8 Position 0.64/2.8 mm Hybrid Unsealed Connector System

1. INTRODUCTION

1.1. Purpose

Testing was performed on the Tyco Electronics 8 Position 0.64/2.8 mm Hybrid Unsealed Connector System to determine its conformance to the requirements of Product Specification 108-2400 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the 8 Position 0.64/2.8 mm Hybrid Unsealed Connector System. Testing was performed at the Global Automotive Division Product Reliability Center between December of 2006 and July of 2008. The test file numbers for this testing are 20060261ACL, 20060262ACL and 20080142ACL. This documentation is on file at and available from the Global Automotive Division Product Reliability Center.

1.3. Conclusion

The 8 Position 0.64/2.8 mm Hybrid Unsealed Connector System listed in paragraph 1.4., conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-2400 Revision A.

1.4.

Test specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Part Number	Description
1326030-6	2.8 mm unsealed receptacle with 18 AWG wire
1326030-8	2.8 mm unsealed receptacle with 12 AWG wire
1456468-1	8-way unsealed hybrid header assembly
1456471-1	8-way unsealed hybrid plug assembly
1924955-1	Generation Y unsealed female contact with 22 AWG wire
1924955-2	Generation Y unsealed female contact with 18 AWG wire

Figure 1

1.5. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

- Temperature: 15 to 35˚C
- Relative Humidity: 25 to 75%

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)											
	1	2	3	4	5	6	7	8	9	10	11	12
	Test Sequence (b)											
Visual inspection	1,6	1,5	1,4	1,6	1,3	1,3	1,4	1,3	1,8	1,7	1,7	1,7
Terminal-connector insertion	2											
Terminal-connector extraction, primary latching	3											
Terminal-connector extraction, secondary latching	4											
Terminal-connector extraction, secondary latching moisture conditioned	5											
TPA, preset to lock		2										
TPA, lock to preset		3										
TPA, preset to OFF (removal)		4										
Connector-connector audible click			2									
Connector-connector audible click after moisture conditioning			3									
Connector-connector mating force				2								
Connector-connector unmating force, primary lock engaged				3								
Connector-connector unmating force, primary lock disengaged				4								
Primary lock disengage				5								
Polarization feature effectiveness, mis-mated					2							
Connector drop						2						
Cavity damage susceptibility							2					
Extraction with primary and secondary latching							3					
Header pin retention, unsoldered								2				
Connector cycling									2	2	2	2
Dry circuit resistance									3,6	3,5	3,5	3,5
Mechanical shock									4			
Vibration									5			
Voltage drop									7	6	6	6
Thermal shock										4		
Temperature/humidity cycling											4	
High temperature exposure												4

NOTE *(a) See paragraph 1.4.*
(b) Numbers indicate sequence in which tests are performed.

Figure 2

2. SUMMARY OF TESTING

2.1. Visual Inspection

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance (C of C) was issued by Quality Engineering. A visual examination of the housing assembly was performed under fluorescence lighting with the naked eye examining for cracks, delaminations, warpage, deformation, discoloration, latching and mating functions. A visual examination of crimped terminals was performed under fluorescence lighting with the naked eye examining for the correct wire size, wire brush, burrs on the terminal, insulation in wire crimp, insulation tears, and bulging of insulation or penetration of the insulation crimp.

2.2. Terminal-connector Insertion

All terminal-connector insertion measurements were less than 30 N for both 0.64 mm and 2.8 mm contacts.

2.3. Terminal-connector Extraction, Primary Latching

All terminal-connector extraction with primary latching measurements were greater than 30 N for 0.64 mm contacts, and greater than 60 N for 2.8 mm contacts.

2.4. Terminal-connector Extraction, Secondary Latching

All terminal-connector extraction with secondary latching measurements were greater than 75 N for 0.64 mm contacts, and greater than 90 N for 2.8 mm contacts.

2.5. Terminal-connector Extraction, Secondary Latching, After Moisture Conditioning

All terminal-connector extraction with secondary latching after moisture conditioning measurements were greater than 60 N for 0.64 mm contacts, and greater than 90 N for 2.8 mm contacts.

2.6. TPA, Preset to Lock

All TPA preset to lock measurements were greater than 15 N without contacts, and less than 60 N with contacts.

2.7. TPA, Lock to Preset

All TPA lock to preset measurements were less than 90 N for the first cycle, and greater than 18 N after the first cycle.

2.8. TPA, Preset to OFF (removal)

All TPA preset to OFF (removal) measurements were greater than 25 N.

2.9. Connector-connector Audible Click

All connector-connector audible click measurements were greater than 7 dB above ambient.

2.10. Connector-connector Audible Click after Moisture Conditioning

All connector-connector audible click measurements after moisture conditioning were greater than 5 dB above ambient.

2.11. Connector-connector Mating Force

All connector-connector mating force measurements were less than 75 N.

2.12. Connector-connector Unmating Force, Primary Lock Engaged

All connector-connector unmating force measurement with the primary lock engaged were greater than 110 N.

2.13. Connector-connector Unmating Force, Primary Lock Disengaged

All connector-connector unmating force measurements with the primary lock disengaged were less than 75 N.

2.14. Primary Lock Disengage

All primary lock disengage measurements were less than 70 N, and greater than 10 N.

2.15. Polarization Feature Effectiveness, Mis-mated

Mis-mated specimens could not be mated when subjected to a force of 220 N for 2 minutes.

2.16. Connector Drop

No evidence of physical damage was visible as a result of drop testing.

2.17. Cavity Damage Susceptibility

TPA could not be fully seated when subjected to a minimum load of 80 N.

2.18. Extraction with Primary and Secondary Latching

All extraction with primary and secondary latching measurements were greater than 75 N for 0.64 mm contacts, and greater than 90 N for 2.8 mm contacts following the cavity damage susceptibility test.

2.19. Header Pin Retention, Unsoldered

All unsoldered header pin retention measurements were greater than 15 N for 0.64 mm contacts, and greater than 50 N for 2.8 mm contacts.

2.20. Connector Cycling

No physical damage occurred as a result of manually mating and unmating the specimens 10 times.

2.21. Dry Circuit Resistance

All dry circuit resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage, were less than 20 milliohms for 0.64 mm contacts, and less than 5 milliohms for 2.8 mm contacts.

2.22. Mechanical Shock

No discontinuities were detected during mechanical shock testing. Following mechanical shock testing, no cracks, breaks, or loose parts on the specimens were visible.

2.23. Vibration

No discontinuities were detected during vibration testing. Following vibration testing, no cracks, breaks, or loose parts on the specimens were visible.

2.24. Voltage Drop

All voltage drop measurements, taken at 2.5 amperes for 18 AWG circuits and 20 amperes for 12 AWG circuits, were less than 20 milliohms for 0.64 mm contacts, and less than 5 milliohms for 2.8 mm contacts.

2.25. Thermal Shock

No discontinuities were detected during thermal shock testing. Following thermal shock testing, no cracks, breaks, or loose parts on the specimens were visible.

2.26. Temperature/humidity Cycling

No evidence of physical damage was visible as a result of temperature/humidity cycling.

2.27. High Temperature Exposure

No evidence of physical damage was visible as a result of exposure to high temperature.

3. TEST METHODS

3.1. Visual Inspection

A C of C was issued stating that all specimens in this test package were produced, inspected, and accepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.

3.2. Terminal-connector Insertion

The force required to insert a terminal into the plug was measured using a tensile/compression device with a stationary platform and a rate of travel of 50 mm per minute. The wires were marked at 3 and 5 cm from the back of the wire crimp and cut at the 5 cm mark.

3.3. Terminal-connector Extraction, Primary Latching

The force required to extract a terminal from the plug with primary latching engaged and secondary latching removed was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.4. Terminal-connector Extraction, Secondary Latching

The force required to extract a terminal from the plug with primary and secondary latching engaged was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.5. Terminal-connector Extraction, Secondary Latching, After Moisture Conditioning

Prior to testing, specimens were subjected to 40˚C and 95 to 98% RH for 6 hours. After conditioning, the force required to extract a terminal from the plug with primary and secondary latching engaged was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.6. TPA, Preset to Lock

The force required to push the TPA to the lock position was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.7. TPA, Lock to Preset

The force required to pull the TPA to the preset position was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.8. TPA, Preset to OFF (removal)

The force required to pull the TPA to the OFF position was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.9. Connector-connector Audible Click

Specimens were manually mated 600 mm from the end of a sound meter probe in an unlit room 20 feet long by 8 feet high by 12 feet wide with carpeted floors and a drop down ceiling.

3.10. Connector-connector Audible Click after Moisture Conditioning

Specimens conditioned at 40˚C and 95 to 98% RH for 6 hours were manually mated 600 mm from the end of a sound meter probe in an unlit room 20 feet long by 8 feet high by 12 feet wide with carpeted floors and a drop down ceiling.

3.11. Connector-connector Mating Force

The force required to fully mate the specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.12. Connector-connector Unmating Force, Primary Lock Engaged

The force required to unmate the specimens with the primary lock engaged was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.13. Connector-connector Unmating Force, Primary Lock Disengaged

The force required to unmate the specimens with the primary lock disengaged was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.14. Primary Lock Disengage

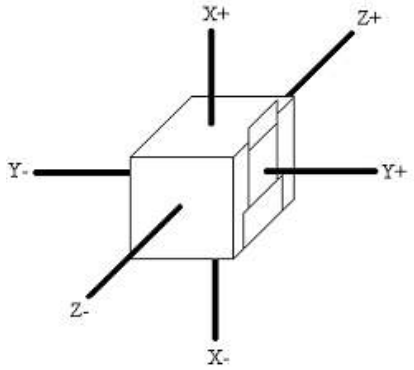
The force required to disengage the primary lock was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.15. Polarization Feature Effectiveness, Mis-mated

A 220 N force was applied to specimens oriented 180 degrees from their normal position in an attempt to mate them using a tensile/compression device with a free floating fixture and a rate of travel of 5 mm per minute. The load was applied for 2 minutes and then released.

3.16. Connector Drop

Unmated specimens were subjected to 6 drops from a height of 1 meter onto a concrete surface. Specimen was oriented prior to each release in the direction of the primary X, Y and Z axes as shown below.



3.17. Cavity Damage Susceptibility

Terminals were inserted into the housings to the point just before a full insert. The TPAs were pushed using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute to see if they would insert into the plugs. The force applied to the TPA was then removed, the terminals fully installed, the TPA fully seated, and the wires extracted with the TPA fully installed as stated in paragraph 3.18.

3.18. Extraction with Primary and Secondary Latching

The force required to extract a terminal from the housing with primary and secondary latching engaged, after cavity damage susceptibility, testing was measured using a tensile/compression device with a free floating fixture and a rate of travel of 50 mm per minute.

3.19. Header Pin Retention, Unsoldered

Unsoldered header pins were pushed in the unmating direction using a pin held in a tensile/compression device with a stationary platform and a rate of travel of 20 mm per minute.

3.20. Connector Cycling

Specimens were manually mated and unmated 10 times.

3.21. Dry Circuit Resistance

Mated specimens were subjected to 20 millivolts maximum open circuit voltage at 100 milliamperes. Measurements were taken on a data acquisition systems using the voltage and current probes bundles (4-wire probe method). The overall resistance measurement includes 9 inches of wire, 1 crimp bulk terminal material, and terminal interface. Nine inches of wire was subtracted out of all readings.

3.22. Mechanical Shock

Specimens were subjected to 10 half sine wave pulses of 11 milliseconds duration at 35 Gs in each of 3 mutually perpendicular planes. Continuity was monitored during the test.

3.23. Vibration

Specimens were subjected to the USCAR-2 Non-Engine Transmission Profile consisting of 8 hour run in each of 3 mutually perpendicular planes.

3.24. Voltage Drop

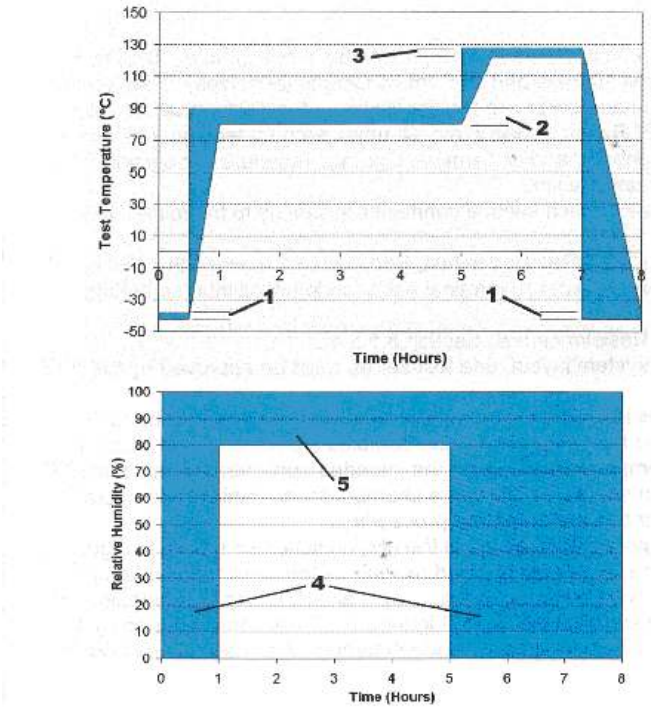
Specimens were subjected to 2.5 amperes for 18 AWG circuits and 20 amperes for 12 AWG circuits. Measurements were taken on a data acquisition system using the voltage probe bundles. The overall resistance measurement included 9 inches of wire, 1 crimp bulk terminal material, and terminal interface. Nine inches of wire was subtracted out of all readings.

3.25. Thermal Shock

Specimens were subjected to 100 cycles between -40 and 85˚C with 30 minute dwells at temperature extremes and 2 minute maximum transfer time between temperatures. Continuity was monitored during the test.

3.26. Temperature/humidity Cycling

Specimens were exposed to 40 cycles of the Class I Temperature Humidity Profile listed in Appendix 1 of USCAR-2 Rev. 4.



Key:
1 (-40)°C
2 (80 – 90)°C
3 Test temperature, see Figure 5.1.4 (Class 3 shown for illustration only)
4 Relative humidity, uncontrolled. Do not vent chamber at hour 5
5 (80 – 100)% Relative humidity

3.27. High Temperature Exposure

Specimens were subjected to 85˚C for 1008 hours.