Circular Plastic Connector With Type III+ Contacts

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* circular plastic connector with Type III+ contacts to determine its conformance to the requirements of AMP Design Objective 108-10024-2 Revision O1.

1.2. Scope

This report covers the electrical and mechanical performance of the circular plastic connector with Type III+ contacts. Testing was performed at the Americas Regional Laboratory under test numbers CTL5029-057-014 and CTL4993-017.

1.3. Conclusion

The circular plastic connector with Type III+ contacts listed in paragraph 1.5, conformed to the electrical and mechanical performance requirements of AMP Design Objective 108-10024-2 Revision O1 with exceptions of part numbers 66564-8 and 66563-8. Both sets of samples did not pass first piece inspection, gold plating was under print requirements.

1.4. Product Description

The circular plastic connector family is designed to provide reliable signal and power connections for electronic, electric power and control circuits. The connectors are available in sizes 11, 13, 17, and 23. The Type III+ contacts are available in size 20 (.040 inch pin diameter), size 18 (.056 inch pin diameter) and size 16 (.062 inch pin diameter) with a wire range of 30 to 14 AWG.

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
1,3	3 each	206150-1	Size 23 plug housing
1,3	3 each	206151-1	Size 23 receptacle housing
1,3	102 each	66564-8	Type III+ .062 pin contact crimped on 20 AWG wire
1,3	102 each	66563-8	Type III+ socket contact crimped on 20 AWG wire
2	1	211770-2	Size 23 plug housing
2	1	211771-1	Size 23 receptacle housing
2	57	1-66359-0	Type III+ .062 pin contact crimped on 14 AWG wire
2	57	1-66358-0	Type III+ .062 socket contact crimped on 14 AWG wire

Figure 1

* Trademark
I Indicates change

LOC B

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 Groups		
	1	2	3
	Test Sequence		
Initial examination of product	1	1	1
Dry circuit resistance	2,6		
Temperature rise vs current		2	
Contact retention			2
Vibration	4		
Mechanical shock	5		
Durability	3		
Final examination of product	7	3	3

NOTE *The numbers indicate sequence in which tests were performed.*

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product - All Test Groups

All samples submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance.

2.2. Termination Resistance - Test Group 1

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 4.0 milliohms after testing.

Test Group	Number of Data Points	Condition	Termination Resistance (ΔR)		
			Min	Max	Mean
1	30	After mechanical	-0.28	0.31	0.058

NOTE *All values in milliohms.*

Figure 3

2.3. 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 19.15 amperes and the correct derating factor value based on the samples wiring configuration.

2.4. Contact Retention - Test Group 3

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housings as a result of applying an axial load of 19 pounds to the contacts.

2.5. Vibration - Test Group 1

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

2.7. Durability - Test Group 1

No physical damage occurred to the samples as a result of mating and unmating the samples 100 times.

2.8. Final Examination of Product - All Test Groups

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

3. TEST METHODS

3.1. Initial Examination of Product

Samples provided for testing were inspected and accepted as conforming to all applicable product drawings, and made using the same core manufacturing processes and technologies as production parts.

3.2. Termination Resistance

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

3.3. 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.

3.4. Contact Retention

An increasing axial load was applied to each contact until the contact backed-out of the test cavity.

3.5. Vibration, Sinusoidal

Mated samples were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied logarithmically between the limits of 10 and 2,000 Hz and returned to 10 Hz in 20 minutes. This cycle was performed 12 times in each of 3 mutually perpendicular planes for a total vibration time of 12 hours. Samples were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.6. Mechanical Shock, Half-sine

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.

3.7. Durability

Samples were mated and unmated 100 times at a maximum rate of 600 cycles per hour.

3.8. Final Examination of Product

Samples were visually examined for evidence of physical damage detrimental to product performance.