.040/2.8 mm Unsealed Hybrid Multilock Connector System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics .040/2.8 mm Unsealed Hybrid Multilock Connector System

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 12Sep06. The Qualification Test Report number for this testing is 501-642. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the 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. Tyco Electronics Documents

- 109-11: Test Specification (Solderability Dip Test)
- 501-642: Qualification Test Report (.040/2.8 mm Unsealed Hybrid Multilock Connector System)
- 502-1212: Engineering Report (Evaluation of .040/2.8 mm Contact Systems)

2.2. Commercial Standard

SAE/USCAR-2 (Rev 4): Performance Specification For Automotive Electrical Connector Systems

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing(s).

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing(s).

3.3. Temperature Rating: -30 to 105˚C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Visual Inspection.	No defects.	USCAR-2 Rev. 4, 5.1.8.
Terminal-to-connector insertion force.	30 N maximum.	USCAR-2 Rev. 4, 5.4.1.
Terminal-to-connector extraction force, with primary latching.	30 N minimum for .040 contact. 60 N minimum for 2.8 contact.	USCAR-2 Rev. 4, 5.4.1.
Terminal-to-connector extraction force, with secondary latching.	75 N minimum for .040 contact. 90 N minimum for 2.8 contact.	USCAR-2 Rev. 4, 5.4.1.
Connector-to-connector mating force.	95 N maximum for fully loaded 22 position plug.	USCAR-2 Rev. 4, 5.4.2.
Connector-to-connector unmating force.	110 N minimum with primary lock engaged, fully loaded 22 position plug. 95 N maximum with primary lock disengaged, fully loaded 22 position plug.	USCAR-2 Rev. 4, 5.4.2.
Primary connector lock disengage force.	10 N minimum, 70 N maximum.	USCAR-2 Rev. 4, 5.4.2.3.B.6.
Polarization feature effectiveness.	220 N minimum for 2 minutes.	USCAR-2 Rev. 4, 5.4.4.
Miscellaneous component engage force (TPA).	75 N maximum with terminals. 15 N minimum without terminals.	USCAR-2 Rev. 4, 5.4.5.
Miscellaneous component disengage force (TPA).	60 N maximum, lock-to-preset. 15 N minimum, removal from housing.	USCAR-2 Rev. 4, 5.4.5.
Connector-to-connector audible click.	7 dB minimum above ambient. 5 dB minimum above ambient after moisture conditioning.	USCAR-2 Rev. 4, 5.4.7.
Connector drop test.	No damage.	USCAR-2 Rev. 4, 5.4.8.
Cavity damage susceptibility.	80 N minimum without damage. Terminal-to-connector extraction force, with secondary latching requirement.	USCAR-2 Rev. 4, 5.4.9.
Header pin retention.	24 N minimum for .040 contact. 50 N minimum for 2.8 contact.	USCAR-2 Rev. 4, 5.7.1.
Header pin solderability.	95% minimum coverage.	Tyco Spec 109-11-5 and 109-11-6.
Connector cycling.	Mate and unmate 10 times as preconditioning.	USCAR-2 Rev. 4, 5.1.7.4.

Figure 1 (continued)

Test Description	Requirement	Procedure
Circuit continuity monitoring.	No contact pair >7.0 ohms for >1 microsecond.	USCAR-2 Rev. 4, 5.1.9.
Dry circuit resistance.	20 milliohms maximum for .040 contact. 5 milliohms maximum for 2.8 contact.	USCAR-2 Rev. 4, 5.3.1.
Voltage drop.	20 milliohms maximum for .040 contact. 5 milliohms maximum for 2.8 contact.	USCAR-2 Rev. 4, 5.3.2.
Vibration/mechanical shock.	No physical damage or discontinuities per 5.1.9.	USCAR-2 Rev. 4, 5.4.6.
Terminal-to-terminal engage force.	See Engineering Report 502-1212.	These tests were not performed as part of product qualification. Shown for reference only.
Terminal-to-terminal disengage force.		
Maximum current capability.		
Thermal shock.		
Temperature/humidity cycling.		
High temperature exposure.		

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test Group ID	1	2	3	4	5	6	7	8	9	10	11
Specimen Quantity	10	10	10	8	15	12	3	5	3(a)	20	10(b)
Test or Examination	Test Sequence (Numbers indicate sequence in which tests are performed)										
Visual inspection	1,4	1,3	1,4	1,3	1,5	1,3	1,3	1,3	1,7	1,3	1,3
Terminal-to-connector insertion force	2										
Terminal-to-connector extraction force, primary	3										
Terminal-to-connector extraction force, secondary		2									
Connector-to-connector mating force					2						
Connector-to-connector unmating force					3						
Primary connector lock disengage force					4						
Polarization feature effectiveness						2					
Miscellaneous component engage force (TPA)			2								
Miscellaneous component disengage force (TPA)			3								
Connector-to-connector audible click				2							
Connector drop test							2				
Cavity damage susceptibility								2			
Header pin retention										2	
Header pin solderability											2
Connector cycling									2		
Circuit continuity monitoring									4(c)		
Dry circuit resistance									3,5		
Voltage drop									6		
Vibration/mechanical shock									4		

NOTE

(a) Three complete assemblies consisting of 54 position header, 22 position plugs key A and B, 10 position plug. Connector assemblies to be soldered to printed circuit board with support representative of typical Radio application.

(b) Ten pin contacts pulled randomly from 3 header assemblies, tested both before and after soldering heat exposure.

(c) Test run concurrently with vibration/mechanical shock.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups shall consist of quantities specified in Figure 2.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall 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.