CHAMP* 050 Series I .025 Inch Centerline Connector

1. INTRODUCTION

1.1. Purpose

Testing was performed on the CHAMP* 050 Series I .025 Inch Centerline Connector to determine its conformance to the requirements of Product Specification 108-1514 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the CHAMP 050 Series I .025 Inch Centerline Connector. Testing was performed at the Engineering Assurance Test Laboratory between 08Nov00 and 18Dec00. The test file number for this testing is CTL 0680-007. This documentation is on file at and available from the Engineering Assurance Test Laboratory.

1.3. Conclusion

The CHAMP 050 Series I .025 Inch Centerline Connector listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-1514 Revision A.

1.4. Product Description

The CHAMP 050 Series I .025 Inch Centerline Connector is used for 30 AWG solid or stranded ribbon cable applications.

1.5. Test Specimens

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	5	1-557089-2	CHAMP receptacle assembly with solid 30 AWG wire and PVC insulated cable PN 2-57013-1
	5	1-557089-2	CHAMP receptacle assembly with stranded 30 AWG wire and PVC insulated cable PN 2-57131-1
2	5	1-557089-2	CHAMP receptacle assembly with solid 30 AWG wire and TPO insulated cable PN 1-219054-1
3	5	1-557089-2	CHAMP receptacle assembly with solid 30 AWG wire and TPO insulated cable PN 1-219054-1
4	5	1-557089-2	Unterminated CHAMP receptacle assembly
5	5	1-557089-2	CHAMP receptacle assembly with solid 30 AWG wire and PVC insulated cable PN 2-57013-1
	5	1-557089-2	CHAMP receptacle assembly with solid 30 AWG wire and TPO insulated cable PN 1-219054-1
	5	1-557089-2	CHAMP receptacle assembly with stranded 30 AWG wire and PVC insulated cable PN 2-57131-1
	5	1-557089-2	CHAMP receptacle assembly with stranded 30 AWG wire and TPO insulated cable PN 3-219055-3

Figure 1

1.6. Environmental Conditions

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

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

* Trademark
I Indicates change

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)				
	1(b)	2(b)	3(b)	4(c)	5(b)
	Test Sequence (d)				
Initial examination of product	1	1	1	1	1
Low level contact resistance	3,7	2,4	2,4		2,5
Insulation resistance				2,6	
Withstanding voltage				3,7	
Vibration	5				
Mechanical shock	6				
Durability	4				
Mating force	2				
Unmating force	8				
Thermal shock				4	3
Humidity-temperature cycling				5	4
Temperature life		3(e)			
Mixed flowing gas			3(e)		
Final examination of product	9	5	5	8	6

NOTE
(a) See paragraph 1.5.
(b) Specimens for these test groups shall be mated and terminated.
(c) Specimens for this test group shall be unmated and unterminated.
(d) Numbers indicate sequence in which tests are performed.
(e) Precondition specimens with 10 durability cycles.

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product - All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance. Plating thickness measurements were taken in the center of the contact areas. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Low Level Contact Resistance - Test Groups 1, 2, 3 and 5

All low level contact resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 50 milliohms initially and had a change in resistance (ΔR) not exceeding ± 15 milliohms after testing.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	340	Initial (30 AWG solid wire with PVC insulation)	10.1055	11.5685	10.8049
	340	Final (ΔR) (30 AWG solid wire with PVC insulation)	-0.6795	0.8206	0.1280
	340	Initial (30 AWG stranded wire with PVC insulation)	10.1210	12.5415	10.7859
	340	Final (ΔR) (30 AWG stranded wire with PVC insulation)	-1.5185	2.2865	0.1322
2	340	Initial (30 AWG solid wire with TPO insulation)	10.0095	11.8250	10.8017
	340	Final (ΔR) (30 AWG solid wire with TPO insulation)	-0.2825	1.8195	0.5780
3	340	Initial (30 AWG solid wire with TPO insulation)	10.1805	12.2825	10.8146
	340	Final (ΔR) (30 AWG solid wire with TPO insulation)	-1.7840	2.6250	0.1892
5	340	Initial (30 AWG solid wire with PVC insulation)	10.1685	11.7035	10.8000
	340	Final (ΔR) (30 AWG solid wire with PVC insulation)	-0.4335	4.9070	0.2885
	340	Initial (30 AWG solid wire with TPO insulation)	10.0680	11.5065	10.8395
	340	Final (ΔR) (30 AWG solid wire with TPO insulation)	-0.3365	4.3175	0.2708
	340	Initial (30 AWG stranded wire with PVC insulation)	10.1660	12.4660	10.8378
	340	Final (ΔR) (30 AWG stranded wire with PVC insulation)	-0.2260	12.8746	0.4895
	340	Initial (30 AWG stranded wire with TPO insulation)	10.1340	11.9285	10.8162
	340	Final (ΔR) (30 AWG stranded wire with TPO insulation)	-0.2810	6.6595	0.7558

NOTE *All values in milliohms.*

Figure 3

2.3. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 1000 megohms.

2.4. Withstanding Voltage - Test Group 4

No dielectric breakdown or flashover occurred.

2.5. Vibration - Test Group 1

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

2.6. 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 specimens were visible.

2.7. Durability - Test Group 1

No physical damage occurred as a result of mating and unmating the specimens 500 times.

2.8. Mating Force - Test Group 1

All mating force measurements were less than 95 grams maximum average per contact position.

2.9. Unmating Force - Test Group 1

All unmating force measurements were greater than 15 grams minimum average per contact position.

2.10. Thermal Shock - Test Groups 4 and 5

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

2.11. Humidity-temperature Cycling - Test Groups 4 and 5

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

2.12. Temperature Life - Test Group 2

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

2.13. 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.

2.14. Final Examination of Product - All Test Groups

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

3. TEST METHODS

3.1. Initial Examination of Product

A Certificate 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 made using the same core manufacturing processes and technologies as production parts. As per Quality Specification 102-8, plating thickness measurements were taken in the center of the contact areas, as defined by the product drawing. Plating thickness measurements indicated the thickness to be within the greater of 50% or 5 microinches.

3.2. Low Level Contact Resistance

Low level contact resistance measurements 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.

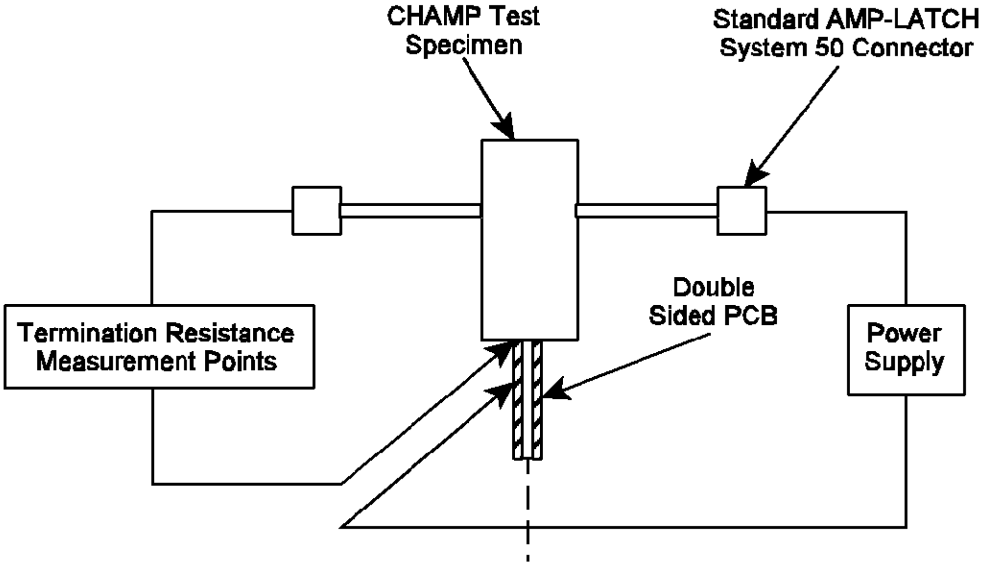

Figure 4
Low Level Contact Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of unmated and unterminated specimens. A test voltage of 500 volts DC was applied for either 2 minutes maximum or until meter stabilization occurred before the resistance was measured.

3.4. Withstanding Voltage

A test potential of 500 volts AC was applied between the adjacent contacts of unmated and unterminated specimens. This potential was applied for 1 minute and then returned to zero. The maximum leakage current allowed was 0.5 milliampere.

3.5. Vibration, Random

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 20 and 500 Hz. The spectrum was flat at 0.05 G^2/Hz from 20 to 500 Hz. The root-mean square amplitude of the excitation was 4.90 GRMS. This was performed for 15 minutes in each of 3 mutually perpendicular planes for a total vibration time of 45 minutes. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.6. Mechanical Shock, Half-sine

Mated specimens 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. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.7. Durability

Specimens were mated and unmated 500 times at a maximum rate of 600 cycles per hour.

3.8. Mating Force

The force required to mate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm [.5 in] per minute. The average force per contact was calculated.

3.9. Unmating Force

The force required to unmate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm [.5 in] per minute. The average force per contact was calculated.

3.10. Thermal Shock

Mated and unmated specimens were subjected to 5 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.

3.11. Humidity-temperature Cycling

Mated and unmated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while maintaining high humidity. During 5 of the first 9 cycles, the specimens were exposed to a cold shock of -10°C for 3 hours (Figure 5).

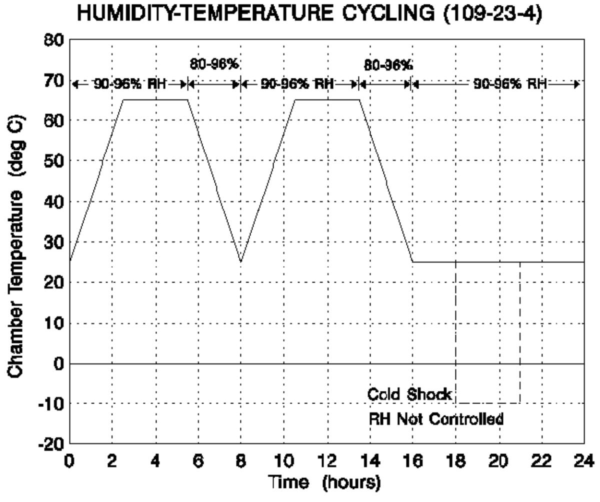

Figure 5
Humidity-Temperature Cycling Profile

3.12. Temperature Life

Mated specimens were exposed to a temperature of 105°C for 500 hours. Specimens were preconditioned with 10 cycles of durability.

3.13. Mixed Flowing Gas, Class IIA

Mated specimens were exposed for 14 days to a mixed flowing gas Class IIA exposure. Class IIA 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, H_2S at 10 ppb and SO_2 at 100 ppb. Specimens were preconditioned with 10 cycles of durability.

3.14. Final Examination of Product

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