The Product Specification For Orthogonal MINI Cool edge Connector

REVISION RECORD

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A	9	First Release	CD1190	2018-05-18	Xg. Liu

Prepared by :	Date:	Approved by :	Date:
_____	_____	_____	_____
(Product Engineer)		(Engineering Manager)	

TABLE OF CONTENTS

1.0 OBJECTIVE

This specification defines the performance, test, quality and reliability requirements of Amphenol Orthogonal MINI Cool edge series connector.

2.0 SCOPE

This Specification includes the Materials/Finishing, Mechanical Characteristics, Electrical Characteristics and Environmental requirements of Amphenol Orthogonal MINI cool edge connector.

3.0 APPLICABLE DOCUMENTS

3.1 Application

3.1.1 Applicable Amphenol Engineering drawings and Application Specification

3.2 Military Standards

3.2.1 MIL-C-45662 : Equipment Calibration

3.3 Other Standards and Specifications

3.4.1 UL94 V-0 : Flammability

3.4.2 EIA 364 : Electrical Connector/Socket Test Procedures Including Environmental Classifications

4.0 REQUIREMENTS

4.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein. Unless otherwise specified, all measurements shall be performed within the following lab conditions:
Temperature : 15 to 35°C
Relative Humidity : 20% to 80%
Atmospheric Pressure : 650mm to 800mm of Hg (86 ~106Kpa)

4.2 Material

Material for each part shall be specified herein, or equivalent. Substitute material shall meet the performance requirements of this specification.

4.2.1 Insulator: High temperature thermoplastic, UL94 V-0
4.2.2 Contact: Cu and Cu alloy
4.2.3 Metal framework : Zinc alloy
4.2.4 Other material: Stainless steel

4.3 Finish

Plated finished for qualification components shall be meet the connector's application.

4.4 Workmanship

Connectors shall be uniform in quality and shall be free from burrs, scratches, cracks, voids, chips, blisters, pin holes, sharp edges, and other defects that will adversely affect product's life or serviceability

4.5 The characteristic impedance

Connectors the characteristic impedance is 85 Ohm +/-10%.

5.0 ELECTRICAL CHARACTERISTIC

5.1 Current Rating

The temperature rise above ambient shall not exceed 30°C at any point in the connector, when contact positions specified are powered at the power levels specified herein:

a) Ambient Conditions: still air at 25°C±5°C
b) Current Rating For Power pin: Total 5A .
c) Current Rating For Signal pin: 0.5A/Pin.
d) Reference: EIA 364-70B.
e) Mated with applicable board.

5.2 Low Level Contact Resistance

Mated with test board, contact resistance shall meet the requirement after environmental exposure when measured in accordance with EIA 364-23B. The maximum initial contact resistance refer to below, The following details shall apply:

a) Initial contact resistance is 150mΩ Max, 15 mΩ Max changed after test
b) Test Voltage: 20mV DC maximum at open circuit.
c) Test Current: not to exceed 100mA.

5.3 Insulation Resistance

The insulation resistance shall not be less than 1000M ohm when measured in accordance with EIA 364-21C. The following details shall apply:

a) Test Voltage : 500V DC
b) Preparation : The connectors shall be Unmated
c) Electrification Time : 1 minute
d) Point of Measurement: Between adjacent contacts.

5.4 Dielectric Withstanding Voltage

There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current (0.5mA max) when the mated connectors are tested in accordance with EIA 364-20B, method B. The following details shall apply:

a) Test Voltage: 1000 V.rms for power pin and 500V.rms for signal pin.
b) Test Duration: 1 minute
c) Preparation: The connectors shall be Unmated
d) Test Conditions: EIA 364-20B Test Conditions I (685~785mm of mercury, and sea level)
e) Points of measurement: Between adjacent contacts

6.0 MECHANICAL CHARACTERISTIC

6.1 Durability.

Mating and un-mating with applicable PCB at the speed rate of less than 10 cycles per minute

a) Reference: EIA 364-09C.
b) Number of Cycles: 200 cycles.
c) No physical damage.

6.2 Durability(Preconditioning).

Mating and un-mating with applicable PCB at the speed rate of less than 10 cycles per minute

a) Reference: EIA 364-09C.
b) Number of Cycles: 20 cycles.
c) No physical damage.

6.3 Mating Force

Mating and un-mating with the applicable PCB, the following details shall apply:

a) Reference: EIA 364-13B.

b) Matting the connectors at the speed rate of 25±3mm/minute.

c) Mating force : 0.6N/pin Max.

6.4 Un-mating Force

Mating and un-mating with the applicable PCB, the following details shall apply:

a) Reference: EIA 364-13B.

b) Withdraw connectors at the speed rate of 25±3mm/minute.

c) Un-mating force : 0.06N/PiN Min.

6.5 Reseating

a) test condition: Manually mating and un-mating the connector with applicable PCB.

b) Requirement: Perform 3 such cycles.

6.6 Compliant Pin Insertion Force

Fully populated connectors shall be applied to test boards, using an electric application press and Amphenol recommended application tooling. The following details shall apply:

a) Reference: EIA 364-05.

b) Average force to insert one EON: 28N maximum;

c)Number of connector assemblies to be tested: 6 (2 test groups, 3 samples each)

d) Number of readings: 1 per connector assembly tested

e) Test boards: Nominal diameter finished holes with immersion tin plating.

f) Measure and record the test board's finished hole sizes prior to performing test.

6.7 Compliant Pin Retention Force

Fully populated connectors shall be removed from test boards, using an electric application press and Amphenol recommended application tooling. The following details shall apply:

a) Reference: EIA 364-05.

b) Average force to remove one standard EON: 2N Min

c)Number of connector assemblies to be tested: 4 (2 test groups, 2 samples each)

d)Number of readings: 1 per connector assembly tested

e)Test boards: Nominal diameter finished holes with tin plating.

7.0 ENVIRONMENTAL CHARACTERISTIC

7.1 Thermal Shock.

No physical damage shall be observe after to exposure at the environment of -55°C and +105°C temperature and to the shock of alternate exposure. The following details shall apply:

a) Reference: EIA 364-32D, Method A Test Condition VII

b) Number of cycles: 10 continuous cycles.

7.2 Humidity-Temperature Cycling.

No physical damage shall be observed after tested in the environment of high humidity and high heat. The following details shall apply:

a) Reference: EIA 364-31B, Method III,

b) Condition A: 240 hours (10 cycles) at 50℃ with 90%~98% relative humidity

7.3 Thermal Cycling.

No physical damages hall be observed after tested in accordance with EIA-364-110,

a) Test condition : Cycle the connector between 15ºC ±3ºC and 85ºC±3ºC, Humidity is not controlled

b) Test Duration : Ramps should be a minimum of 2 ºC per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes)

c) Number of cycles: Perform 500such cycles.

7.4 Thermal Disturbance.

No physical damages hall be observed after tested in accordance with EIA-364-110,

a) Test condition : Cycle the connector between 15ºC ±3ºC and 85ºC±3ºC, Humidity is not controlled

b) Test Duration : Ramps should be a minimum of 2 ºC per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes)

c) Number of cycles: Perform 10such cycles.

7.5 High Temperature Life.

No physical damage shall be observed after tested in accordance with EIA-364-17B. The following details shall apply:

a) Test Condition: 105°C+2/-2℃

b) Test time condition: 240 hours

c) Connector state: Mated.

7.6 Temperature Life(Preconditioning).

No physical damage shall be observed after tested in accordance with EIA-364-17B. The following details shall apply:

a) Test Condition: 105°C+2/-2℃

b) Test time condition: 120 hours

c) Connector state: Mated.

7.7 Dust Contamination.

Perform in accordance with EIA 364-91 Dust contamination 1 (benign), unmated receptacle connectors.

7.8 Physical Shock

No discontinuities greater than 1 μs and no physical damage shall be observed after tested in accordance with EIA-364-27B. The following details shall apply:

a) Test condition: A (490 m/s2, 11 ms, half-sine).

b) 3 shocks in both directions along each of three orthogonal axes (18 totals).

c) Mounting: Rigidly mount assemblies.

d) Apply current: 10mA.

7.9 Vibration

No discontinuities greater than 1 μs and no physical damage shall be observed after tested in accordance with EIA-364-28E. The following details shall apply:

a) Test Condition: (10Hz～500Hz～10Hz, amplitude: 1.5mm, 100m/s2).

b) Duration: 120 minutes per axis.

c) Direction: each of 3 orthogonal axis.

d) Mounting: Rigidly mount assemblies.

7.10 Salt Spray.

No obvious corrosion shall be observed after tested. The following details shall apply:

a) Reference: EIA 364-26B, Test Condition B.
b) Temperature: 35°C +1°C /-2°C;
c) Concentration: 5%;
d) Humidity: 95~98% RH
e) Duration: 48 hour

7.11 Industrial Mixed Flowing Gas (MFG). EIA 364-65, Class 2A

a) Temperature : 30°C ± 1°C, 70± 2% RH
b) Gas Concentration : Cl2 10±3ppb, NO2 200±50ppb, H2S 10±5ppb, SO2 100±20ppb
c) Half of the samples are exposed unmated for seven days, then mated for remaining seven days. Other half of the sample is mated during entire testing.
d) Requirement: Shall meet EIA 364-18 Visual Examination requirements, show no physical damage, and shall meet requirements of additional tests as specified in the test sequence

8.0 QUALITY ASSURANCE PROVISIONS

8.1 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.

8.2 Inspection Condition.

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

a) Temperature : 25 ± 5°C
b) Relative Humidity : 30% ~ 60%
c) Barometric Pressure: Local ambient

8.3 Sample Quantity and Description

The numbers of samples to be tested in each group shown in Qualification Testing Sequences are defined as follows: 5pcs each group (Group F and Group H is 2Pcs, Group K 6Pcs), All samples must be free of defects that would impair normal connector operation. All samples must meet dimensional requirements of connector.

8.4 Acceptance

8.4.1 Electrical and mechanical requirements placed on test samples as indicated in Paragraphs 5.0 and 6.0 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 stated requirements.

8.4.2 Failures attributed to equipment, test set up, or operator error shall not disqualify the product. If product failure occurs, corrective actions shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

8.5 Qualification Testing.

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production. The test sequence shall be as shown in Qualification Testing Sequences

Visual Examination : EIA 364-18

8.6 Re-qualification Testing.

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

a) 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 be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.
b) A significant change is made to the manufacturing process, which impacts the product form, fit or function.
c) A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

Table 1: Qualification Testing Sequences

TEST OR EXAMINATION		TEST GROUP									
	item	A	B	C	D	E	F	G	H	I	J
Examination of connector(s)	4.4	1,8	1,10	1,9	1,11	1	1	1,10	1,11	1,5	1,9
Current Rating	5.1					2					
Low Level Contact Resistance	5.2	2,5,7	2,5,7,9	2,6,8	4,8			2,5, 7,9	2,5, 7,8, 10	2,4	2,4,6, 8
Insulation Resistance	5.3				3,10						
Dielectric Withstanding Voltage	5.4				2,9						
Durability	6.1				7						
Durability(Preconditioning)	6.2	3	3	3				3	3		
Matting Force	6.3				5						
Unmating Force	6.4				6						
Reseating	6.5	6	8	7					9		7
Compliant Pin Insertion Force	6.6						2,4,6				
Compliant Pin Retention Force	6.7						3,5				
Thermal Shock	7.1		4								
Humidity-Temperature Cycling	7.2		6								
Thermal Cycling	7.3			5							
Thermal Disturbance	7.4								8		5
High Temperature Life	7.5	4		4							
Temperature Life (Preconditioning)	7.6							4	4		
Dust Contamination	7.7										3
Physical Shock	7.8							8			
Vibration	7.9							6			
Salt Spray	7.10									3	
Industrial Mixed Flowing Gas	7.11								6		