

NUMBER 108-12045

PRODUCT SPECIFICATION  
 AMP\* COAXICON\* CONTACTS  
 FOR USE IN RM OR RME CONNECTORS

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1.0 SCOPE

1.1 This specification contains performance requirements and qualification test procedures for AMP COAXICON contacts for use in RM (ARINC Specification 404), or RME (MIL-C-81659, Series 2) connectors.

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|------------|-----------------|-------------|------------------------|-----|-----------------------------|--------------------------|---|---|---------------|
|            |                 |             |                        |     |                             |                          |   |   |               |
|            |                 |             |                        | DR  | <i>N. Berger 1/9/81</i>     |                          |  | AMP INCORPORATED<br>Harrisburg, Pa.                             |               |
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2.0 APPLICABLE DOCUMENTS

2.1 The following documents constitute a part of this specification to the extent specified herein. In the event of conflict between requirements of this specification and the referenced documents, this specification shall take precedence.

2.1.1 Military Documents.

|             |   |
|-------------|---|
| MIL-C-17    | Coaxial Cable, Radio Frequency  |
| MIL-C-45662 | Calibration of Standards  |
| MIL-C-81659 | Connectors, Electrical, Rectangular,<br>Environment Resistant, Crimp Contacts |
| MIL-STD-105 | Sampling Procedures And Tables For<br>Inspection By Attributes                |
| MIL-STD-202 | Test Methods For Electrical And<br>Electronic Component Parts                 |

3.0 REQUIREMENTS

3.1 Definitions. For the purpose of this specification, the following definitions shall apply.


3.1.1 Contact Assembly. Pin and socket contacts terminated to appropriate coaxial cable and assembled in connector housings.

3.1.2 Pin or Socket Contact. A coaxial contact which may contain either a male or female center contact, as applicable.

3.1.3 Contact Shell. The shield or braid circuit of a contact.

3.2 Design and Construction. Contacts shall be of the design, construction, and physical dimensions specified on the applicable AMP Product Drawing.

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

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3.4 Functional Characteristics.

|  |                    |
|--|--------------------|
| Nominal Impedance  | 50 ohms            |
| Frequency Range<br>(Sizes 5, 9, & 15 contacts)             | 0 to 500 MHz       |
| Operating Temperature                                      | -65 to +85°C       |
| Operating Voltage (Rated)<br>(Sizes 5, 9, and 15 contacts) | 325 Vac rms, 60 Hz |

4.0 QUALITY ASSURANCE PROVISIONS

4.1 General Provisions. The quality provisions specified herein shall be employed in the manufacturing and testing of this product to assure normal production units meet the performance requirements of this specification.

4.2 Classification of Test.


- (A) Qualification Inspection (See 5.0)
- (B) Quality Conformance Inspection (See 6.0)

4.3 Test Conditions.

4.3.1 Measurements. Measurements shall be taken with instruments that have been calibrated in accordance with Specification MIL-C-45662.

4.3.2 Laboratory Conditions. Unless otherwise specified, normal Laboratory temperature, humidity, and atmospheric pressure shall be considered acceptable for test purposes.

4.3.3 Coaxial Cable. Coaxial cable used for testing shall be manufactured in accordance with MIL-C-17.

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### 5.0 QUALIFICATION INSPECTION

- 5.1 Sample Selection. Test samples selected for qualification inspection shall be representative of current production and shall have met the requirements for Quality Conformance Inspection, Paragraph 6.0.
- 5.2 Test Procedure. Qualification Inspection shall be conducted in accordance with Table I. Test Group I shall consist of 10 mated pairs each of size 5, 9, and 15 contacts crimped to RG 58 C/U, RG 58 C/U, and RG 316 respectively. Test Groups II and III shall consist of 4 mated pairs each of the same size contacts and type of cable as Test Group I. Test Group IV shall consist of 4 mated pairs each of size 5 and 9 contacts crimped to RG 316 cable, size 15 contacts crimped to RG 178 cable and size 15 contacts crimped to RG 196 cable. Each Test Group shall be tested in the sequence specified. For test purposes, contacts shall be assembled into appropriate connector blocks and mated to the proper interface dimensions. Each connector half shall contain one of the following type inserts (see Figure 1) and the number of contacts needed to satisfy the Test Group. RME connector inserts shall have all unused cavities sealed in a suitable manner during Moisture Resistance and Salt Spray exposure.

FIGURE I



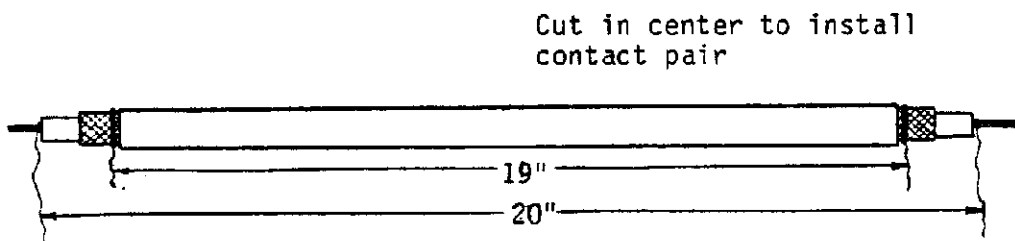
NOTE: Size 15 Coaxial contacts shall go into Size 16 contact positions.

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5.3 Test Sample Preparation.

- 5.3.1 Test Group I & IV. Samples shall be assembled by the test facility that will perform the VSWR testing. For each contact pair, a 10-foot length of cable shall be calibrated, then cut in half and the contacts assembled to each 5-foot length, except on semi-rigid cable, for which one foot will be sufficient.
- 5.3.2 Test Groups II and III. For each contact pair, a 22-inch length of coaxial cable shall be cut, and stripped to expose the inner and outer conductors (a maximum of 1.5 inches back from each end). Current equalizers consisting of short lengths of #26 AWG copper conductor shall be wrapped around and soldered to the center conductor at each end of each cable approximately 20 inches apart and to the braid approximately 19 inches apart (see Figure II). The D.C. resistance of both the center conductor and braid between equalizers shall be measured on each cable. Each cable shall then be cut in half and a contact pair assembled to these cut ends.

FIGURE II




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- 5.4 Acceptance. All samples shall meet the requirements specified in the Performance Section of this specification, Paragraph 5.5.
- 5.5 Performance Requirements and Test Methods. Contacts shall be designed to meet the performance requirements specified herein. To verify compliance to this specification, production items shall be tested and shall meet the requirements of this specification. Tests shall be conducted in the order specified in Table I.

TABLE I

| Qualification Inspection Sequence        |            |                         |         |      |    |
|--|------------|-------------------------|---------|------|----|
| Test or Examination                      | Para-graph | Test Group and Sequence |         |      |    |
|  |            | I                       | II      | III  | IV |
| Examination of Product                   | 5.5.1      | 1                       | 1       | 1    | 1  |
| Contact Resistance                       | 5.5.2      |                         | 2-12-15 | 2-7  |    |
| Insulation Resistance                    | 5.5.3      |                         | 3-6-10  | 3-8  |    |
| Dielectric Withstanding Voltage/Altitude | 5.5.4      |                         | 7-11    | 4-9  | 3  |
| Insertion/Withdrawal Force               | 5.5.5      |                         | 4-16    | 5-10 |    |
| Voltage Standing Wave Ratio              | 5.5.6      | 2                       |         |      | 2  |
| Cable Retention                          | 5.5.7      |                         | 17      | 11   |    |
| Thermal Shock                            | 5.5.8      |                         | 5       |      |    |
| Durability                               | 5.5.9      |                         | 8       |      |    |
| Vibration                                | 5.5.10     |                         |         | 6    |    |
| Moisture Resistance                      | 5.5.11     |                         | 9       |      |    |
| Physical Shock                           | 5.5.12     |                         | 13      |      |    |
| Salt Spray                               | 5.5.13     |                         | 14      |      |    |

5.5.1 Examination of Product. When contacts are examined as specified, there shall be no evidence of physical defects or damage that could render them unsuitable for test.

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5.5.1.1 Test Method. Connectors shall be thoroughly examined to assure proper assembly in accordance with the manufacturer's instructions. They shall show no evidence of physical defects or damage or being otherwise unfit for testing.


5.5.2 Contact Resistance. When tested as specified, the contact resistance of mated contacts shall not exceed the resistance of an equivalent length of conductor by more than the following values.

| <u>Contact Size</u> | <u>Cable Size</u> | <u>Contact Resistance in Millohms</u> |                      |
|---------------------|-------------------|---------------------------------------|----------------------|
|                     |                   | <u>Center Contact</u>                 | <u>Outer Contact</u> |
| 5                   | RG 58 C/U         | 10.0                                  | 1.5                  |
| 9                   | RG 58 C/U         | 10.0                                  | 1.5                  |
| 15                  | RG 316            | 15.0                                  | 2.0                  |

5.5.2.1 Test Method. Contacts shall remain in connector blocks and contact resistance measured between equalizers on the center conductor and braid of each contact pair using a test current of 100 milliamperes D.C. The contact resistance of each contact pair shall be determined by subtracting the conductor resistance, measured before cutting and assembling the contacts, from this value.

5.5.3 Insulation Resistance. When tested as specified at 500 volts D.C., the insulation resistance between the center contact and outer shell of each contact shall be 5000 megohms or greater, except after Moisture Resistance where the insulation resistance shall be 200 megohms or greater.

5.5.3.1 Test Method. Unmated contact assemblies shall be tested in accordance with MIL-STD-202, Method 302, Test Condition B. Measurements shall be taken between the inner and outer contacts.

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5.5.4 Dielectric Withstanding Voltage. When tested as specified at the following voltages, there shall be no evidence of dielectric breakdown or flashover.


| <u>Contact Size</u> | <u>Cable Type</u> | <u>Dielectric Withstanding Voltage (60 Hz, rms) Sea Level</u> | <u>50,000 ft.</u> |
|---------------------|-------------------|---|-------------------|
| 5                   | RG 58 C/U         | 750   | 350               |
| 5                   | RG 316            | 750   | 350               |
| 9                   | RG 58 C/U         | 750   | 350               |
| 9                   | RG 316            | 750   | 350               |
| 15                  | RG 316            | 325   | 150               |
| 15                  | RG 178            | 325   | 150               |
| 15                  | RG 196            | 325   | 150               |

5.5.4.1 Test Method. Contacts shall be tested in accordance with MIL-STD-202, Method 301. The applicable test potential (60Hz AC) shall be applied at a rate of 500 volts per second between the inner and outer contacts. Contacts shall be assembled in suitable connectors, unmated during test at sea level and mated during test at 50,000 feet.

5.5.5 Insertion/Withdrawal Force. When tested as specified, the force required to mate and unmate individual contact pairs shall be as follows:

| <u>Contact Size</u> | <u>Insertion Force (maximum)</u> | <u>Withdrawal Force (minimum)</u> |
|---------------------|----------------------------------|-----------------------------------|
| 5                   | 5.0 pounds                       | 1.0 pound                         |
| 9                   | 5.0 pounds                       | 1.0 pound                         |
| 15                  | 25.0 ounces                      | 5.0 ounces                        |

5.5.5.1 Test Method. Pin and socket contacts shall be firmly held in a self-aligning fixture and mated and unmated at a slow, steady rate of speed while recording the forces required to perform these operations.

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5.5.6 Voltage Standing Wave Ratio. Contact assemblies terminated to their appropriate cable shall not exhibit a VSWR exceeding 1.3 to 1.0 at frequencies to 500 MHz when tested as specified on all cables.

5.5.6.1 Test Method. Testing shall be performed on mated contact pairs using the expanded or interference test method.

5.5.7 Cable Retention. When tested as specified, contacts shall not break or become separated from the cable at a tensile force less than 60 pounds for size 5 and 9 contacts and 10 pounds for size 15 contacts.


5.5.7.1 Test Method. Contacts shall be held firmly between the jaws of a tensile machine. The braid and center conductor of the cable shall be joined together to create an equal pull on both. Testing shall be performed using a head speed of 1 inch per minute.

5.5.8 Thermal Shock. When tested as specified, contacts shall show no evidence of physical damage. Insulation Resistance shall be measured during the high temperature portion of the fifth cycle and shall meet the performance requirement for Insulation Resistance (5,000 megohms or greater).

5.5.8.1 Test Method. Mated contact assemblies shall be subjected to 5 cycles of Thermal Shock in accordance with MIL-STD-202, Method 107, Test Condition A, except the low temperature extreme shall be -65°C. During the fifth cycle at the high temperature portion, Insulation Resistance shall be measured in accordance with Paragraph 5.5.3.1.

5.5.9 Durability. After 500 cycles of mating and unmating as specified, contacts shall show no evidence of mechanical damage or contact base metal exposure.

5.5.9.1 Test Method. Contacts shall be subjected to 500 cycles of mating and unmating at a rate not exceeding 10 cycles per minute.

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5.5.10 Vibration. During the vibration test specified at 10 to 2000 Hz for 12 hours, there shall be no electrical discontinuities exceeding 1 microsecond duration. Upon completion of testing, there shall be no evidence of physical damage.


5.5.10.1 Test Method. Contact assemblies shall be held together using a static mating force of 100 pounds. Flexible cables shall be clamped to the fixture 6 +/- 1 inches from the rear of the connector. Testing shall be performed in accordance with MIL-STD-202, Method 204, Test Condition D. Throughout the test, inner and outer contacts shall be wired in series, a D.C. current of 0.1 ampere applied, and contacts monitored to detect any electrical discontinuities exceeding 1 microsecond duration.

5.5.11 Moisture Resistance. After the completion of Step 6 of the final cycle of Moisture Resistance as specified, the contact assemblies shall be removed from the test chamber and the excess moisture shaken off. Insulation Resistance shall be measured and shall not be less than 200 megohms. Contacts shall also meet the performance requirements for Dielectric Withstanding Voltage.

5.5.11.1 Test Method. Contact assemblies shall be mated and subjected to moisture resistance testing in accordance with MIL-STD-202, Method 106, omitting steps 7a and 7b. Upon completion of step 6 of the final cycle, the connectors shall be removed from the chamber, excess moisture shaken off, and Insulation Resistance measured in accordance with Paragraph 5.5.3.1.

5.5.12 Physical Shock. Upon completion of testing as specified, contacts shall show no evidence of physical or mechanical damage, and during test the connectors shall show no loss of electrical continuity in excess of 1 microsecond.

5.5.12.1 Test Method. Contact assemblies shall be mated as described for vibration, Paragraph 5.5.10.1 and subjected to Physical Shock in accordance with

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MIL-STD-202, Method 213, Test Condition A. During test contacts shall be series wired and monitored for loss of electrical continuity in excess of 1 microsecond.

5.5.13 Salt Spray. After 48 hours exposure to a 5% salt spray as specified, contacts shall show no exposure of base metal and contact mating or unmating shall not be affected. Contact assemblies shall then be mated and shall meet the requirements of all subsequent testing.

5.5.13.1 Test Method. Contact assemblies shall be fully mated and subjected to salt spray corrosion in accordance with MIL-STD-202, Method 101, Test Condition B. Upon completion of exposure, connectors shall be unmated for rinsing and examination, then remated for "after test" measurements.


6.0 QUALITY CONFORMANCE INSPECTION

6.1 Sample Selection. Unless otherwise specified, sampling procedures shall be in accordance with MIL-STD-105. Sampling and Acceptable Quality Levels shall be as specified in the applicable AMP Quality Specifications. Dimensional requirements shall be in accordance with the applicable AMP Product Drawing.

6.2 Test Procedure. Contacts supplied in accordance with this specification shall meet the requirements for Quality Conformance Inspection, Table II. Examination and test shall be conducted in the order specified.

TABLE II

| Quality Conformance Inspection |                       |
|--------------------------------|-----------------------|
| Test or Examination            | Test Method           |
| Examination of Product         | Quality Specification |

|  |  |                  |          |
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