PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the AMP* commercial SMB series coaxial connectors. These connectors consist of a plug containing the female inner contact.

1.2. Definitions

A. Connector assembly: Consists of a mated plug and jack, terminated to their respective cable

B. Plug: Contains the female inner contact and a collar encasing an outer contact spring

1.3. 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 Specifications

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, see Figure 6)

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LTR	REVISION RECORD	APP	DATE
0	Release per ECN C 83-610	[signature]	7/27/83

DR [signature] 7/22/83
CHK [signature] 7/22/83
APP Thomas Cohen 7-27-83

AMP INCORPORATED Harrisburg, Pa. 17105

LOC B | NO 108-12058 | REV 0

TITLE: CONNECTOR, COAXIAL, SMB SERIES, COMMERCIAL

C

DIST 12

AMP 1250-16 REV 4-82

2.2. Military Specification

MIL-C-39012: Connectors, Coaxial, Radio Frequency, General Specification for

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

A. Inner Contact: Plug, beryllium copper
B. Outer Contact (shell): Plug, copper
C. Insulation, dielectric: Polypropylene
D. Spring: Beryllium copper

3.3. Ratings

A. Operating Voltage:

(1) 335 volts (rms) sea level
(2) 85 volts (rms) 70,000 feet

B. Operating Temperature: -65° to 85°C for cabled connectors
C. Frequency Range: 0 to 4 GHz
D. Normal Impedance: 50 ohms

3.4. Performance and Test Description

Connectors 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	Requirement	Procedure
Examination of Product	Meets requirements of product drawing.	Visual, dimensional and functional per applicable inspection plan.
ELECTRICAL		
Termination Resistance, Specified Current	Type / Contact / Resistance, milliohms maximum Initial / Final: Center 6.0 / 8.0; Outer 2.0 / 2.5	Measure potential drop of mated contacts at 1 ampere maximum, see Figure 4; AMP Spec 109-25, calculate resistance.
Dielectric Withstanding Voltage	1000 vac (rms) dielectric withstanding voltage, one minute hold. No breakdown or flashover.	Test between center contact and outer shell of unmated connector; AMP Spec 109-29-1.
Insulation Resistance	1000 megohms minimum.	Test between center contact and outer shell of unmated connector; AMP Spec 109-28-4.
Voltage Standing Wave Ratio	Type SMB / VSWR, maximum: Standard 1.25+.04(f in GHz); Rt Angle 1.35+.04(f in GHz)	Measure VSWR of mated connectors conducted through frequency range of .5 to 4.0 GHz; AMP Spec 109-9.
Permeability	Shall not exceed 2 mu.	Measure magnetic permeability using 2 mu pellet; AMP Spec 109-88.
RF High Potential	700 volts (rms) at 5 MHz; no breakdown or flashover; 1 minute hold.	Subject mated connectors to 700 volts instantaneously applied between center contact and outer shell; AMP Spec 109-29-1, except at 5 MHz.
RF Leakage	-55 dB minimum total connector leakage, cable to cable.	Subject mated connector pairs to a frequency between 2 and 3 GHz in accordance with MIL-C-39012.
RF Insertion Loss	Type SMB / dB Loss, maximum: Standard .30; Rt Angle .60	Subject mated connector pairs to insertion loss in accordance with MIL-C-39012 at 1.5 GHz.

Figure 1 (cont)

Test Description	Requirement	Procedure
Corona/Altitude	250 volts rms minimum at 5 picocoulombs.	Subject connector assemblies to corona at 70,000 feet altitude; AMP Spec 109-40.
MECHANICAL		
Vibration (a)	No discontinuities greater than 1 microsecond.	Subject mated connectors, mounted per Figure 5, to 20 G's, 10-2000 Hz with 100 ma current applied; AMP Spec 109-21-4.
Physical Shock (a)	No discontinuities greater than 1 microsecond.	Subject mated connectors, mounted per Figure 5, to 75 G's sawtooth in 6 milliseconds; 3 shocks in each direction applied along the 3 mutually perpendicular planes; total 18 shocks; AMP Spec 109-26-8.
Mating Force (b)	14 pounds maximum.	Measure force necessary to mate connector assembly, incorporating free floating fixture at a rate of .5 inch/ minute; AMP Spec 109-42, cond A.
Unmating Force	2-16 pounds initially and 2-14 pounds after environments or 5 conditioning cycles.	Measure force necessary to unmate connector assembly at a rate of .5 inch/minute; AMP Spec 109-42, cond A.
Durability (a)	Mating-unmating force; contact engaging and separating force.	Mate and unmate connectors for 500 cycles at a maximum rate of 12 cycles per minute; AMP Spec 109-27.
Cable Retention	20 pounds minimum. No loss of electrical continuity.	Apply axial load of 20 pounds to movable sleeve attached to cable and perform bend test; MIL-C-39012.

Figure 1 (cont)

Test Description	Requirement	Procedure
Contact Engaging Force	2.5 pounds maximum.	Size 1 time using gage 1, as indicated in Figure 3, insert gage 2 and measure force; AMP Spec 109-35, engagement depth .050 minimum.
Contact Separating Force	1 ounce minimum.	Measure force to separate using gage 3 as indicated in Figure 3; AMP Spec 109-35, separation depth .050 minimum.
ENVIRONMENTAL		
Thermal Shock (a)	No physical damage.	Subject unmated connectors to 5 cycles between -65° and 85°C; AMP Spec 109-22.
Corrosion, Salt Spray	No base metal visible on interface or mating surface.	Subject mated connectors to 5% salt concentration for 48 hours; AMP Spec 109-24, cond B.

(a) Shall show no evidence of damage, cracking or chipping.

(b) Samples shall be conditioned by mating and unmating 5 times before measurements are made for test group 4 only.

Figure 1 (end)

3.6. Connector Tests and Sequences

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of Product	1	1	1	1
Termination Resistance, Specified Current			8,11,13,16	
Dielectric Withstanding Voltage			9,15	
Insulation Resistance	7	7	7	8
Voltage Standing Wave Ratio		8		
Permeability	2	2	2	3
RF High Potential			18	
RF Leakage (d)				9
RF Insertion Loss				2
Corona/Altitude			17	
Vibration			10	
Physical Shock			12	
Mating Force (c)	5	5,12	5,20	6
Unmating Force	6	6,13	6,21	7
Durability		9		
Cable Retention			19	
Contact Engaging Force	3	3,10	3	4
Contact Separating Force	4	4,11	4	5
Thermal Shock			14	
Corrosion, Salt Spray	8			

(a) See Para 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition 5 times before measurements for test group 4 only.
(d) Does not apply to right angle connectors.

Figure 2

4. QUALITY ASSURANCE PROVISION

4.1. Qualification Testing

A. Sample Selection

Connector assembly and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test group 1 shall consist of 3 mated, loose-piece uncabled, connectors. Test groups 2 and 4 shall consist of 3 mated connectors and shall be assembled by the laboratory performing RF and VSWR measurements. Test group 3 shall consist of 3 mated connectors crimped to 10 inch lengths of cable. Free ends shall be stripped, see Figure 4, and equalizers applied to center conductors and shields. A 3 foot length of cable shall also be prepared to determine resistance of 1 inch of cable for both center conductor and shield. All connectors shall be crimped to appropriate coaxial cable RG-316 manufactured in accordance with MIL-C-17.

B. Test Sequence

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

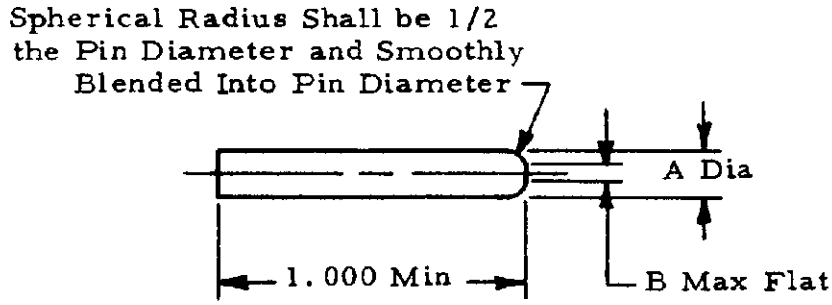
C. Acceptance

(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.

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.

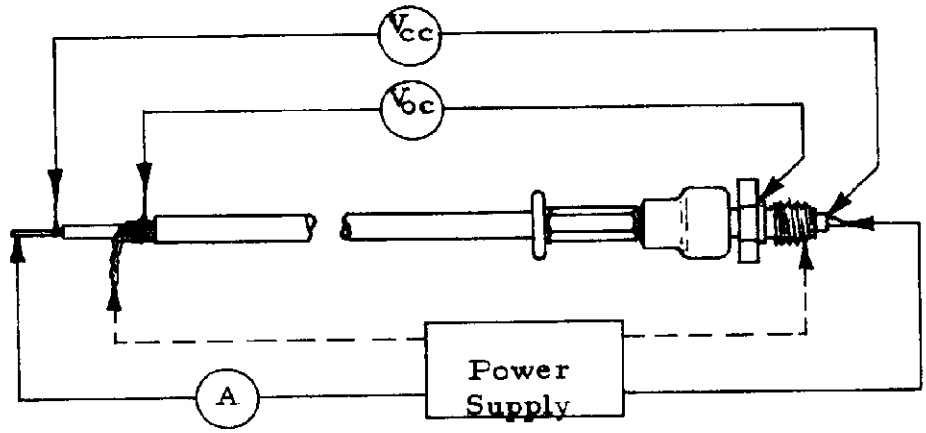


Gage Number	A	B
1	$.0215^{+.0001}_{-.0000}$	Maximum flat .015
2	$.0210^{+.0001}_{-.0000}$	
3	$.0190^{+.0000}_{-.0001}$	

Note: Test pins shall be steel with 16 microinch finish.

Figure 3

Engaging and Separating Gages



V_{cc} is center contact

V_{oc} is outer contact

Measure distance between probes and subtract an equal wire length of resistance to obtain actual contact resistance.

Figure 4

Termination Resistance Measurement Points

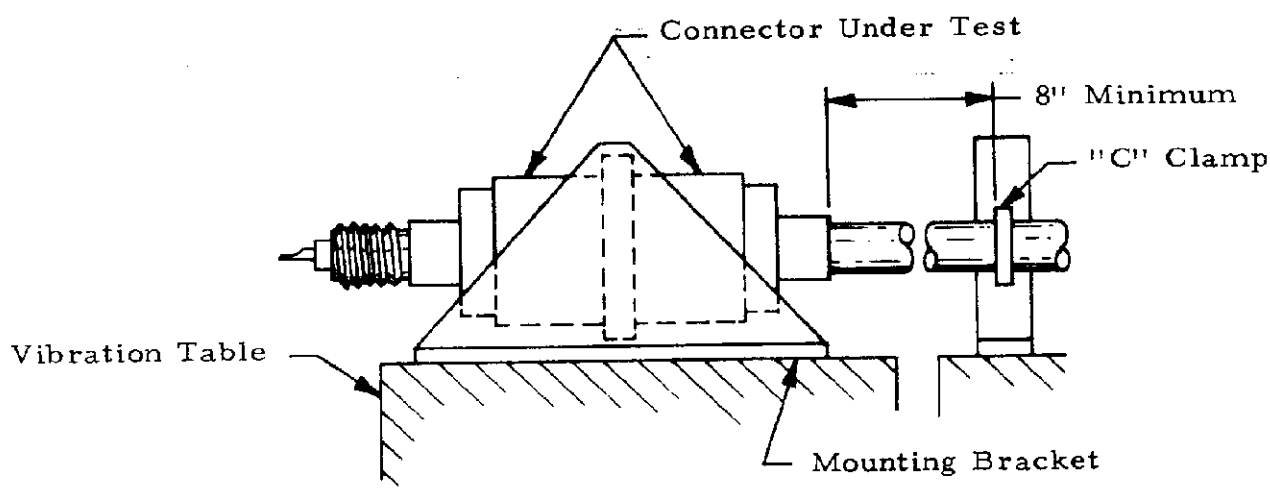


Figure 5

Vibration Mounting

AMP Test Spec No	Title	Commercial Reference	Military Reference
109-25	Rated Current Termination Resistance, Test Procedure for Electrical Connectors	EIA RS-364, TP-6 IPC-31	MIL-STD-1344, Method 3004
109-29	Withstanding and/or Breakdown Voltage, Test Procedure for	EIA RS-364, TP 20	MIL-STD-202, Method 301 MIL-STD-1344, Method 3001
109-28	Insulation Resistance, Test Procedure for	EIA RS-364, TP-21	MIL-STD-202, Method 302 MIL-STD-1344, Method 3003
109-9	Measuring VSWR of Coaxial Connectors, Swept Frequency Interference Method for		MIL-STD-1344, Method 3005
109-88	Permeability, Magnetic, Test Procedure for		MIL-STD-1344, Method 3006
109-40	Corona, Test Procedure for	EIA RS-364, TP-44	
109-21	Vibration, Test Procedure for	EIA RS-364, TP-28	MIL-STD-202, Method 204 MIL-STD-1344, Method 2005
109-26	Mechanical Shock, Specified Pulse, Test Procedure for	EIA RS-364-TP-27	MIL-STD-202, Method 213 MIL-STD-1344, Method 2004
109-42	Mating and Unmating Force, Test Procedure for	EIA RS-364, TP-13	MIL-STD-1344, Method 2013
109-35	Contact Engaging and Separating Force, Test Procedure for	EIA RS-364, TP-37	MIL-STD-1344, Method 2014
109-22	Thermal Shock, Test Procedure for Electrical Connectors	EIA RS-364, TP-32	MIL-STD-202, Method 107 MIL-STD-1344, Method 1003
109-24	Salt Spray Corrosion Test, Procedure for Electrical Connectors	EIA RS-364, TP-26 ASTM B 117-64	MIL-STD-202, Method 101 MIL-STD-1344, Method 1001

Figure 6

Cross-Reference Between AMP, Commercial and Military Specifications