAL																				
Termination Resistance, Dry Circuit	25 milliohms maximum.	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum, see Figure 4; Test Specification 109-6-1.																		
Dielectric Withstanding Voltage	500 vac dielectric withstanding voltage, one minute hold. 1 milliampere maximum leakage current. No breakdown or flashover.	Test between adjacent contacts of unmated connector, contacts and adjacent conductor, and contacts to metal shell; Test Specification 109-29-1.																		
Insulation Resistance	5000 megohms minimum initial, 1000 megohms final.	Test between adjacent contacts of unmated connector; Test Specification 109-28-4.																		
Temperature Rise vs Current	Maximum temperature rise at specified current, 30°C. At maximum ambient of 70°C reference Para 3.3.B	Measure temperature rise vs current with all circuits energized; Test Specification 109-45-1.																		
MECHANICAL																				
Vibration, Random	No discontinuities greater than 1 microsecond. See Note.	Subject mated connector with hardware to 16.4 G rms with 100 ma current applied, refer to Figure 5; Test Specification 109-21-5, Figure 3, test level E, 20 minutes duration in each of 3 mutually perpendicular planes.																		
Physical Shock	No discontinuities greater than 1 microsecond. See Note.	Subject mated connectors with hardware to 50 G's half-sine shock pulses of 11 milliseconds duration; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks; Test Specification 109-26-1.																		
Mating Force	Maximum force pounds. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>No. of Contacts</th> <th>With Ground Indents</th> <th>Without Ground Indents</th> </tr> </thead> <tbody> <tr> <td>9</td> <td>30</td> <td>4.5</td> </tr> <tr> <td>15</td> <td>33</td> <td>7.5</td> </tr> <tr> <td>25</td> <td>37</td> <td>12.5</td> </tr> <tr> <td>37</td> <td>40</td> <td>18.5</td> </tr> <tr> <td>50</td> <td>45</td> <td>25.0</td> </tr> </tbody> </table>	No. of Contacts	With Ground Indents	Without Ground Indents	9	30	4.5	15	33	7.5	25	37	12.5	37	40	18.5	50	45	25.0	Measure force necessary to mate connector assembly, a distance of .140 from point of initial contact incorporating free floating fixture at a rate of .5 inch/minute; Test Specification 109-42. cond A.
No. of Contacts	With Ground Indents	Without Ground Indents																		
9	30	4.5																		
15	33	7.5																		
25	37	12.5																		
37	40	18.5																		
50	45	25.0																		

Figure 1 (continued)

Test Description	Requirement			Procedure
Unmating Force	Force, pounds			Measure force necessary to unmate connector assembly, incorporating free floating fixtures at a rate of .5 inch/minute; test Specification 109-42, cond. A.
	<u>No. of Contacts</u>	<u>With Ground Indents</u>	<u>Without Ground Indents</u>	
	9	30	0.5	
	15	33	0.9	
	25	37	2.5	
	37	40	2.5	
Durability	See Note. Gold Plating Thickness <u>Microinches</u>		<u>Durability Cycles</u>	Mate and unmate connector assemblies for indicated number of cycles at a maximum rate of 200 cycles/hours; Test Specification 109-27.
	15		100	
	30		500	
ENVIRONMENTAL				
Thermal Shock	See Note.			Subject unmated connector to 5 cycles between -55°C and 105°C; Test Specification 109-22.
Humidity-Temperature Cycling	See Note.			Subject mated connectors to 10 humidity-temperature cycles between 25°C and 65°C at 95% RH; Test Specification 109-23, method III, cond B. With cold shock at -10°C less step 7b. Measurement shall be made within 5 hours of removal from chamber.
Industrial Mixed Flow Gas	See Note.			Precondition connectors to 10 durability cycles. Subject mated connectors to environmental class III for 20 days; Test Specification 109-85-3.
Temperature Life	See Note.			Subject mated connectors to temperature life; Test Specification 109-43, test level 10, duration C. 3.6.

NOTE

Shall remain mated and show no evidence of damage, cracking or chipping and meet requirements of subsequent testing.

Figure 1 (end)

Test or Examination	Test Group (a)						
	1	2	3	4 (b)	5	6 (d)	7
	Test Sequence (c)						
Examination of Product	1, 9	1, 6	1, 6	1, 5	1, 5	1, 8	1, 6
Termination Resistance, Dry Circuit	3, 7	2, 5	2, 5	2, 4	2, 4		
Dielectric Withstanding Voltage						3, 7	
Insulation Resistance						2, 6	
Temperature Rise vs Current				3			
Vibration	5						
Physical Shock	6						
Mating Force	2						2
Unmating Force	8						3, 5
Durability	4	3	3				4
Thermal Shock						4	
Humidity-Temperature Cycling			4			5	
Industrial Mixed Flowing Gas					3		
Temperature Life		4					

NOTE

- (a) See Para 4.1.A
 (b) Discontinuities shall not be measured for this test group
 (c) Numbers indicate sequence in which tests are performed
 (d) Test group 6 humidity-temperature cycling is to be conducted unmated

Figure 2

3.6. Retention of Qualification Tests

Test or Examination	Test Group (a)	
	1	2
	Test Sequence (b)	
Examination of Product	1, 8	1, 8
Termination Resistance, Dry Circuit		3, 7
Dielectric Withstanding Voltage	3, 7	
Insulation Resistance	2, 6	
Mating Force		2
Unmating Force		6
Durability		4
Thermal Shock	4	
Humidity-Temperature Cycling	5	5

NOTE

- (a) See Para 4.1.A
 (b) Numbers indicate sequence in which tests are performed.

Figure 3

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Connector assemblies shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production per Figure 6. Hardware where indicated shall be female screwlock kit 205817-1 and screw retainer kit 746881-1 for connector sizes 1 through 4. Connector size 5 shall utilize slide latch 745577-1 with screw 206943-5 and locking post 206514-1.

B. Test Sequence

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

4.2. Retention of Qualification

If, in a five-year period, no changes to the product or process occur, the product shall be subjected to the two groups of the testing described in the test sequence, see Figure 3. Justification for exceeding this time limit must be documented and approved by the division manager.

4.3. 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.

4.4. 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.

4.5. 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.

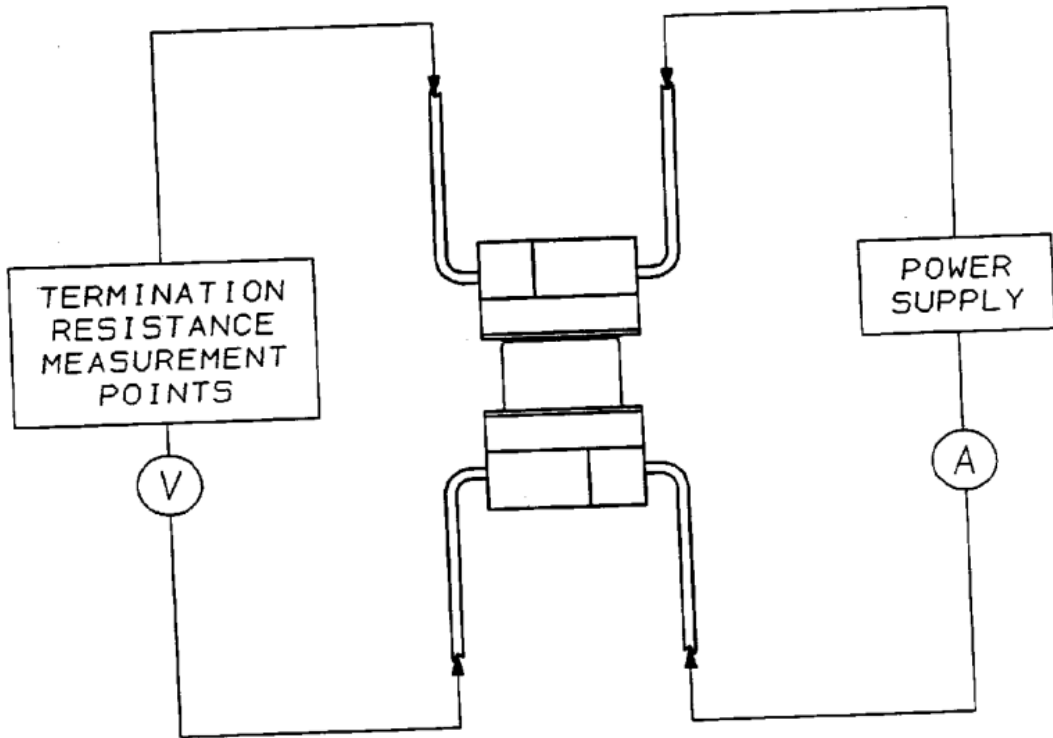
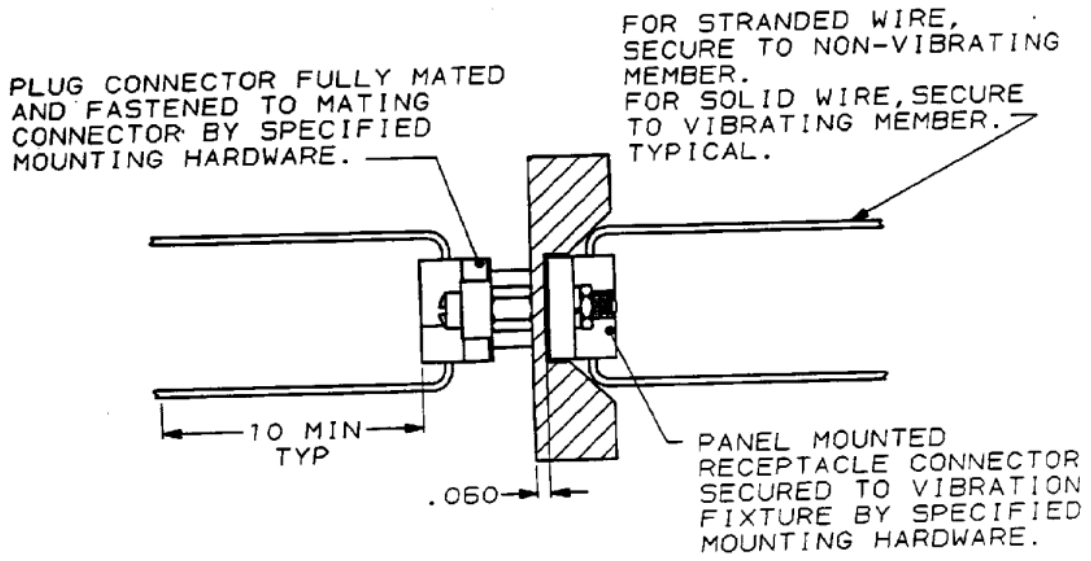
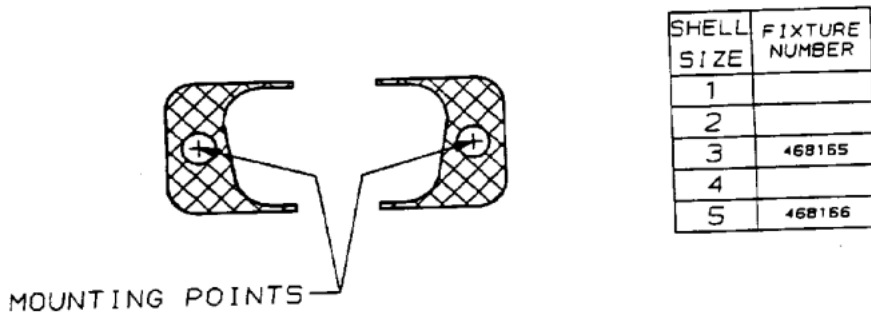


Figure 4
Termination Resistance Measurement Points



NOTE: RECEPTACLE CONNECTOR TO BE MOUNTED ON VIBRATION FIXTURE UNLESS OTHERWISE SPECIFIED.



VIBRATION LEVEL IS APPLIED TO THE CONNECTOR MOUNTING AREA (X) OF THE VIBRATION FIXTURE.

Figure 5
Sample Assembly and Mounting Arrangement
for Vibration and Physical Shock

Group	Qty	Recp	Plug	Size	Shell	AWG	Cable	Hdwr
1	5	747319-2	747322-2	3	Plastic	28	Stranded	Yes
1	5	111119-1	111120-1	5	Metal	28	Stranded	Yes
1	5	747319-2	747322-2	3	Plastic	26	Stranded	Yes
1	5	111119-1	111120-1	5	Metal	26	Stranded	Yes
1	5	747319-2	747322-2	3	Plastic	26	Solid	Yes
1	5	111119-1	111120-1	5	Metal	26	Solid	Yes
2	5	747318-4	747321-4	1	Plastic	28	Stranded	Yes
2	5	746789-1	746790-1	5	Metal	28	Stranded	Yes
2	5	747318-4	747321-4	1	Plastic	26	Solid	Yes
2	5	746789-1	746790-1	5	Metal	26	Solid	Yes
2	5	747318-4	747321-4	1	Plastic	26	Stranded	Yes
2	5	746789-1	746790-1	5	Metal	26	Stranded	Yes
3	5	747318-4	747321-4	1	Plastic	28	Stranded	Yes
3	5	746789-1	746790-1	5	Metal	28	Stranded	Yes
4	5	747303-1	747306-1	4	Metal	26	Stranded	No
4	5	746789-1	746790-1	5	Metal	26	Stranded	No
5	5	747319-4	747322-4	1	Plastic	28	Stranded	Yes
6	5	747303-4	747306-4	1	Metal	28	Stranded	No
6	5	746789-1	746790-1	5	Metal	28	Stranded	No
7	5	747318-4	747321-4	1	Plastic	--	N/A	No
7	5	747318-3	747321-3	2	Plastic	--	N/A	No
7	5	747318-1	747321-1	4	Plastic	--	N/A	No
7	5	747303-4	747306-4	1	Metal	--	N/A	No
7	5	747303-3	747306-3	2	Metal	--	N/A	No
7	5	747303-2	747306-2	3	Metal	--	N/A	No
7	5	747303-1	747306-1	4	Metal	--	N/A	No

Figure 6