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1.0 OBJECTIVE

1. This specification defines the performance, test quality and reliability requirements of the Miniature Jack connector.

2.0 SCOPE

This specification is applicable to the termination characteristics of the Miniature Jack connector family which provides sufficient externally accessible inputs and outputs.

3.0 GENERAL

This document is composed of the following sections.

1. Objective
2. Scope
3. General
4. Applicable Documents
5. Requirements
 - ✧ Qualification
 - ✧ Material
 - ✧ Finish
6. Mechanical characteristics
7. Electrical characteristics
8. Environmental Conditions
9. Quality assurance provisions
 - ✧ Equipment Calibration
 - ✧ Inspection Conditions
 - ✧ Sample Quantity and Description
 - ✧ Acceptance
 - ✧ Qualification Testing
 - ✧ Requalification Testing
10. Test Sequence
 - Table 1 Qualification testing matrix

4.0 APPLICABLE DOCUMENTS

4.1 Specifications


- 4.1.1 Engineering drawings 10038075.

4.2 Military Standards

- 4.2.1 Eia-Std-364: test method per electronic industries association
- 4.2.1 Mil-Std-202F: test methods for electronic and electrical component parts
- 4.2.2 Mil-G-45204: gold plating, electrodeposited
- 4.2.3 Mil-G-45662: Calibration system requirement

4.3 Federal Specifications

- 4.3.1 QQ-N-290: Nickel plating (electrodeposited)
- 4.3.2 QQ-S-698: Steel, sheet and strip, low carbon.

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4.3.3 QQ-B-750: Bronze, phosphor, bar, plate, rod, sheet, strips flat wire and structure and shaped sections.

4.4 Other Standard and Specifications

4.4.1 UL-94: Test Flammability of plastic materials

4.5 FCI Specifications

4.5.1 BUS-19-002: Solderability test

4.5.2 BUS-03-405: Insertion / Withdrawal force measurement

5.0 REQUIREMENT

5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

5.2 Material

5.2.1 The material for each component shall be as specified herein or equivalent.

5.2.2 Insulating Housing:

- ✧ The insulators shall be rated flame retardant 94V-O in accordance with UL-94.
- ✧ The housing shall be glass filled, PA9T or other high performance resin.

5.3 Finish

The finish for applicable components shall be specified on the applicable product drawing

5.3.1 Contact terminal coating : 0.6 um Ag or Au, over 2 um Cu underplating.

5.3.2 Tip Spring coating : 0.6 um Ag or Au, over 2 um Cu underplating.

5.3.3 Break Terminal coating : 0.6 um Ag or Au, over 2 um Cu underplating.

6.0 Mechanical characteristics

6.1 Mating / Unmating Force-

0.4 2.5Kgf, initially;

0.3 2.5Kgf, after 5,000 cycles life test.

6.2 Durability


The part shall withstand 5,000 mate and unmate cycles at 10 20 cycles per minute with no functional damage.

6.3 Workmanship

Parts shall be uniform in workmanship and appearance, There shall be no excessive nicks, deep scratches, excessive burrs or defects in materials that may affect the function, serviceability or appearance of this part, Leads shall be free of nicks, protrusions, burrs, micro-cracks and foreign material deposits such as paint, film or molding flash.

6.4 Marking

Each part shall be permanently and legibly marked , Minimum marking shall include the manufacturer's name and trademark or logo , manufacturer's part number and lot date code .

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7.0 ELECTRICAL CHARACTERISTICS

7.1 Current rating –the maximum current rating of the connector shall be 1 ampere.

7.2 Contact Resistance –

The low-level contact resistance shall not exceed 50 milliohms initial. The maximum change in LLCR is 30 milliohms after duration and environment test. The defined as below listed at current less than 100mA with frequency of 1 KHz with EIA-364-23B.

- ✧ Voltage Drop-20 millivolts max.
- ✧ Test Current –Not to exceed rates current.

7.3 Insulation Resistance-

The insulation resistance of connectors shall be more than 100 megohms after environmental exposure when measured in accordance with EIA-364-21C.

The following details shall apply :

- ✧ Test Voltage –500 volts DC.
- ✧ Electrification Time-1 or 2 minutes , unless otherwise specified .
- ✧ Points of Measurement –Between adjacent contacts and terminals.

7.4 Dielectric Withstanding Voltage –

There shall be evidence of arc-over, insulation breakdown , or excessive leakage current (1/2 milliampere) when the unmated connectors are tested in accordance with EIA-364-20B.

The following details shall apply :

- ✧ Test Voltage – 500 volts DC, 60 Hz.
- ✧ Test Duration – 60 seconds,
- ✧ Test Condition –1 (760 torr - sea level)

8.0 ENVIRONMENTAL CONDITIONS

After exposure to the following environmental conditions in accordance with the specified test procedure and /or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements per paragraphs 6.0 and 7.0 as specified in the Table test sequences unless specified otherwise , assemblies shall be mated during exposure .

8.1 Operating Temperature Rang : -25 to 85

8.2 Thermal Stress : The part shall withstand 50 cycles between limits at 15 to 30 per minute as measured on the product.


8.3 Mechanical Shock :

The part shall withstand three drops in trapezoidal 50 G , 11 msec. Velocity change of 170 inches/sec.

During and after each shock, the test shall evidence no discontinuity greater than 1 microsecond. The test shall be in accordance with MIL-STD-202F, method 213-1, the following details shall apply:

- ✧ Condition : A (50G, 11 ms half-sine)
- ✧ Number of shock: 3 shocks in both directions along each of 3 orthogonal (18 total).

No discontinuities greater than 1.0 microseconds.

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8.4 Moisture Resistance :

The part shall not exhibit evidence of mechanical or electrical degradation after exposure to a high humidity environment in accordance with MIL-364-31B.

The dew drops on the surface of jack shall be blown off and removed from the surface of jack and then placed in ambient temperature for more than 30 minutes, recovery period ,

- ✧ Relative HUMIDITY : $90\% \pm 5\%$, 96 hours.
- ✧ Temperature : 40 ± 2 .
- ✧ Sample : Unmated during exposure.

8.5 Vibration :

The parts shall not exhibit evidence of physical or mechanical damage when subjected to mechanical vibration. During the test, the contacts/lead shall not exhibit discontinuity greater than 1 microsecond along each axis. Testing shall be in accordance with MIL-STD-202F, Method 204D.

- ✧ Condition : A
 - ✧ Vibration Amplitude : 10 g peak / 1.52mm max.
 - ✧ Frequency range : 10 – 55 – 10 Hz.
 - ✧ Sweep time and duration : 15 minutes per sweep, 2 hours along each of 3 axis .
- The test has to be made with the customer device to have a global set.

8.6 Thermal Shock : MIL-STD-202F, Method 107G.


- ✧ Test condition : A (25, 1-hours cycle)
- ✧ Temperature range : -55 ± 5 to 85 ± 5 .
- ✧ Time at each temperature : 30 minutes
- ✧ Transfer time : 5 minutes max.
- ✧ Number of cycles : 5 cycles .
- ✧ Samples : Unmated during exposure .

8.7 Solderability: EIA-364-52B.

- ✧ Contact tails shall be solderable over a minimum, of 1.0 mm from the tip.
- ✧ Steam aging : Suspended 2 inches above boiling , distilled water for 4 hours.
- ✧ Acceptable coverage : 95%
- ✧ Flux : Alpha 100.
- ✧ Flux immersion time : 5 – 10 seconds.
- ✧ Solder dwell time : Terminal held immediately above solder for 10 seconds and then immersed for 3 ± 0.5 seconds ,The solder tails shall be bent normal to the base of the connector to prevent the insulator from touching the solder bath .
- ✧ Solder Temperature : 230 ± 5 .

8.8 Solder-Heat Resistance

- ✧ Solder tail shall be immersed into a solder bath at 250 ± 5 for 30 ± 1 sec after the procedure, observe the socket housing. Method are defined in EIA-364-56.

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9.0 QUALITY ASSURANCE PROVISIONS

9.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with MIL-C-45662 and ISO 9000.

9.2 Inspection Conditions

Unless otherwise specified herein , all inspections shall be performed under the following ambient conditions.

- ✧ Temperature: 25 ± 5 .
- ✧ Relative humidity : 30% to 60%.
- ✧ Barometric Pressure : Local ambient

9.3 Acceptance

9.3.1 Electrical and mechanical requirements placed on test samples as indicated in paragraphs 6.0 and 7.0 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the started requirements.

9.3.2 Failures attributed to equipment, test setup, or operator error shall not disqualify the product , if product failure occurs, corrective action shall be taken an samples resubmitted for qualification.


9.4 QualificationTesting

Qualification testing shall be performed on sample units produced with equipment and procedures normally ursed in production . The test sequence shall be s show in Table 1.

9.5 Requalification Testing

If any of the following conditions occur, the responsible product engineer shall initiate requalification testing consisting of all applicable parts of the qualification test matrix Table 1.

1. A significant design change is made to the existing product which impacts the product form, fit or function . Examples of significant changes shall include but not limited to , changes in the plating material composition or thickness contact force, contact surface geometry, insulator design, contact base material , or contact lubrication requirements.
2. A significant change is made to the manufacturing process which impacts the product form, fit or function.
3. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.


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10.0 TEST SEQUENCE:

Table 1

		Endurance Test Sequence								
Test group		Sample group								
NO.	Test item	A	B	C	D	E	F	G	H	I
1	Examination of product	1,13	1,13	1,13	1,13	1,9			1,13	1,13
2	Dielectric strength	2,8	2,8	2,8	2,8	4			2,8	2,8
3	Insulation resistance	3,9	3,9	3,9	3,9	5			3,9	3,9
4	Contact resistance	4,10	4,10	4,10	4,10	6			4,10	4,10
5	Insertion force	5,11	5,11	5,11	5,11	7			5,11	5,11
6	Withdrawal force	6,12	6,12	6,12	6,12	8			6,12	6,12
7	Operating endurance	7								
8	Humidity test		7							
9	Dry heat			7						
10	Cold test				7					
11	Solderability					2				
12	Soldering heat					3				
13	Terminal strength						1			
14	Contact pressure							1		
15	Torsion strength								7	
16	Composite temperature/humidity cyclic test									7

Note: Test sample quality : 10 pcs / group

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