NO 108 - 10019

PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the minimum performance requirements, test methods and quality assurance provisions for rectangular, miniature rack and panel AMP* RM series electrical connectors.

1.2. Description

These connectors employ rear release removable pin and socket contacts intended for crimp termination and are capable of continuous operation within a temperature range of -65°C (-85°F) to 125°C (257°F). The upper temperature is the maximum internal hot-spot temperature resulting from any combination of electrical load and ambient conditions.

1.3. Performance

Connectors supplied under this specification shall meet all applicable performance requirements of MIL-C-81659.

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 drawings, the drawings 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. 108-10028: Contacts, Electrical, General Specification for
B. 109 Series: Test Specifications as indicated in Figure 1
(Comply with MIL-STD-202 and MIL-STD-1344)

2.2. Military Specifications

A. MIL-C-22520: Crimping Tools, Terminal, Hand, Wire Termination, General Specification for
B. MIL-C-39029: Contacts, Electric, General Specification for
C. MIL-C-81659: Connectors, Electrical, Rectangular, Environment Resistant, Crimp Contacts, General Specification for
D. MIL-I-17214: Indicator, Permeability, Low-MU
E. MIL-W-16878/4: Wire, Electrical, Insulated, High Temperature

2.3. Military Standards

MIL-STD-105: Sampling Procedures and Tables for Inspection by Attributes

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LTR	REVISION RECORD	APP	DATE
B	Completely revised	[illegible]	4-22-76

DIST 10

DR C.E. Fitz 4/22/76
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NAME CONNECTORS, ELECTRICAL, RM SERIES

3. REQUIREMENTS

3.1. Test Equipment and Conditions

A. Conditions

Unless otherwise specified, the tests shall be conducted under the following laboratory conditions:

(1) Temperature: 15° - 35°C
(2) Atmospheric pressure: 650-800 millimeters of mercury
(3) Relative humidity: 30 - 80%

B. Equipment

Facilities used to provide the required environments shall be controlled and monitored. Instruments and equipment shall be regularly maintained and calibrated to standards which are traceable to the National Bureau of Standards.

C. Reports

Laboratory test reports shall be maintained during the test program and contain test details, test measurements and equipment used to conduct the tests.

D. Contacts

The contacts used in testing these connectors shall have been previously qualified to AMP Specification 108-10028 or MIL-C-39029.

3.2. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Visual Inspection	Connectors shall show no evidence of physical defects or being otherwise unfit for testing. Markings on all connectors shall be legible after all tests.	Connectors shall be thoroughly examined to insure that they have been properly assembled. Visual inspection shall be performed throughout the test program to note any changes in material, color, markings, etc.
Maintenance Aging	Individual contact insertion forces shall not exceed 3 lb.	Connectors shall be tested in accordance with AMP Spec 109-17. The following details shall apply: 1. Insertion and removal of a contact shall be considered 1 cycle. 2. Each wired contact shall be inserted, removed and reinserted using the applicable insertion and removal tools. 3. Each connector shall be mated and unmated 10 times. 4. Twenty percent of the contacts in each plug and receptacle shall be subjected to 9 additional cycles of extraction-insertion. 5. The force to fully seat the cycled contacts shall be measured during the third and ninth insertion.

Figure 1 (cont)

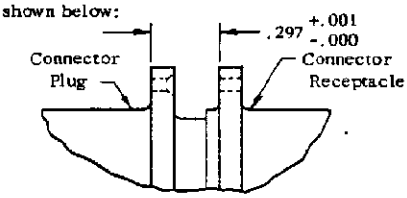
Test Description	Requirement	Procedure
Contact Retention	Each individual contact shall withstand the specified axial load without dislodging or damaging the contact, connector or contact retention mechanism. Axial displacement of the contact with the specified load applied, shall not exceed .015 in. Contact Size / Axial load, lb min 22 / 15 20 / 20 16 / 25 12 / 30	Connectors shall be tested in accordance with AMP Spec 109-30. The following details shall apply: 1. Contacts which have been subjected to 10 cycles of maintenance aging shall be tested. 2. The applicable load specified in the requirements shall be applied to the mating end of the contact at a rate of 1 lb/sec. 3. Contact location shall be measured after a load of 2 lb has been applied to the contact to insure that all slack has been removed between the contact and the contact retention device. 4. Full load shall be applied for 5 - 10 sec before measuring displacement.
Insulation Resistance	Insulation resistance shall not be less than 5000 megohms.	Connectors shall be tested in accordance with AMP Spec 109-28. The following details shall apply: 1. Connectors: Unmated 2. Test voltage: 500 vdc 3. Duration of application of test voltage: 1 minute 4. Points of application of test voltage: Between 10 pairs of adjacent contacts and between the shell and 5 contacts closest to the shell in each insert.
Dielectric Withstanding Voltage	Connectors shall show no evidence of disruptive discharge or breakdown when subjected to the test voltages indicated below: Test Condition / Voltage Rating: A — Positions 106, 67, 33C4 (Mated / Unmated); B — All Others (Mated / Unmated) Sea Level: — / 1200 / — / 1500 50,000 ft: 450 / — / 550 / —	Connectors shall be tested in accordance with AMP Spec 109-29. The following details shall apply: 1. Connectors: Mated or unmated as shown in the requirements. 2. Magnitude of test voltage: As shown in the requirements. 3. Nature of potential: AC-rms 60 Hz 4. Points of application of test voltage: Between 10 pairs of adjacent contacts and between the shell and 5 contacts closest to the shell in each insert.
Thermal Shock	There shall be no evidence of damage detrimental to the ability of the connectors to meet all subsequent test requirements.	Connectors shall be tested in accordance with AMP Spec 109-22. The following details shall apply: 1. Connectors: Mated 2. Number of cycles: 5 3. Temperature extremes: -65°C to 125°C
Mating & Unmating Force	Mating and unmating forces shall not exceed 35 lb per insert.	Connectors shall be tested in accordance with AMP Spec 109-42, cond A. The following details shall apply: 1. The connectors shall be mated and unmated 3 times. 2. During the third cycle the maximum force required to mate and unmate the connectors shall be measured and recorded. 3. A mated connector shall be defined as shown below: 

Figure 1 (cont)

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NAME

CONNECTORS, ELECTRICAL, RM SERIES

Test Description	Requirement	Procedure
Durability	There shall be no damage detrimental to the ability of the connectors to meet all subsequent test requirements.	Connectors shall be tested in accordance with AMP Spec 109-27. The following details shall apply: 1. Number of cycles: 500
Temperature Life	There shall be no damage detrimental to the ability of the connectors to meet all subsequent test requirements.	Connectors shall be tested in accordance with AMP Spec 109-43. The following details shall apply: 1. Test level: 4 (125°C) 2. Test duration: D (1000 hr) 3. Electrical load: None
Humidity	Connectors shall show no deterioration from the polarizing voltage and the insulation resistance shall not be less than 100 megohms. Connectors shall show no evidence of disruptive discharge or breakdown when subjected to the test voltages specified in the dielectric withstanding voltage requirements at sea level.	Connectors shall be tested in accordance with AMP Spec 109-23. The following details shall apply: 1. Test condition: B (10 days) 2. Test method: III 3. Step 7b is not required 4. Connectors: Unmated 5. Polarizing voltage: 200 vdc applied between 3 adjacent pairs of contacts and the shell and 3 contacts closest to the shell during the final cycle. 6. Final measurements: Following step 6 of the final cycle the connectors shall be removed from the chamber, excess moisture removed by shaking and placed in standard atmospheric conditions for a period of 4 hr, after which insulation resistance and dielectric withstanding voltage at sea level shall be measured between the same points of application as previously tested.
Salt Spray	Corrosion resulting from the salt spray shall not cause exposure of base metal of the connectors or contacts when examined under 10X magnification, and shall not interfere with the mating and unmating force of the connectors.	Connectors shall be tested in accordance with AMP Spec 109-24. The following details shall apply: 1. Connectors: Mated 2. Test condition: B (48 hr) 3. Salt solution: 5%
Insert Retention	Connectors shall retain their inserts in their proper location in the shell. Evidence of cracking, breaking, separation from the shell or loosening of parts shall be cause for rejection.	A mechanical load of 120 lb shall be applied to both faces of the insert in turn. Load shall be increased gradually at a rate not to exceed 20 lb/sec and held for 5-10 sec at the specified value. Contacts may be removed from the insert for this test.
Vibration	During the 12 hr period of vibration there shall be no cracking, breaking or loosening of parts of the connectors and no recurrent loss of electrical continuity for a period of 1 microsecond or greater. A single non-recurrent discontinuity shall be ignored.	Connectors shall be tested in accordance with AMP Spec 109-21. The following details shall apply: 1. Test condition: E (20 G's max, 10-2000 Hz) 2. All contacts shall be series wired and connected to a suitable testing circuit with 0.1 amp current flowing. 3. Contacts shall be monitored for loss of electrical continuity of 1 microsecond duration or greater during test.

Figure 1 (cont)

Test Description	Requirement	Procedure
Mechanical Shock	When subjected to 18 drops of 50 G's input shock pulse with a time duration of 11 milliseconds each pulse, there shall be no cracking, breaking or loosening of parts of the connectors and no recurrent loss of electrical continuity for a period of 1 microsecond or greater. A single nonrecurrent discontinuity shall be ignored.	Connectors shall be tested in accordance with AMP Spec 109-26. The following details shall apply: 1. Test condition: A 2. All contacts shall be series wired and connected to a suitable testing circuit with 0.1 amp current flowing. 3. Contacts shall be monitored for loss of electrical continuity of 1 microsecond duration or greater during test.
Magnetic Permeability	Permeability of the connectors shall be less than 2 mu.	Unwired connectors shall be measured with an instrument conforming to MIL-I-17214.

Figure 1 (end)

3.3. Connector Tests and Sequences

Examination or Test	Test Group (a)		
	1	2	3
	Test Sequence (b)		
Visual Inspection	1	1	1
Magnetic Permeability	2		
Maintenance Aging	3	2	2
Mating & Unmating Force	4,12	3,10	3
Contact Retention	5,13	4,11	4
Thermal Shock	8		
Insulation Resistance	6	5,8	5
Dielectric Withstanding Voltage	7	6,9	6
Humidity	9		
Temperature Life		7	
Durability	10		
Vibration		12	
Mechanical Shock		13	
Salt Spray	11		
Insert Retention	14	14	7

(a) See Para 4.3.A.

(b) Numbers indicate sequence in which tests are performed.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Responsibility for Inspection

AMP Incorporated is responsible for the performance of all inspection requirements specified herein, and for controlling the quality of the delivered product.

4.2. Classification of Inspections

The inspections specified herein are classified as follows:

A. Qualification Inspection per Para 4.3.
B. Acceptance Inspection per Para 4.4.

4.3. Qualification Inspection

The object of qualification inspection is to confirm that the product shall meet all requirements of this specification and shall consist of the examinations and tests performed in the sequence specified in Figure 2, on the test samples specified in Para 4.3.A.

A. Connectors

The samples used for qualification inspection shall be produced with equipment and procedures which are representative of production. Four counterpart inserts having the greatest complement of contacts, for each voltage rating shown in Figure 1 (dielectric withstanding voltage requirements), shall be supplied for test group 1 and 2 of Figure 2. Two plugs and receptacles with single inserts of all other insert configurations shall be provided for test group 3 of Figure 2.

B. Sample Preparation

Connectors shall be fully wired with approximately 3 ft lengths of type E or EE wire conforming to MIL-W-16878/4. Termination of the wire to the contacts shall be accomplished by using hand tools conforming to MIL-C-22520.

(1) One half of the test samples in test group 1 and 2 shall be wired with wire of the largest size applicable to the contact wire barrel and with a finished outside diameter approaching the maximum specified in MIL-W-16878/4. The other samples shall be wired with wire of the smallest applicable size.

(2) All samples of test group 3 shall be wired with wire of the largest applicable size.

4.4. Acceptance Inspection

A. General

Acceptance inspections shall consist of the following inspections which are intended to assure compliance of production connectors with the requirements of this specification.

(1) Lot Inspection per Para 4.4.B.
(2) Periodic Inspection per Para 4.4.C.

B. Lot Inspection

A lot shall consist of connectors of the same part number, manufactured by the same process and submitted for inspection at one time. Connectors shall be selected in accordance with MIL-STD-105, or equivalent, and inspected in accordance with the applicable quality inspection plan (QIP).

(1) Rejected Lots

If a lot is rejected, it may be reworked to correct the defects or screen out the defective units and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection.

C. Periodic Inspection

Shall be made on sample units which have passed the lot inspection requirements and shall be subjected to the tests specified in Figure 2 in the order shown.

(1) Sampling Plan

Every 24 months, mating connector sample units shall be selected and tested in accordance with the following:

(a) Two plugs and receptacles containing inserts having the greatest complement of contacts (that are in production) shall be provided for test group 1 and 2 of Figure 2. The test samples shall be wired in accordance with Para 4.3.B.

(b) One plug and receptacle containing inserts of all other insert configurations in production shall be provided for test group 3 of Figure 2. The test samples shall be wired in accordance with Para 4.3.B.

D. Failures

There shall be no failures during any examination or test of Figure 2. If a sample fails to pass qualification or periodic inspection, corrective action shall be taken on the materials or processes or both, as warranted, and on all units of product which were manufactured with essentially the same materials and processes and are considered subject to the same failure. After corrective action has been taken, qualification or periodic inspection shall be repeated on additional sample units.

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