PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance, tests, and quality requirements for the AMP* Twinax Connectors. These connectors are intended for application to Twinax dual conductor shielded cables. Products covered by this specification are as follows:

A. Twinax Connectors: Threaded coupling connectors for dual conductor shielded cables.

(1) Plug: Contains male inner contacts.
(2) Receptacle: Contains female inner contacts.
(3) Feedthrough: Consists of back-to-back receptacles.

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 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.)
C. Corporate Bulletin 76: Cross reference between AMP Test Specifications and military or Commercial Documents

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AMP INCORPORATED Harrisburg, Pa. 17105

LOC B NO 108-12050 REV B

TITLE CONNECTOR, TWINAX, PLUGS AND RECEPTACLES

G

DIST 12

2.2. Military

A. MIL-C-9660: Cables, Composite Telephone and Television
B. 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

The materials utilized in the construction of the connectors and the finish or plating shall be as specified on the applicable AMP Product Drawing.

3.3. Ratings

A. Voltage: 500 vac rms
B. Operating Temperature: -40° to 80°C
C. Operating Relative Humidity: 10% to 90%

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	Resistance (milliohms) Maximum Inner Contacts 5.0 Outer Contacts 1.0 Braid to Shell 1.0	Measure potential drop of mated connectors with 1 ampere DC, see Figure 3; AMP Spec 109-25, calculate resistance.

Figure 1 (cont)

Test Description	Requirement	Procedure
Dielectric Withstanding Voltage	1700 vac rms 60 Hz dielectric withstanding voltage, one minute hold. No flashover or breakdown.	Test between adjacent contacts and between contacts and shell of mated connector assemblies; AMP Spec 109-29-1.
Insulation Resistance	5000 megohms minimum initial.	Test between adjacent contacts and between contacts and shell of mated connector assembly; AMP Spec 109-28-4.
Magnetic Permeability	Magnetic permeability shall be 2.0 mu maximum.	Measure magnetic permeability; AMP Spec 109-88.
R.F. Insertion Loss	At 100 MHz insertion loss 0.2 dB maximum for plug and receptacle and 0.4 dB maximum for feedthrough.	Measure insertion loss at 100 MHz. First measure a length of cable. Then insert connector without changing length more than 5 cm. Remeasure insertion loss. Subtract cable reading from cable and connector reading.
MECHANICAL		
Vibration (a)	No discontinuities greater than 10 microseconds.	Subject mated connectors to 15 G's, 10-2000 Hz with 100 ma current applied; AMP Spec 109-21-3.
Physical Shock (a)	No discontinuities greater than 10 microseconds.	Subject mated connector to 100 G's sawtooth in 6 milliseconds; 9 shocks with 2 inner contacts in a plane perpendicular to applied force then rotate 90° for 9 more shocks for a total 18 shocks; AMP Spec 109-26-9.

Figure 1 (cont)

Test Description	Requirement	Procedure
Mating Characteristics	Outer contact (plug only). All slotted spring members shall contact ring within .031" of their tip ends. Inner contact (jack only). Insertion force shall be 2 pounds maximum.	Outer contact: spring members of plug shall be inserted into a .605" test ring to within .031" of spring member tip ends. Inner contacts: Measure force to insert .053" minimum test pin into contacts of jack of .125" depth excluding lead-in.
Crimp Tensile	75 pounds minimum.	Determine crimp tensile at a rate of 1 inch/minute; AMP Spec 109-16.
Durability (a)	No physical damage.	Mate and unmate connector assemblies for 250 cycles; AMP Spec 109-27.
Coupling Nut Retention	Coupling nut shall not damage or dislodge from body. Torque 0.75 inch-pounds maximum.	Apply 100 pound force to coupling nut away from body for 1 minute. Then measure torque required to effect rotation.
Coupling Proof Torque	Coupling nut shall not damage or dislodge from body.	Mate plug with standard mating part. Torque to 15 inch-pounds, hold for 1 minute then unmate.
ENVIRONMENTAL		
Thermal Shock (a)	No physical damage.	Subject mated connectors to 5 cycles between -40° and 80°C; AMP Spec 109-22.

Figure 1 (cont)

Test Description	Requirement	Procedure
Humidity-Temperature Cycling	200 megohms final insulation resistance. No dielectric breakdown or flashover.	Subject mated connectors to 10 humidity-temperature cycles between 25° and 65°C at 95% RH; AMP Spec 109-23, Method III, cond B, 5 cold shocks less step 7b. Dry at 50°C for 24 hours before measuring insulation resistance.
Corrosion, Salt Spray	No base metal exposure on interface or mating surfaces.	Subject unmated connectors to 5% salt concentration for 48 hours; AMP Spec 109-24, cond B.
Resistance to Soldering Heat (a)	No physical damage.	Submerge the solder contacts to a depth at least half the distance of the contact and not touch the connector; AMP Spec 109-63-2.

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

Figure 1 (end)

3.6. Connector Tests and Sequences

Test or Examination	Test Group (a)	
	1	2
	Test Sequence (b)	
Examination of Product	1	1
Termination Resistance, Specified Current	8,10,12,18	
Dielectric Withstanding Voltage	7,17	6,9
Insulation Resistance	6,16	5,8
Magnetic Permeability	3	3
R.F. Insertion Loss (c)		4
Vibration	13	
Physical Shock	14	
Mating Characteristics	2	2
Crimp Tensile (d)	19	
Durability	11	
Coupling Nut Retention (d)	4	
Coupling Proof Torque (d)	5	
Thermal Shock	9	
Humidity-Temperature Cycling	15	
Corrosion, Salt Spray		10
Resistance to Soldering Heat (e)		7

(a) See Paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) This test is not applicable to Twinax receptacles.
(d) Plugs only.
(e) Plugs and receptacles only.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Connectors shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test Groups 1 and 2 shall each consist of 10 connectors of each type (plugs, receptacles, and feedthroughs). Test cable shall conform to MIL-C-9660, Type I. Group 1 connectors and/or their mating connectors, as required, shall be assembled to 12-inch lengths of cable with current equalizers attached to the center conductors and braid at the other end. Group 2 connectors shall be cabled as required for the insertion loss test. Following the insertion loss test, the cables shall be trimmed to 3 inches to facilitate subsequent testing.

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.

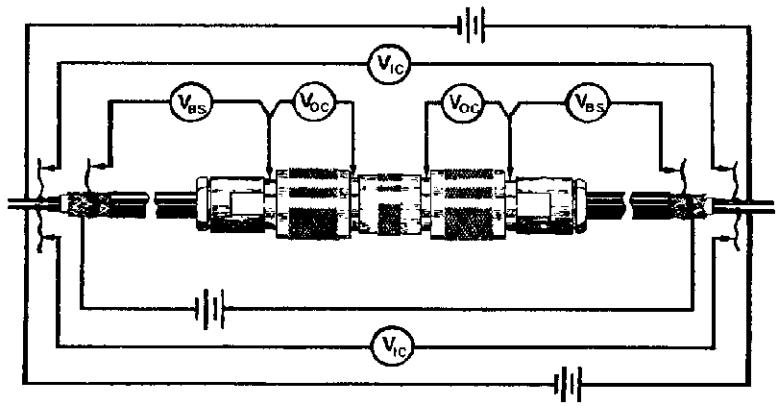
(2) Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken.

4.2. Requalification Testing

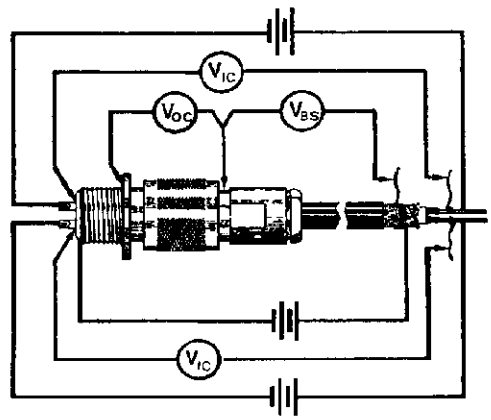
Requalification shall be established by the cognizant divisional engineering function and may consist of all or any part of the overall qualification program provided that it is conducted within the required time period.

4.3. 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.



Feedthrough



Plug and Receptacle

NOTES: (a) V_{IC} = Inner contact probe points.
V_{OC} = Outer contact probe points.
V_{BS} = Braid to shell probe points.

(b) Also measure three foot length of cable and calculate milliohms per inch of center conductors and shield.

(c) Measure distance between probe points and subtract that distance of cable resistance from measurement to determine actual termination resistance.

Figure 3

Resistance Measurement Points