



Sealed COPALUM* Terminals & Splices, Copper Wire

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for uninsulated sealed COPALUM* terminals and splices intended for termination of stranded copper wire used in the aerospace industry.

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 completed on 25Apr95. The test file number for this testing is CTL 3014-000-042. This documentation is on file at and available from the Americas Regional Laboratory.

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 requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. AMP Documents

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1.
- C. Corporate Bulletin 401-76: Cross-reference between AMP Test Specifications and Government or Commercial Documents
- D. 108-11011: Product Specification
- E. 108-11011-2: Product Specification
- F. 108-11011-3: Product Specification
- G. 114-2134: Application Specification
- H. 408-2281: Instruction Sheet
- I. 501-431-1: Qualification 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. Materials

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

3.3. Ratings

- A. Voltage: 600 volts
- B. Current: See Figure 3
- C. Temperature: -55 to 150°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 AMP Specification 109-1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure	
Examination of product.	Meets requirements of product drawing and AMP Spec 114-2134.	Visual, dimensional and functional per applicable quality inspection plan.	
ELECTRICAL			
Millivolt drop.	See Figure 3.	AMP Spec 109-3. Measure millivolt drop of samples. See Figure 4.	
Temperature rise vs current.	30°C maximum temperature rise above wire temperature. See Figure 3.	AMP Spec 109-45-1. Measure temperature rise vs current.	
Current cycling.	30°C maximum temperature rise above wire temperature and voltage drop per Figure 3.	AMP Spec 109-51. Subject samples to 40 cycles of 60 minutes ON and 30 minutes OFF at test current per Figure 3.	
		AMP Spec 109-51. Subject samples to 10 cycles of 60 minutes ON and 30 minutes OFF at 180°C wire temperature.	
MECHANICAL			
Crimp tensile.	Wire Size	AMP Spec 109-16. Determine crimp tensile at maximum rate of 1 inch per minute.	
	AWG		
	10-CU		300
	8-CU		500
	6-CU		575
	4-CU		800
	2-CU		1050
	0-CU		1500
00-CU	2000		
000-CU	2850		

Figure 1 (cont)

Test Description	Requirement	Procedure
Vibration, sinusoidal.	See Note.	AMP Spec 109-21-3. Subject samples to 15 G's between 10-2000 Hz on 2 planes. One end of sample shall be mounted by clamping the terminal tongue not more than 1 inch above the vibrating member with a stable clamping device. Other end of the sample shall be secured to a stable support external to the vibrating table with all slack or tension removed from the wire. See Figure 5.

ENVIRONMENTAL

Thermal shock.	See Note.	AMP Spec 109-22. Subject samples to 5 cycles between -55 and 150°C.
Humidity-temperature cycling.	See Note.	AMP Spec 109-23-3, Condition B. Subject samples to 10 cycles between 25 and 65°C at 95% RH.
Salt spray corrosion.	See Note.	AMP Spec 109-24. Subject samples to 5% salt concentration for 96 hours.
Temperature life.	See Note.	AMP Spec 109-43. Subject samples to temperature life at 150°C for 120 hours.

NOTE

Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence in Figure 2.

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)	
	1	2
	Test Sequence (b)	
Examination of product	1,12	1,5
Millivolt drop	2,10	2,4
Temperature rise vs current	3,9	
Current cycling		3(c)
Vibration	4	
Crimp tensile	11	
Thermal shock	5	
Humidity-temperature cycling	7	
Salt spray corrosion	8	
Temperature life	6	

NOTE

- (a) See Para 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Measurements shall be taken every 10 cycles.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Samples shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. All test groups shall consist of 10 terminals and 6 splices. Terminals and splices shall be prepared per Figure 4. Thermocouples shall be attached to each terminal in transition area between tongue and wire barrel, and to each splice at midway point between ends of splice. Two lead-in conductors shall be prepared by crimping a terminal to each end of a 48 inch length of wire for test group 1 and a 72 inch length of wire for test group 2.

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 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.

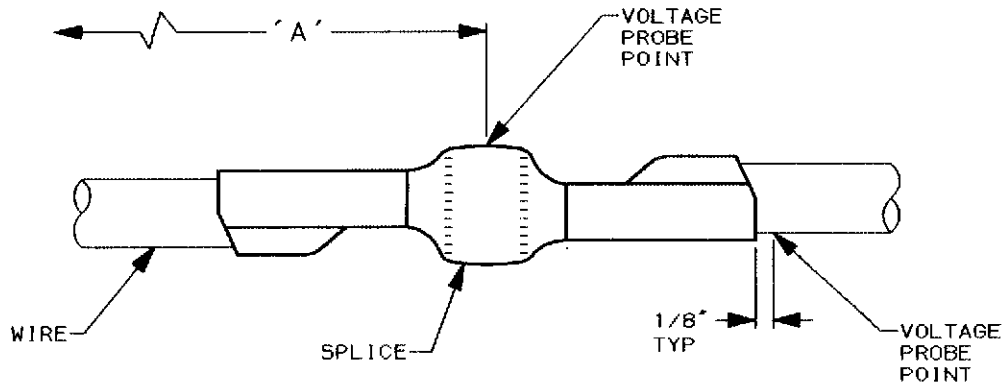
4.4. Quality Conformance Inspection

Applicable AMP 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.

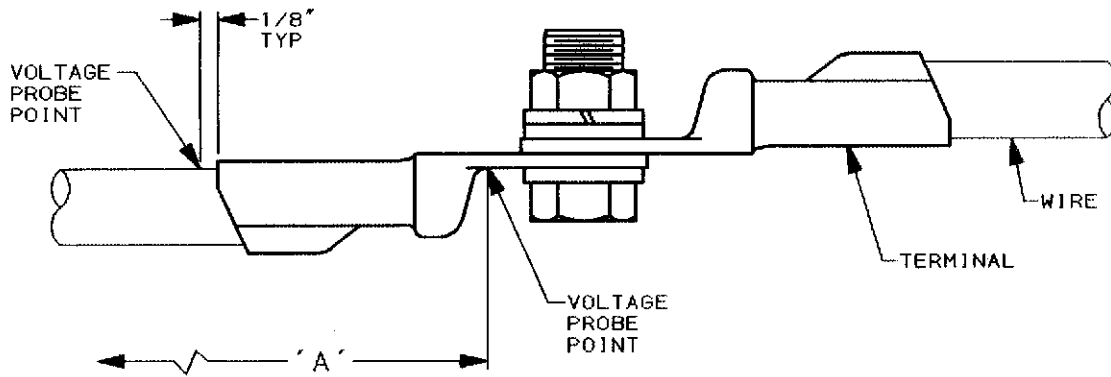
Sample Size	"A" Dimension (inches)	Test Current (amperes)	Voltage Drop (millivolts)			
			Maximum Initial		Maximum Final	
			Terminal	Splice	Terminal	Splice
2-CU (a)	24	181	5	5	6	7
0-CU (b)	24	245	5	5	6	7
000-CU (c)	24	328	4	NA	6	NA

- NOTE**
- (a) *This wire size has been tested and meets requirements, details can be found in Test Report CTL 3014-013.*
 - (b) *This wire size has been tested and meets requirements, details can be found in Test Report CTL 3015-011AR.*
 - (c) *This wire size has been tested and meets requirements, details can be found in Test Report CTL 3015-010.*

Figure 3
Test Current & Millivolt Drop Requirements

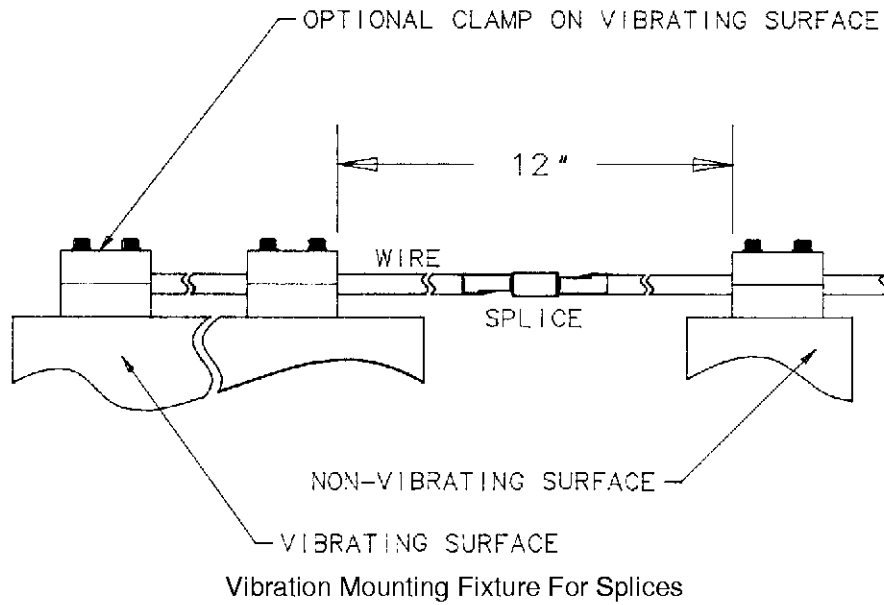


Voltage Probe Points for Splices



Voltage Probe Points For Terminals

Figure 4
Voltage Probe Points



NOTE: HEIGHT OF NON-VIBRATING CLAMP MAY BE ADJUSTED TO ACCOUNT FOR COIL SET (CURVATURE OF CABLE) OR CRIMP BARREL INCLINATION.

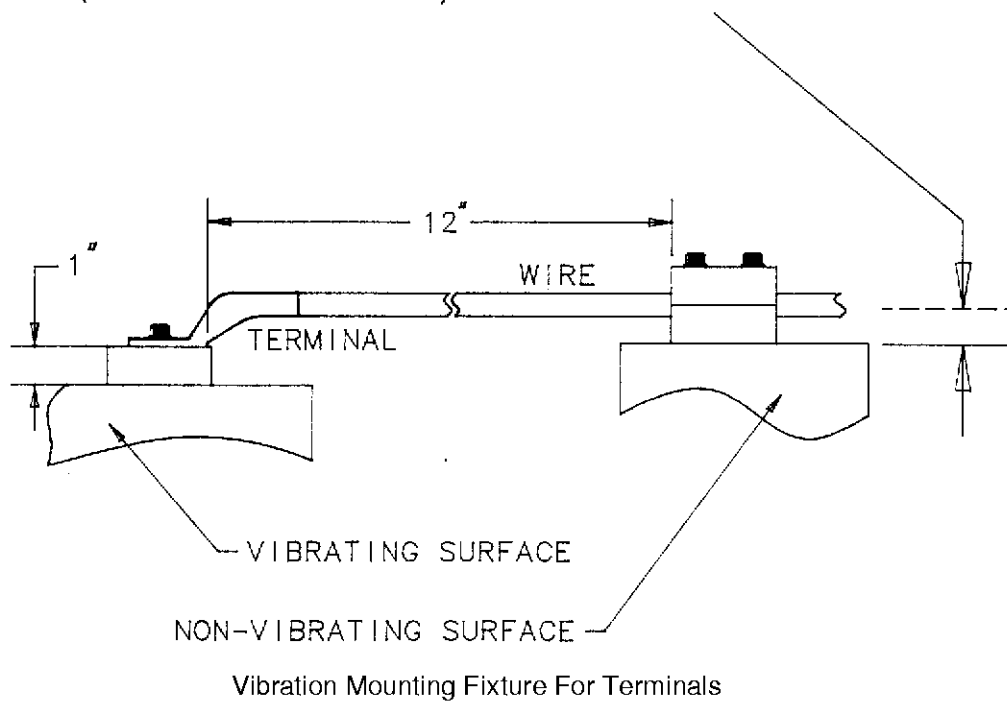


Figure 5
Vibration Mounting Fixtures