NETCONNECT* EtherSeal Modular Jacks and Plugs

1. INTRODUCTION

1.1. Purpose

Testing was performed on the Tyco Electronics NETCONNECT* EtherSeal Modular Jacks and Plugs, to determine their conformance to the requirements of Product Specification 108-2187, Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the Tyco Electronics NETCONNECT EtherSeal Modular Jacks and Plugs. Testing was performed at the Engineering Assurance Product Testing Laboratory and Environ Laboratories LLC between 01Oct04 and 30Nov04. The test file number for this testing is CTLK301-001. This documentation is on file at and available from the Engineering Assurance Product Testing Laboratory.

1.3. Conclusion

The Tyco Electronics NETCONNECT EtherSeal Modular Jacks and Plugs listed in paragraph 1.5 conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-2187, Revision A.

1.4. Product Description

Assemblies are designed for installation into various outlet plates, surface mount boxes, panels, and other similar type fittings.

1.5. Test Specimens

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

Test Group	Quantity	Part Number	Description
1,2,3,4,5,6	60	1479563-2	EtherSeal Receptacle Kit, UTP, Cat 5e Rev E
1,2,3,4,5,6	60	1479601-5	EtherSeal Cable Ass'y, Cat 5e Rev A
1,3,4,5,6	10	03121209 30	Enclosure 4.7 x 4.8 x 3.4 inches (purchased)

Figure 1

1.6. Environmental Conditions

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

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

* Trademark
| Indicates change

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of product	1,7	1,18	1,11	1,6	1,7	1,5
Contact resistance		4,8,12	2,6	2,5	2,6	2,4
Insulation resistance		5,9,13	7		4	
Voltage proof		6,10,14	8		5	
Vibration				3		
Mechanical shock				4		
Insertion force		2,15				
Withdrawal force		3,16				
Effectiveness of coupling device		17				
Mechanical operation (c)			3,5			
Water jet spray	2					
Immersion	3					
Solid foreign objects	5					
Access to hazardous parts	6					
Rapid change of temperature		7				
Climatic damp heat		11				
Flowing gas corrosion test			4			
Electrical load and temperature					3	
Prolonged submersion	4					
Salt spray						3

NOTE
(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Test shall be done n/2 cycles for sequence 3 and n/2 cycles for sequence 5, n=750.

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product

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

2.2. Contact Resistance

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

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
2	80	Initial	41.77	64.36	52.02
	80	After climatic damp heat (ΔR)	-9.60	6.83	0.91
3	80	Initial	41.46	63.76	51.52
	80	After mechanical operation (ΔR)	-6.27	15.99	1.38
4	80	Initial	40.64	64.41	52.28
	80	After mechanical shock (ΔR)	-1.38	8.76	0.40
5	80	Initial	41.80	67.13	52.81
	80	After electrical load and temperature (ΔR)	-1.71	11.32	0.96
6	80	Initial	42.00	65.92	52.70
	80	After salt spray (ΔR)	-7.62	4.97	-0.42

NOTE All values in milliohms

Figure 3

2.3. Insulation Resistance

All insulation resistance measurements were greater than 500 megohms.

2.4. Voltage Proof

No dielectric breakdown or flashover occurred.

2.5. Vibration

No discontinuities greater than 10 microseconds were detected during vibration testing. Following vibration testing, no cracks, breaks, or loose parts were visible on the specimens.

2.6. Mechanical Shock

No discontinuities greater than 10 microseconds were detected during mechanical shock testing. Following mechanical shock testing, no cracks, breaks, or loose parts on the specimens were visible.

2.7. Insertion Force

All insertion values were less than 116 N maximum which included the locking mechanism.

2.8. Withdrawal Force

All withdrawal values were less than 116 N maximum.

2.9. Effectiveness of Coupling Device

The coupling did not loosen or dislodge from the plug body.

2.10. Mechanical Operation

No physical damage occurred as a result of mating and unmating the specimens 750 times.

2.11. Water Jet Spray

Upon completion of the test, no water penetration was noted.

2.12. Immersion

Upon completion of exposure, the test units showed no signs of damage or degradation. A visual inspection of the interior of the test units showed no signs of water infiltration.

2.13. Solid Foreign Objects

Upon completion of the exposure, a visual inspection of the interior found no visible signs of dust infiltration.

2.14. Access to Hazardous Parts

The 1.0 mm probe did not pass through any openings on the specimens.

2.15. Rapid Change of Temperature

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

2.16. Climatic Damp Heat

No evidence of physical damage was visible as a result of exposure to climatic damp heat.

2.17. Flowing Gas Corrosion Test

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

2.18. Electrical Load and Temperature

No evidence of physical damage was visible as a result of exposure to electrical load and temperature.

2.19. Prolonged Submersion

Upon completion of exposure, the test units showed no signs of damage or degradation. A visual inspection of the interior of the test units showed no signs of water infiltration.

2.20. Salt Spray

No evidence of physical damage was visible as a result of exposure to a salt spray atmosphere.

2.21. Final Examination of Product

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1. Examination of Product

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

3.2. Contact Resistance

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

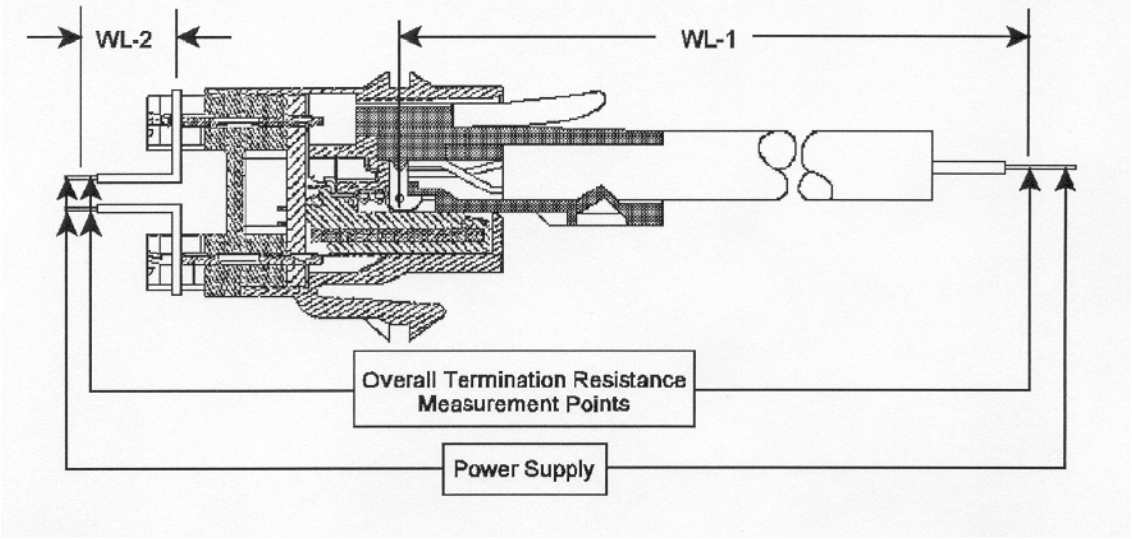

Figure 4
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of mated specimens. A test voltage of 100 volts DC was applied for 2 minutes before the resistance was measured.

3.4. Voltage Proof

A test potential of 1000 volts AC was applied between the adjacent contacts of mated specimens. This potential was applied for 1 minute and then returned to zero.

3.5. Vibration

The parameters of this test condition are a simple harmonic motion having an amplitude of either .0118 inch [0.3 mm] double amplitude (maximum total excursion) or 5 gravity unit (g's peak) whichever is less. The vibration frequency was varied logarithmically between the approximate limits of 10 to 500 Hz at a rate of 1 octave per minute. The test specimens were vibrated for 2 hours in each of 3 mutually perpendicular axes, so that the motion was applied for a total period of approximately 6 hours. Specimens were monitored for discontinuities of 10 microseconds or greater using an energizing current of 100 milliamperes.

3.6. Mechanical Shock

The parameters of this test condition are a half-sine waveform with an acceleration amplitude of 30 gravity units (g's peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular axes of the test specimen, for a total of 18 shocks. Specimens were monitored for discontinuities of 10 microseconds or greater using an energizing current of 100 milliamperes.

3.7. Insertion Force

The force required to mate individual specimens was measured using a tensile/compression device with the rate of travel at 0.3 inch per minute and a free floating fixture. The force was recorded when the coupling snapped into position.

3.8. Withdrawal Force

The locking coupling was manually released and the force required to unmate individual specimens was measured using a tensile/compression device with the rate of travel at 0.3 inch per minute and a free floating fixture.

3.9. Effectiveness of Coupling Device

A tensile load of 50 N was applied between the coupling and the plug body and held for 60 seconds.

3.10. Mechanical Operation

Specimens were manually mated and unmated a total of 750 times at a maximum speed of 10 mm per second, rested 5 seconds, and then unmated. One half of the cycles were performed after initial contact resistance and the remainder after flowing gas corrosion test.

3.11. Water Jet Spray

Testing was performed by Environ Laboratories.

3.12. Immersion

Testing was performed by Environ Laboratories.

3.13. Solid Foreign Objects

Testing was performed by Environ Laboratories.

3.14. Access to Hazardous Parts

Testing was performed by Environ Laboratories.

3.15. Rapid Change of Temperature

Mated specimens were subjected to 100 cycles of thermal shock with each cycle consisting of 30 minute dwells at -40 and 70˚C. The transition between temperatures was an average of 3 minutes.

3.16. Climatic Damp Heat

Mated specimens were exposed to 21 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 85˚C twice while maintaining high humidity. During 5 of the first 7 cycles, the specimens were exposed to a cold shock at -10˚C for 3 hours (Figure 5). Specimens 1 to 5 were mated, specimens 6 to 10 were unmated.

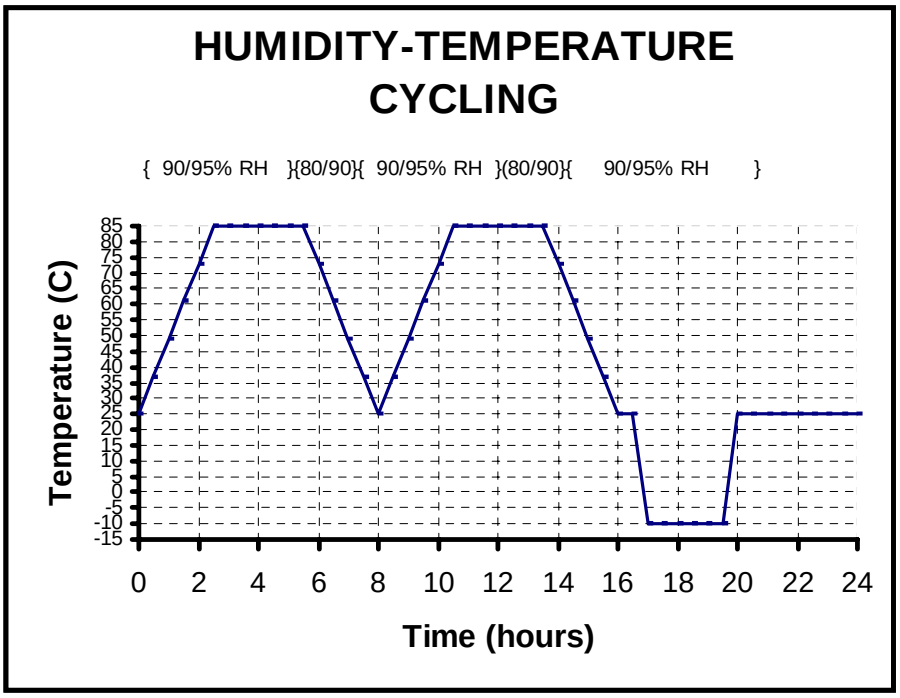

Figure 5
Typical Climatic Damp Heat Profile

3.17. Flowing Gas Corrosion Test

Specimens 1 through 5 were mated, specimens 6 through 10 were unmated. These specimens were exposed for 4 days to a mixed flowing gas per IEC 68-2-60, 1995-12, Method 2 exposure. Exposure is defined as a temperature of 30˚C and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb, NO_2 at 200 ppb, and H_2S at 10 ppb.

3.18. Electrical Load and Temperature

Specimens were exposed to an ambient temperature of 85 C for 500 hours. Specimens 1 through 5 were not energized, specimens 6 through 10 were energized with 0.5 ampere during exposure.

3.19 Prolonged Submersion

Testing was performed by Environ Laboratories.

3.20. Salt Spray

Mated specimens were subjected to a 5% salt spray environment for 500 hours. The temperature of the box was maintained at 95 +2/-3˚C, the pH of the salt solution was between 6.5 and 7.2.

3.21. Final Examination of Product

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.