MTA-100 Wire-To-Wire Posted Connector System

1. INTRODUCTION

1.1. Purpose

Testing was performed on the Tyco Electronics MTA-100 posted connector wire-to-wire system to determine its conformance to the requirements of AMP Product Specification 108-1050-1 Revision C.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the MTA-100 posted connector wire-to-wire system. Testing was performed at the Americas Regional Laboratory and the Americas Global Automotive Center Product Reliability Center between 26Oct98 and 25Mar99. The test file numbers for this testing are CTL 2147-001, 19980190 ACL, and 19980191 ACL. This documentation is on file at and available from the Americas Regional Laboratory (CTL test numbers) and the Americas Global Automotive Product Reliability Center (ACL test numbers).

1.3. Conclusion

The MTA-100 posted connector wire-to-wire system listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1050-1 Revision C.

1.4. Product Description

This system is mass terminated using insulation displacement technology on 2.54 mm [.100 inch] centerlines and mates with standard MTA connectors, providing a reliable interconnection between wires in wire-to-wire applications. The system is available in 2 through 17 positions.

1.5. Test Samples

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

Test Group	Quantity	Part Number	Description
1	10	1-643075-6	Dust cover
	5	1-643813-6	16 position connector terminated to 6 inches of 22 AWG wire
	5	1-647000-6	16 position posted terminated to 6 inches of 22 AWG wire
2	12	1-643075-6	Dust cover
	3	1-643813-6	16 position connector terminated to 12 inches of 22 AWG wire
	3	1-647000-6	16 position posted terminated to 12 inches of 22 AWG wire
	3	1-643443-6	16 position connector terminated to 12 inches of 28 AWG wire
	3	1-647003-6	16 position posted terminated to 12 inches of 28 AWG wire
3	10	1-643075-6	Dust cover
	5	1-641190-6	16 position connector terminated to 22 AWG wire
	5	1-647016-6	16 position posted terminated to 22 AWG wire

Figure 1 (continued)

* Trademark
| Indicates change

Test Group	Quantity	Part Number	Description
4	10	643075-8	Dust cover
	5	643813-8	8 position connector terminated to 22 AWG wire
	5	647000-8	8 position posted terminated to 22 AWG wire
5	5	1-647000-6	16 position posted terminated to 22 AWG wire
	5	1-647001-6	16 position posted terminated to 24 AWG wire
	5	1-647002-6	16 position posted terminated to 26 AWG wire
	5	1-647003-6	16 position posted terminated to 28 AWG wire

Figure 1 (end)

1.6. Environmental Conditions

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

Temperature: 15 to 35°C
Relative Humidity: 20 to 80%

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)				
	1	2(c)	3(d)	4	5
	Test Sequence (b)				
Examination of product	1,9	1,9	1,5	1,8	1,3
Termination resistance	3,7	2,7	2,4		
Insulation resistance				2,6	
Dielectric withstanding voltage				3,7	
Temperature rise vs current		3,8			
Termination tensile strength					2(e)
Sinusoidal vibration	5	6(f)			
Mechanical shock	6				
Durability	4				
Mating force	2				
Unmating force	8				
Thermal shock				4	
Humidity/temperature cycling		4(g)		5	
Temperature life		5			
Mixed flowing gas			3(g)		

NOTE

(a) See paragraph 1.5.
(b) Numbers indicate sequence in which tests are performed.
(c) Tin-lead plated samples.
(d) Gold plated samples.
(e) Subject half the samples to parallel tensile test and the other half to perpendicular tensile test for a total of 30 pulls with each wire size.
(f) Discontinuities shall not be measured. Energize at 18°C level for 100% loadings per AMP Specification 109-151.
(g) Precondition samples with 3 cycles durability.

Figure 2

2. SUMMARY OF TESTING

2.1. Examination of Product - All Test Groups

All samples submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by the Product Assurance Department. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance - Test Groups 1, 2 and 3

All termination resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 16 milliohms initially and had a change in resistance (ΔR) of less than 10 milliohms after testing.

2.3. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 5,000 megohms initially and 1,000 megohms after testing.

2.4. Dielectric Withstanding Voltage - Test Group 4

No dielectric breakdown or flashover occurred.

2.5. Temperature Rise vs Current - Test Group 2

All samples had a temperature rise of less than 30°C above ambient when tested using a baseline rated current of 7.58 amperes and the correct derating factor value based on the samples wiring configuration.

2.6. Termination Tensile Strength

All parallel tensile values were greater than 17.8 N [4 lbf]. All perpendicular tensile values were greater than 13.3 N [3 lbf].

2.7. Sinusoidal Vibration - Test Groups 1 and 2

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

2.8. Mechanical Shock - Test Group 1

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

2.9. Durability - Test Group 1

No physical damage occurred as a result of manually mating and unmating the samples 25 times.

2.10. Mating Force - Test Group 1

All mating force measurements were less than 8.9 N [2 lbf].

2.11. Unmating Force - Test Group 1

All unmating force measurements were greater than 0.4 N [0.1 lbf].

2.12. Thermal Shock - Test Group 4

No evidence of physical damage was visible as a result of exposure to thermal shock.

2.13. Humidity/temperature Cycling - Test Groups 2 and 4

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

2.14. Temperature Life - Test Group 2

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

2.15. Mixed Flowing Gas - Test Group 3

No evidence of physical damage was visible as a result of exposure to the pollutants of mixed flowing gas.

3. TEST METHODS

3.1. Examination of Product

Where specified, samples were visually examined for evidence of physical damage detrimental to product performance.

3.2. Termination Resistance

Termination resistance measurements at low level current were made using a 4 terminal measuring technique (Figure 3). The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

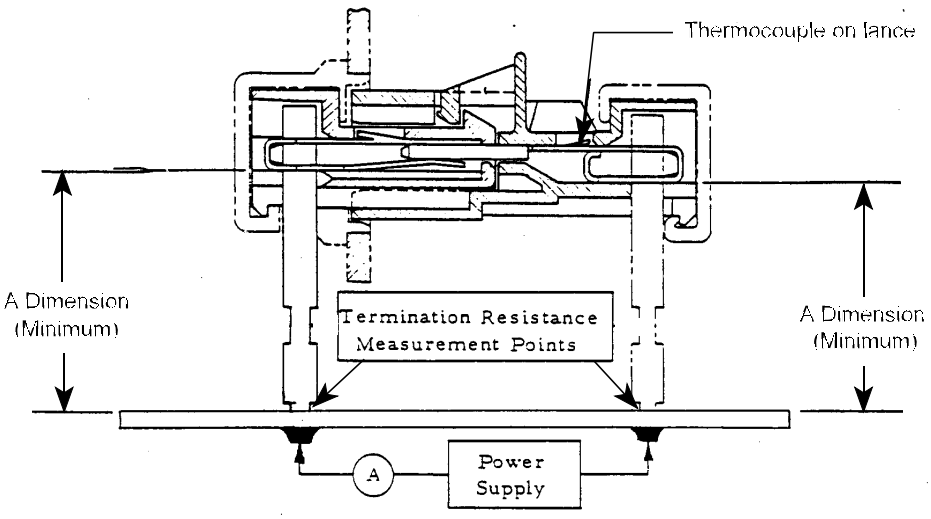

Figure 3
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of unmated samples. A test voltage of 500 volts DC was applied for 1 minute before the resistance was measured.

3.4. Dielectric Withstanding Voltage

A test potential of 750 volts AC was applied between the adjacent contacts of unmated samples. This potential was applied for 1 minute and then returned to zero.

3.5. Temperature Rise vs Current

Temperature rise curves were produced by measuring individual contact temperatures at 5 different current levels. These measurements were plotted to produce a temperature rise vs current curve. Thermocouples were attached to individual contacts to measure their temperatures. The ambient temperature was then subtracted from this measured temperature to find the temperature rise. When the temperature rise of 3 consecutive readings taken at 5 minute intervals did not differ by more than 1°C, the temperature measurement was recorded.

3.6. Termination Tensile Strength

The force load was applied to each sample using a tensile/compression device with the rate of travel at 25.4 mm [1 in] per minute.

3.7. Sinusoidal Vibration

Mated samples were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of .06 inch, double amplitude. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in 1 minute. This cycle was performed 120 times in each of 3 mutually perpendicular planes for a total vibration time of 6 hours. Test group 1 samples were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Mechanical Shock

Mated samples were subjected to a mechanical shock test having a half-sine waveform of 50 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes for a total of 18 shocks. Samples were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.9. Durability

Samples were manually mated and unmated 25 times.

3.10. Mating Force

The force required to mate individual samples was measured using a tensile/compression device with a free floating fixture and a rate of travel of 25.4 mm [1 in] inch per minute. The maximum average force per contact was calculated.

3.11. Unmating Force

The force required to unmate individual samples was measured using a tensile/compression device with a free floating fixture and a rate of travel of 25.4 mm [1 in] per minute. The minimum average force per contact was calculated.

3.12. Thermal Shock

Mated samples were subjected to 25 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 105°C. The transition between temperatures was less than 1 minute.

3.13. Humidity/temperature Cycling

Mated samples were exposed to 10 cycles of humidity/temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65°C twice while maintaining high humidity. During 5 of the first 9 cycles, the samples were exposed to a cold shock of -10°C for 3 hours. A 15 minute vibration was performed upon completion and within 15 minutes after the 5 cycles of cold shock.

3.14. Temperature Life

Mated samples were exposed to a temperature of 85°C for tin plated samples and 105°C for gold plated samples for 1,000 hours.

3.15. Mixed Flowing Gas, Class III

Mated samples were exposed for 20 days to a mixed flowing gas Class III exposure. Class III exposure is defined as a temperature of 30°C and a relative humidity of 75% with the pollutants of Cl_2 at 20 ppb, NO_2 at 200 ppb and H_2S at 100 ppb. Samples were preconditioned with 3 cycles of durability.