AMP

QUALIFICATION TEST REPORT

AMP* AMPOWER* TERMINALS
Per MIL-T-7928

501-40 Rev. 0

Product Specification:	MIL-T-7928
CTL No.:	CTL3050-021
Date:	October 15, 1986
Classification:	Unrestricted
Distribution:	14

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Table of Contents

AMP

AMP INCORPORATED

HARRISBURG, PENNSYLVANIA 17105 PHONE: 717-564-0100 TWX: 510-657-4110

CORPORATE TEST LABORATORY

Qualification Retention Test
AMP AMPOWER Terminals per MIL-T-7928,
Group C (Class 2)

1. Introduction

1.1 Purpose

Testing was conducted to determine that AMP AMPOWER Terminals continue to comply with the Group C Inspection requirements of MIL-T-7928, paragraph 4.6.4.2.

1.2 Scope

This report covers electrical and mechanical performance of these terminals, made by the Wiring Products Division of the General Products Group. Terminals, representative of current production, were subjected to inspection and were accepted by the Product Assurance Department of the division. They were submitted to the laboratory on April 22, 1986, and Aug. 15, 1986. Testing was performed between June 18, 1986 and Sept. 4, 1986.

1.3 Conclusions

All samples met the Group C periodic inspection requirements specified in MIL-T-7928 for Class 2 terminals.

1.4 Product Description

AMP AMPOWER terminals consist of a tin plated copper body. AMP Class 2 crimping tools produce crimps for a given size wire and terminal that are precisely alike in appearance and performance.

1.5 Test Samples

The following terminals were subjected to the Group C Inspection test sequence of MIL-T-7928:

AMP Part No.	Military Part No.	Description	
		Wire Range	Stud Size
328142	M20659-109	6	1/4"
328164	M20659-112	4	3/8"
325201	M20659-113	2	1/4"
325301	M20659-117	1/0	1/4"
325402	M20659-119	2/0	5/16"
325503	M20659-121	3/0	3/8"
325605	M20659-124	4/0	1/2"

These terminals are typical of the product line from wire sizes 6 through 4/0 AWG. Other catalog numbers represent variations of the tongues and bolt hole sizes.

Class 2 hydraulic crimping tools used to prepare test samples were Cat. #69099 hydraulic head and the following dies that fit it:

Wire Size	Die Catalog Number
6	69133-1
4	69134-2
2	46765-3
1/0	46766-2
2/0	46767-2
3/0	46749-2
4/0	46750-2

1.6 Test Sequence as specified in MIL-T-7928

Samples were subjected to the test sequence listed below:

Inspection	Requirement Paragraph	Method Paragraph
Group I		
Current Cycling	3.5.2	4.7.3
Voltage Drop	3.5.1	4.7.2
Group II		
Vibration	3.5.6	4.7.7
Voltage Drop	3.5.1	4.7.2
Tensile Strength	3.5.7	4.7.8
Group III		
Immersion (105°C Rating)	Not Applicable	
Dielectric Withstanding Voltage	Not Applicable	
Group IV		
Flammability	Not Applicable	
Group V		
Salt Spray (corrosion)	3.5.4	4.7.5
Voltage Drop	3.5.1	4.7.2
Tensile Strength	3.5.7	4.7.8
Group VI		
Heat Aging (175°C Rating)	3.5.9.1	4.7.10.3
Salt Spray (corrosion)	3.5.4	4.7.5
Voltage Drop	3.5.1	4.7.2
Tensile Strength	3.5.7	4.7.8
Group VII		
Low Temperature Crimp	Not Applicable	
Dielectric Withstanding Voltage	Not Applicable	
Group VIII		
Axial Load	Not applicable	
Dielectric Withstanding Voltage	Not Applicable	

2. Summary of Test Results

2.1 Group I

Four samples of each terminal, crimped on wire, were subjected to current cycling. After 50 current cycles at the specified currents, all samples met the voltage drop requirement.

Test Methods:

Four samples of each size terminal, crimped on the wire size for which they were designed, were current cycled. Samples were attached to 3-foot lengths of wire. One cycle consisted of 30 minutes of current "on" time, followed by 15 minutes of current "off" time.

Following current cycling, voltage drop measurements were taken at the test current specified. The measurements were taken after the temperature of the conductors had stabilized. The average voltage drop reported has had an equal length of wire measurement deducted from the measured values.

Test Results:

Voltage Drop:

Wire Size	Average Voltage Drop Difference	Required Voltage Drop Difference	DC Test Current	DC Cycling Current
6	-0.717 mv.	+3.0 mv.	101 a.	126 a.
4	-0.255 mv.	+3.0 mv.	135 a.	169 a.
2	0.141 mv.	+3.0 mv.	181 a.	226 a.
1/0	0.737 mv.	+4.0 mv.	245 a.	306 a.
2/0	0.478 mv.	+4.0 mv.	283 a.	354 a.
3/0	0.489 mv.	+4.0 mv.	328 a.	410 a.
4/0	0.287 mv	+4.0 mv.	380 a.	475 a.

2.2 Group II

Four samples of each terminal, crimped on wire, were vibrated for 18 hours in two mutually perpendicular planes, then were measured for termination resistance. This was followed by tensile testing. All samples passed the vibration, termination resistance and tensile requirements of the specification.

Test Methods:

Four samples of each size terminal, crimped on the wire size for which they were designed, were rigidly mounted to the vibration fixture by their normal mounting means. The other end was mounted to a stable support 12 inches back from the vibration table, with all slack removed. The terminals were vibrated in accordance with MIL-STD-202, Method 201 for 18 hours in each of two mutually perpendicular axes. Following vibration, the terminals were measured for voltage drop as described in Para. 2.1 above, after which the terminals were pulled to destruction, using a head speed of 1 inch per minute.

Test Results:

Voltage Drop:

Wire Size	Average Voltage Drop Difference	Required Voltage Drop Difference	DC Test Current
6	-0.528 mv.	+3.0 mv.	101 a.
4	-0.200 mv.	+3.0 mv	135 a.
2	0.123 mv.	+3.0 mv	181 a.
1/0	0.684 mv.	+4.0 mv.	245 a.
2/0	0.483 mv.	+4.0 mv	283 a.
3/0	0.807 mv	+4.0 mv.	328 a.
4/0	0.622 mv	+4.0 mv	380 a.

Tensile Strength:

Wire Size	Maximum Force (lbs.)	Minimum Force (lbs.)	Required Force (lbs.)
6	>433	399	300
4	>586	572	400
2	>795	770	550
1/0	>955	900	700
2/0	>1225	1220	750
3/0	>1585	1475	825
4/0	>2270	1745	875

2.3 Group III

This requirement is not applicable to uninsulated terminals.

2.4 Group IV

This requirement is not applicable to uninsulated terminals.

2.5 Group V

Four samples of each terminal, crimped on wire, were exposed to a 5% salt spray for 48 hours. Then the samples were measured for voltage drop and tensile tested. All samples passed the termination resistance and tensile requirements of the specification.

Test Methods:

Four samples of each size terminal, crimped on the wire size for which they were designed, were exposed to 48 hours of 5% salt spray in accordance with MIL-STD-202, Method 101, condition B. Then they were rinsed in distilled water and air dried for a minimum of one hour. They were measured for voltage drop as described in Para. 2.1, and pulled to destruction as described in Para 2.2.

Test Results:

Voltage Drop:

Wire Size	Average Voltage Drop Difference	Required Voltage Drop Difference	DC Test Current
6	-0.703 mv.	+3.0 mv.	101 a.
4	-0.259 mv.	+3.0 mv.	135 a.
2	0.012 mv.	+3.0 mv.	181 a.
1/0	0.687 mv.	+4.0 mv.	245 a.
2/0	0.350 mv.	+4.0 mv.	283 a.
3/0	0.488 mv	+4.0 mv.	328 a.
4/0	0.610 mv.	+4.0 mv.	380 a.

2.5 Group V (continued)

Tensile Strength:

Wire Size	Maximum Force (lbs.)	Minimum Force (lbs.)	Required Force (lbs.)
6	>465	447	300
4	>584	573	400
2	>906	865	550
1/0	>1020	930	700
2/0	>1460	1340	750
3/0	>1825	1800	825
4/0	>2150	2110	875

2.6 Group VI

Four samples of each terminal, crimped on wire, were conditioned at 193°C for 120 hours. The cooled samples were subjected to the Salt Spray (corrosion) requirement. Then the samples were measured for voltage drop and tensile tested. All samples passed the voltage drop and tensile requirements of the specification.

Test Methods:

Four samples of each size terminal, crimped on the wire size for which they were designed, were placed in a circulating air oven at 193°C for 120 hours. After cooling to room temperature, they were exposed to the salt spray test described in Para. 2.5, then measured for voltage drop as described in Para. 2.1, and pulled to destruction as described in Para. 2.2.

Test Results:

Voltage Drop:

Wire Size	Average Voltage Drop Difference	Required Voltage Drop Difference	DC Test Current
6	-0.685 mv.	+3.0 mv.	101 a.
4	-0.155 mv.	+3.0 mv.	135 a.
2	-0.091 mv.	+3.0 mv.	181 a.
1/0	0.484 mv.	+4.0 mv.	245 a.
2/0	0.368 mv.	+4.0 mv.	283 a.
3/0	0.546 mv.	+4.0 mv.	328 a.
4/0	0.677 mv.	+4.0 mv.	380 a.

2.6 Group VI (continued)

Tensile Strength:

Wire Size	Maximum Force (lbs.)	Minimum Force (lbs.)	Required Force (lbs.)
6	480	435	300
4	>480	460	400
2	>980	963	550
1/0	>1130	>1010	700
2/0	1400	1110	750
3/0	>1690	>1630	825
4/0	2150	1900	875

2.7 Group VII

This requirement is not applicable to uninsulated terminals.

2.8 Group VIII

This requirement is not applicable to uninsulated terminals.

3. Test Equipment Calibration

3.1 Calibrated Equipment

Calibrated test equipment used for this program is on a periodic calibration schedule which complies with MIL-STD-45662. Calibration of test equipment is performed by AMP Corporate Metrology, with standards that are traceable to the National Bureau of Standards.

3.2 Uncalibrated Equipment

Uncalibrated equipment (ovens, chambers, power supplies and the like) used for this program was monitored with calibrated equipment.

4. Validation

Report prepared by:

J. J. Edwards — 10/15/86
Supervisor
Design Assurance Testing
Corporate Test Laboratory

Report reviewed by

James R. Kohout — 10/15/86
Manager
Product Testing Section
Corporate Test Laboratory

Report approved by:

Robert J. Osif — 10/17/86
Manager
Product Assurance
Wiring Products Division