AMP

QUALIFICATION TEST REPORT

CONNECTOR, COAXIAL
CONSUMER SERIES BNC, CRIMP TYPE

501-273 Rev. O

Product Specification:	108-1435 Rev O
CTL No.:	CTL3696-002
Date:	September 13, 1994
Classification:	Unrestricted
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Corporate Test Laboratory Harrisburg, Pennsylvania

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(R3696ts)

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMP* Consumer Series BNC, Crimp Type Connectors to determine its conformance to the requirements of AMP Product Specification 108-1435 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Consumer Series BNC, Crimp Type Connector manufactured by the Signal Transmission Products Division. The testing was performed between July 27, 1994 and September 12, 1994.

1.3 Conclusion

The Consumer Series BNC, Crimp Type Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1435 Rev. O.

* Trademark

1.4 Product Description

The Consumer series , Crimp type BNC coaxial connector is designed to mate with standard BNC connectors. It has a 50 ohm impedance with a frequency limit of 2 GHz. The center contact is either beryllium copper, phosphor bronze, or brass, gold over nickel plating.

1.5 Test Samples

The test samples were randomly selected from normal current production lots, and the following part numbers were used for test:

Test Group	Quantity	Part Nbr	Description
1,2,3,4,5,6	18	414650-1	BNC Plug on RG-58/U cable
1,2,3,4,5,6	18	228979-5	BNC Jack on RG-58/U cable

1.6 Qualification Test Sequence

	Test Groups					
Test or Examination	1	2	3	4	5	6
Examination of Product	1,13	1,5	1,5	1,8	1,5	1,4
Termination Resistance, Dry Circuit	4,8	2,4	2,4			
Dielectric Withstanding Voltage				3,7		
Insulation Resistance				2,6		
RF High Potential						3
Shielding Effectiveness					3	
RF Insertion Loss					2	
VSWR					4	
Corona						2
Vibration	6					
Physical Shock	7					
Mating Force	2,9					
Unmating Force	3,10					
Cable Retention	11					
Coupling Nut Retention, Rotational	12					
Durability	5					
Thermal Shock				4		
Humidity-Temperature Cycling				5		
Mixed Flowing Gas			3			
Temperature Life		3				

The numbers indicate sequence in which tests were performed.

2. Summary of Testing

2.1 Examination of Product - All Groups

All samples submitted for testing were selected from normal current production lots. They were inspected and accepted by the Product Assurance Department of the Signal Transmission Products Division.

2.2 Termination Resistance, Dry Circuit - Groups 1,2,3

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage has a maximum increase in resistance (ΔR) of less than 3.0 milliohms for the center contact and 5.0 milliohms for the outer contact.

Test Group	Nbr of Samples	Condition	Min	Max	Mean
		Center Contact			
1	3	After Mechanical	+0.05	+0.11	+0.071
2	3	After Temp Life	+0.03	+0.06	+0.046
3	3	After Gas Exposure	-0.04	0.00	-0.021
		Outer Contact			
1	3	After Mechanical	+1.05	+1.48	+1.305
2	3	After Temp Life	+0.95	+2.38	+1.456
3	3	After Gas Exposure	-0.55	+0.40	-0.493

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred when a test voltage of 1,500 vac was applied between the outer braid and inner contacts.

2.4 Insulation Resistance - Group 4

All insulation resistance measurements were greater than 5,000 megohms.

2.5 RF Hi Pot - Group 6

There was no breakdown or flashover between center and outer contact when a test voltage of 1,000 vac 5.0 MHz was applied for one minute.

2.6 Shielding Effectiveness - Group 5

When tested through the frequency range of 50 to 2000 MHz, radiation was reduced a minimum of 40dB up to 1500 MHz and a minimum of 35dB up to 2000 MHz.

2.7 RF Insertion Loss - Group 5

All insertion loss results were less than 0.5 dB.

2.8 Voltage Standing Wave Ratio - Group 5

All voltage standing wave ratio measurements were less than the specification requirement of 1.3.

2.9 Corona/Altitude - Group 6

There was no corona discharge greater than 5 picocoulombs at or below a potential of 300 volts DC at an altitude of 70,000 feet.

2.10 Vibration - Group 1

No discontinuities of the contacts were detected during vibration. Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.11 Physical Shock - Group 1

No discontinuities of the contacts were detected during physical shock. Following physical shock testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.12 Mating Force/Torque - Group 1

All mating force measurements were less than 6 pounds.
All mating torque measurements were less than 6 inch pounds.

2.13 Unmating Force - Group 1

All unmating force measurements were less than 6 pounds.
All unmating torque measurements were less than 6 inch pounds.

2.14 Cable Retention - Group 1

There was no loss of electrical continuity or physical damage as a result of applying a 40 pound tensile load to the cable for 30 seconds.

2.15 Coupling Nut Retention, Rotational - Group 1

The coupling nut did not loosen or dislodge from the plug body as a result of applying a tensile load of 20 pounds between the coupling nut and plug body and during collar rotation..

2.16 Durability - Group 1

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

2.17 Thermal Shock - Group 4

No evidence of physical damage to either the contacts or the connector was visible as a result of thermal shock.

2.18 Humidity-Temperature Cycling - Group 4

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to humidity-temperature cycling.

2.19 Mixed Flowing Gas - Group 3

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

2.20 Temperature Life - Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to an elevated temperature.

3. Test Methods

3.1 Examination of Product

Product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

3.2 Termination Resistance, Low Level

Termination resistance measurements at low level current were made using a four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes DC with an open circuit voltage of 50 millivolts DC.

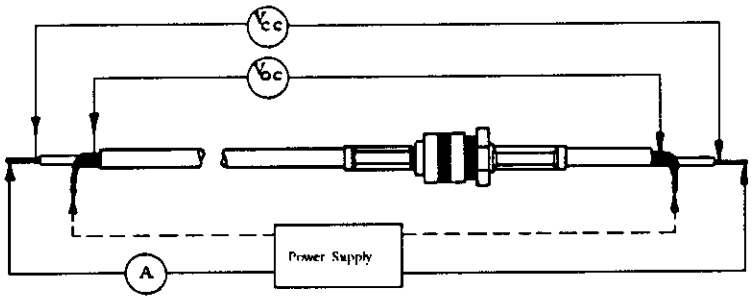

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 1,500 vac was applied between the outer and inner contacts. This potential was applied for one minute and then returned to zero.

3.4 Insulation Resistance

Insulation resistance was measured between the outer and inner contacts, using a test voltage of 500 volts DC. This voltage was applied for two minutes before the resistance was measured. Measurements were made within 5 minutes after removal from the chamber.

3.5 RF High Potential

An RF test potential of 1,000 volts @ 5.0 Megahertz was applied between center contact with outer contact of the unmated connectors. This potential was applied for one minute and then returned to zero.

3.6 Shielding Effectiveness

The radiated response from unshielded cable while conductors were excited between 50 and 2000 MHz, was measured. The procedure was repeated, using jacks and plugs terminated to shielded cable. The difference in response is the shielding effectiveness in dB.

3.7 Insertion Loss

A full Two-Port Calibration was performed on a network analyzer and the insertion loss, S_{21}, of the sample was measured.

3.8 Voltage Standing Wave Ratio

VSWR was measured on mated samples using an HP8510B network analyzer. The sweep range was 0.1 to 2.0 GHz.

3.9 Corona/Altitude

A test voltage of 300 v(rms) at a 5 picocoulombs maximum discharge was applied between the center contact and outer contact of the mated connectors. This test voltage was applied with a simulated altitude of 70,000 feet.

3.10 Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied uniformally between the limits of 10 and 55 Hz and returned to 10 Hz in 1 minutes. This cycle was performed 120 times in each of three mutually perpendicular planes, for a total vibration time of 6 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.11 Physical Shock

Mated connectors were subjected to a physical 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 three mutually perpendicular planes, for a total of 18 shocks. The connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.12 Mating Force

The force/torque required to fully mate individual connectors was measured, using a free floating fixture.

3.13 Unmating Force

The force/torque required to unmate individual connectors was measured using a free floating fixture.

3.14 Cable Retention

A tensile load of pounds was applied between the connector and cable for 30 seconds; during this hold period the connectors were monitored for discontinuities.

3.15 Coupling Nut Retention, Rotational

A tensile load of 20 pounds was applied between the coupling nut and the plug body. During the hold the coupling nut was rotated 720° in both directions

3.16 Durability

Connectors were mated and unmated 100 times at a rate not exceeding 12 per minute.

3.17 Thermal Shock

Mated connectors were subjected to 5 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55°C and 85°C. The transition between temperatures was less than one minute.

3.18 Humidity-Temperature Cycling

Mated connectors 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 the relative humidity was held at 95%. During five of the first nine cycles, the connectors were exposed to a cold shock at -10°C for 3 hours.

3.19 Mixed Flowing Gas, Class II

Mated connectors were exposed for 14 days to a mixed flowing gas Class II exposure. Class II exposure is defined as a temperature of 30°C and a relative humidity of 70% with the pollutants of $C1_2$ at 10 ppb, NO_2 at 200 ppb, and H_2S at 10 ppb. Samples were preconditioned with 5 cycles of durability.

3.20 Temperature Life

Mated samples were exposed to a temperature of 85°C for 1,000 hours.

4. Validation

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9/13/94

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