

PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the AMP\* crimp type III+, stamped and formed contacts. These contacts are for use in connectors and other electronic components. The contacts are primarily intended for use where coupling means is provided separately from individual contact.

1.2. Qualification

When tests are performed on the subject product line, the procedures specified in AMP 109 series 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. AMP Documents

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1. (Comply with MIL-STD-202, MIL-STD-1344 and EIA RS-364)
- C. Corporate Bulletin 401-76: Cross-reference between AMP Test Specifications and Military or Commercial Documents
- D. 114-10004 : Application Specification
- E. 501-66 : Test Report

2.2. Military Specification

MIL-W-16878/1 & 4: Wire, Electrical, Insulated, High Temperature

3. REQUIREMENTS

3.1. Design and Construction

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

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				DR F.Rinehardt 5/6/88	<b>AMP</b> AMP Incorporated Harrisburg, PA 17105-3608		
				CHK J.Stine 5/9/88			
				APP D.Summers 5/11/88			
				NO	108-10042	REV B	LOC B
B	Revise per ECN BD 4089	<i>FR</i>	6/26 90	PAGE 1 OF 8	TITLE CONTACT, STAMPED AND FORMED. TYPE III+		
LTR	REVISION RECORD	APP	DATE				

3.2. Material

- A. Body: Brass, gold or tin plated
- B. Retention hood: Stainless steel

3.3. Rating

- A. Current/Voltage: See Para 3.5.(a)
- B. Operating temperature:
  - (1) -55° to 150°C for gold plated contacts
  - (2) -55° to 90°C for tin plated contacts

3.4. Performance and Test Description

Contacts shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirements	Procedure
Examination of Product	Meet requirements of product drawing and AMP Spec 114-10004.	Visual, dimensional and functional per applicable inspection plan.
ELECTRICAL		
Termination Resistance, Specified Current	See Figure 4.	Measure potential drop of mated contacts after stabilizing, see Figure 3; AMP Spec 109-25, calculate resistance.
Termination Resistance, Dry Circuit	See Figure 4.	Subject mated contact pair to 50 mv open circuit at 100 ma maximum, see Figure 3; AMP Spec 109-6-1.
Current Cycling	Termination resistance, specified current.	Subject mated contacts to 500 cycles at 125% specified current for 30 minutes "ON" - 15 minutes "OFF"; AMP Spec 109-51, cond B, test method 3.

Figure 1 (cont)

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Test Description	Requirement	Procedure																				
<b>MECHANICAL</b>																						
Contact Engaging Force	See Figure 5 for maximum force per contact.	Measure force to engage using gage 2 as indicated in Figure 6; AMP Spec 109-35, engagement depth $.230 \pm .010$ .																				
Contact Separating Force	See Figure 5 for minimum force per contact.	Size 3 times using gage 2 as indicated in Figure 6, insert gage 1 and measure force to separate; AMP Spec 109-35, separation depth $.230 \pm .010$ .																				
Crimp Tensile	<table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Wire Size, AWG</th> <th style="text-align: right;">Crimp Tensile pounds minimum</th> </tr> </thead> <tbody> <tr><td>14</td><td style="text-align: right;">50</td></tr> <tr><td>16</td><td style="text-align: right;">40</td></tr> <tr><td>18</td><td style="text-align: right;">25</td></tr> <tr><td>20</td><td style="text-align: right;">17</td></tr> <tr><td>22</td><td style="text-align: right;">10</td></tr> <tr><td>24</td><td style="text-align: right;">7</td></tr> <tr><td>26</td><td style="text-align: right;">4</td></tr> <tr><td>28</td><td style="text-align: right;">2.5</td></tr> <tr><td>30</td><td style="text-align: right;">1.5</td></tr> </tbody> </table>	Wire Size, AWG	Crimp Tensile pounds minimum	14	50	16	40	18	25	20	17	22	10	24	7	26	4	28	2.5	30	1.5	Determine crimp tensile at a rate of 1 inch/minute; AMP Spec 109-16.
Wire Size, AWG	Crimp Tensile pounds minimum																					
14	50																					
16	40																					
18	25																					
20	17																					
22	10																					
24	7																					
26	4																					
28	2.5																					
30	1.5																					
Durability	Show no evidence of damage; contact engaging force and separating force.	Contacts shall be installed in a suitable fixture and subject to 500 cycles for gold and 50 cycles for tin contacts; AMP Spec 109-27 except cycle rate shall not exceed 300 cycles/hour. The applicable counterpart connector inserts may be used for fixture.																				
<b>ENVIRONMENTAL</b>																						
Thermal Shock	Shall show no evidence no damage, meet termination resistance, dry circuit and specified current; engaging and separating force.	Subject mated contacts to 10 cycles between $-55^{\circ}$ and $90^{\circ}\text{C}$ for tin and $-55^{\circ}$ and $150^{\circ}\text{C}$ for gold; AMP Spec 109-22.																				
Figure 1 (cont)																						
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Test Description	Requirement	Procedure
Humidity-Temperature Cycling	Termination resistance, dry circuit; engaging and separating force.	Subject mated connectors to 10 humidity-temperature cycles between 25° and 65°C at 95% RH; AMP Spec 109-23, method III, cond B, with cold shock at -10°C less step 7b.
Industrial Mixed Flowing Gas	Show no evidence of damage Meet termination resistance dry circuit and specified current.	Subject mated contacts to environmental class II for 10 days; AMP Spec 109-85-2
Temperature Life	Show no evidence of damage Meet termination resistance dry circuit and specified current; engaging and separating force.	Subject mated connectors to temperature life, AMP Spec 109-43, except 240 hours at 150°C for gold and 90°C for tin.

- (a) The continuous current rating for individual contacts cannot be applied directly to the number of contacts as they are dependent on the thermal and physical properties of the material. System design shall assure that continuous current rating does not create internal hot spots that exceed the temperature designated by the connector specification, during steady state or transient conditions.

Figure 1 (end)

### 3.6. Connector Tests and Sequences

Test or Examination	Test Group (a)	
	1	2
	Test Sequence (b)	
Examination of Product	1,10	1
Termination Resistance, Specified Current		2,4
Termination Resistance, Dry Circuit	2,7	
Current Cycling		3
Contact Engaging Force	8	
Contact Separating Force	9	
Crimp Tensile		5
Durability	3	
Thermal Shock	4	
Humidity-Temperature Cycling (d)	6	
Industrial Mixed Flowing Gas (c)	6	
Temperature Life	5	

- (a) See Para 4.1.A  
 (b) Numbers indicate sequence in which tests are performed  
 (c) Gold plated samples only.  
 (d) Tin plated samples only.

Figure 2

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#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1. Qualification Testing

###### A. Sample Selection

Contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. All test groups shall consist of 10 samples of each part number (pin and socket). One-half of the samples shall be crimped to maximum gauge wire and the other half crimped to minimum gauge wire. All wire lengths shall be a minimum of 12 inches.

- (1) Gold plated contacts shall be crimped to wire conforming to MIL-W-16878/4, Type E.
- (2) Tin plated contacts shall be crimped to wire conforming to MIL-W-16878/1, Type B.

###### B. Test Sequence

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

###### C. Acceptance

- (1) All samples tested in accordance with this specification shall meet the stated tolerance limit.
- (2) 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.

##### 4.2. Quality Conformance Inspection

The applicable AMP 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.

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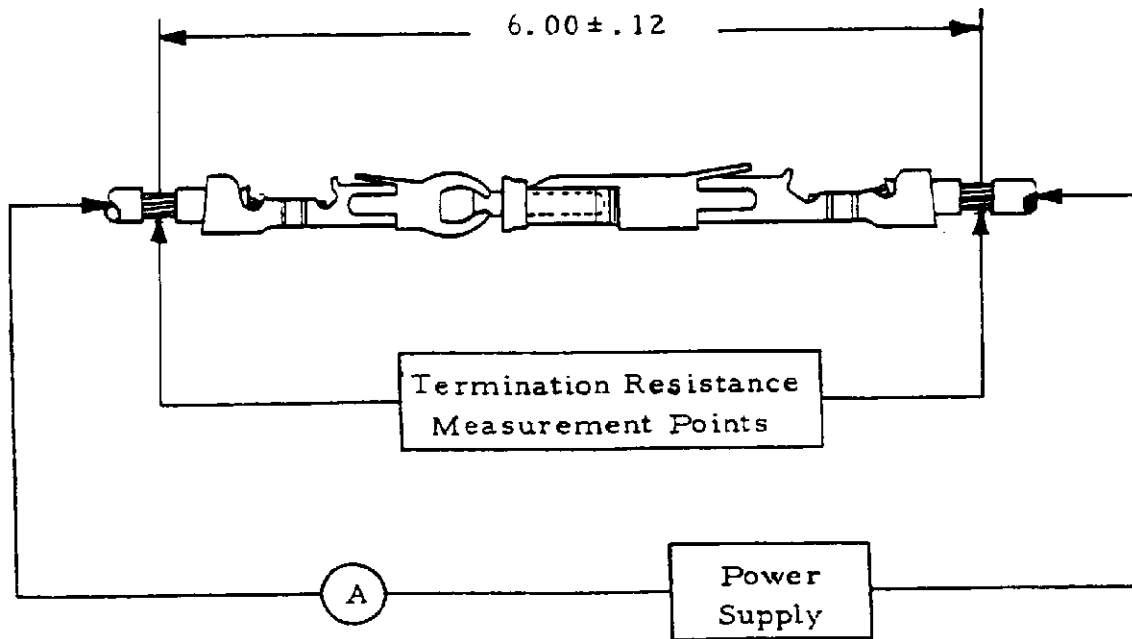
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NOTE: Termination resistance equals millivolts divided by test current less resistance of 4.5 inches of wire

Figure 3  
Termination Resistance Measurement Test Circuit

Mating End Size	Wire Size AWG	Test Current amperes (a)	Resistance, milliohms maximum
16	14	17	6.00
	16	13	6.50
	18	10	7.50
	20	7.5	9.00
	22	5.0	9.50
	24	3.0	14.5
	26	2.0	19.0
	28	1.5	30.0
	30	1.2	43.0

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

Figure 4  
Termination Resistance

Mating End Size	Pin Diameter, inches	Minimum Separation ounces	Maximum Engagement, ounces
16	.0625	1.5	36.0

Figure 5  
Contact Engagement and Separation Force

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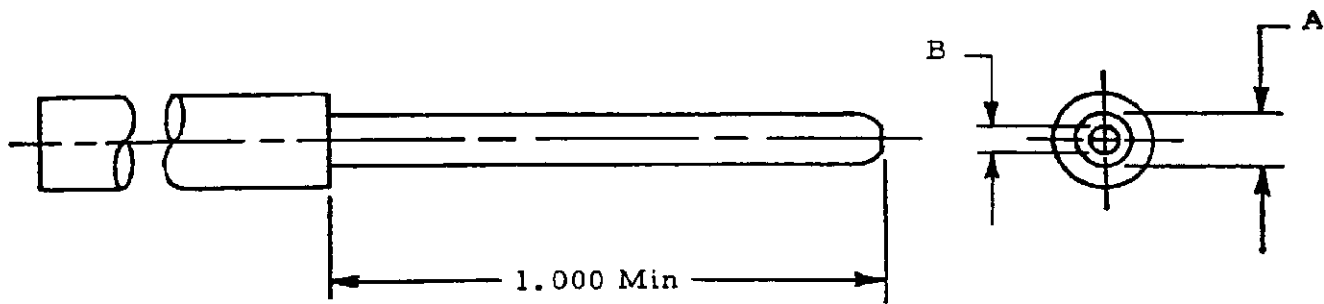
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Gage Number	Contact Size	A	B Maximum Flat
1	16	$.0615^{+.0001}_{-.0000}$	.015
2	16	$.0635^{+.0000}_{-.0001}$	

Figure 6

Engaging and Separating Gages