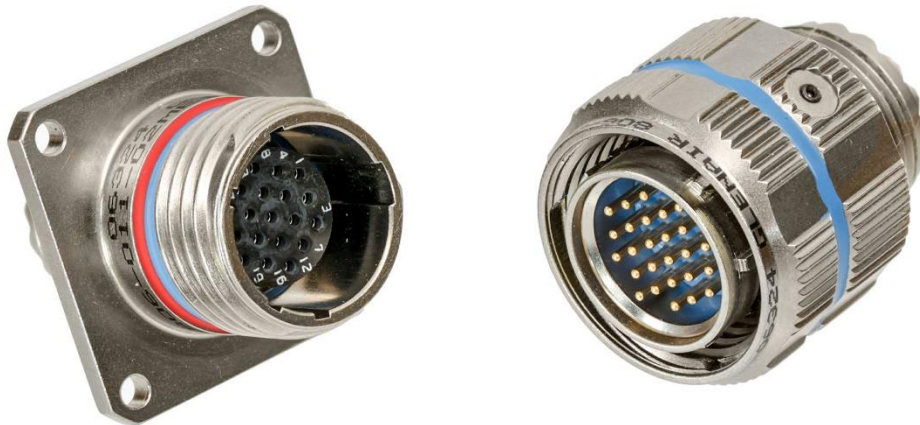




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**QUALIFICATION TEST REPORT ABSTRACT FOR
SERIES 806 MIL-AERO
MICRO MINATURE CIRCULAR CONNECTOR**

REPORT NO. GT-16-83 ABSTRACT



PREPARED BY: _____

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DATE: 12/2/2021

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1 INTRODUCTION

1.1 Purpose

Testing was performed on Glenair Series 806 connectors to determine its conformance to the requirements of Product Specification 806-014.

1.2 Scope

This report summarizes electrical, mechanical, and environmental performance testing of Glenair Series 806 connectors. The information in this report was obtained from tests conducted by Environmental Associates, Santa Ana, California, and DNB Engineering, Fullerton, California. These documents are on file at Glenair, Glendale California and are available upon request.

Testing Agency	Location	Date	Test Report Title	Test Report Number
Environment Associates	Santa Ana, CA	May 18, 2016	Qualification Test Report for the Connector, Plug, Threaded Accessory Part Number: 806-012 and Connector, Receptacle, Threaded Accessory: Part Number: 806-013	OC25972-1118644
DNB Engineering, Inc.	Fullerton, CA	January 26, 2016	Shielding Effectiveness Test report for the 806 Series Connectors	TR043584
DNB Engineering, Inc.	Fullerton, CA	February 2, 2016	Lightning Indirect Effects Test report for the Series 806 Connectors	TR043584(A)

1.3 Conclusion

The Series 806 connectors have been shown to be capable of meeting the requirements of Glenair Product Specification 806-014.



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1.4 Product Description

The Series 806 connector is a multi-pin ultraminiature circular electrical connector intended for application in hostile environments subject to high vibration, high temperature, and moisture. The Series 806 is designed to meet the requirements of MIL-DTL-38999 Series III, with the following design enhancements: higher density contact arrangements (size 20HD and 22HD) for reduced size and weight, improved voltage ratings, new shallow ramp triple-start ACME mating thread for improved vibration resistance, and a radial peripheral seal O-ring.

1.5 Test Specimens

TEST NO.	OC25972-1118644						TR043584
TESTING AGENCY	ENVIRONMENTAL ASSOCIATES						DNB ENGINEERING
PART NUMBER	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	
806-012-ME8-7PMA	11	2	1	6	1	1	1
806-013-ME8-7SMTA	11	2	1	6	1	1	1
806-012-ME8-3PMA	11		1				
806-013-ME8-3SMTA	11		1				
850-094-1	5						
850-095-1	5						
809-204	5						
809-205	5						
806-012-ME11-19PMA		2	1	6	1	1	1
806-013-ME11-19SMTA		2	1	6	1	1	1
806-012-ME12-26PMA		2	1	6	1	1	1
806-013-ME12-26SMTA		2	1	6	1	1	1
806-011-DOME8-7SA							1
806-010-G6ME8-7PA							1
806-011-02ME11-19SA							1
806-010-G6ME11-19PA							1
806-011-02ME12-26SA							1
806-010-02ME12-26PA							1

1.6 Inspection Conditions

All tests were performed with the test specimens at standard laboratory conditions as defined below unless otherwise required by the procedure.

1. Temperature between 15° C. and 35° C.
2. Relative humidity between 20% and 90%.
3. Barometric pressure between 700 mm and 800 mm of mercury absolute.



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1.7 Qualification Test Summary

Product Spec 806-014 Para.	TEST NO.	OC25972-1118644 Environmental Associates					
	TEST	Test Group Sequence					
		1	2	3	4	5	6
4.1	Dielectric Withstanding voltage	3		3	9		
4.2	Insulation resistance at ambient temperature	1		2	8		
4.3	Insulation resistance at elevated temperature	2					
4.4	Contact resistance at 25 °C	4					
4.5	Contact resistance at 200 °C						
4.6	Low level contact resistance	5					
4.7	Shell-to-shell conductivity				6	2	
4.8	Backshell shield braid to shell conductivity						1
4.9	Indirect lightning strike ⁽¹⁾						2
4.10	EMI shielding ⁽¹⁾					3	
5.2	Durability					1	
5.3	Coupling and uncoupling torque				3		
5.4	Insert retention		3				
5.5	External bend moment			4			
5.6	Contact retention		1				
5.7	Magnetic permeability						
5.8	Contact engaging/separation force	6					
6.1	Temperature cycling				1		
6.2	Random vibration, elevated temp, 43 g rms				4		
6.3	Random vibration, ambient temp, 49g rms				4		
6.4	Sine vibration, 60 g rms				4		
6.5	Mechanical shock, 300 g				5		
6.6	High impact shock (901)		2				
6.7	Humidity, cyclic				7		
6.8	Ozone exposure	Qualification by similarity. See Section 2					
6.9	Fluid immersion						
6.10	Altitude immersion						
6.11	Altitude – low temperature				2		
6.12	Outgassing	Qualification by similarity. See Section 2					
(1) Indirect lightning and EMI shielding tests performed by DNB Engineering, Inc. Fullerton, CA. Test report number TR043584							



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2 **QUALIFICATIONS BY SIMILARITY**

The Series 806 QTP did not include ozone exposure, fluid immersion or thermal vacuum outgassing. These requirements are considered to be qualified by similarity to Glenair Series 23 MIL-DTL-38999 Series III. Ozone exposure, fluid immersion and outgassing properties are dependent on the plastic, elastomeric and bonding materials used in the connector. Series 806 materials are identical to the materials used in MIL-DTL-38999 qualified products which have successfully met these requirements.

Product Spec 806-014 Para.	TEST	Qualification by Similarity Data
6.8	Ozone exposure	Testing facility: NTS Date: July 1, 2014 Report No.: PR030637 Ref: Environmental Associates report no. OC24719-0117617
6.9	Fluid immersion	Testing facility: Environmental Associates Date: September 11, 2014 Report No. OC24719-0117617
6.12	Thermal vacuum outgassing	Testing facility: Pacific Testing Laboratories Date: April 25, 2014 P.O. No. A140957 Ref.: Environmental Associates report no. OC24719-0117617

3 **SUMMARY OF QUALIFICATION TESTING**

3.1 **Initial Examination of Product**

All specimens submitted for testing were representative of standard production lots. All specimens were accepted by Glenair Quality Assurance prior to submittal to testing.

3.1.1 **Dielectric Withstanding Voltage at Sea Level**

Test Method

MIL-DTL-38999M Para. 4.5.11.1

EIA-364-20

AC rms, 60 Hz

Unmated connectors

Requirement

No breakdown or flashover, 2 mA maximum leakage current

1800 volts size 20HD contact arrangements

1000 volts size 22HD contact arrangements

Results

PASS. All specimens met the requirement.

3.1.2 **Dielectric Withstanding Voltage at Altitude**

Test Method

MIL-DTL-38999M Para. 4.5.11.2

EIA-364-20

AC rms, 60 Hz



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Mated connectors

Requirement

No breakdown or flashover, 2 mA maximum leakage current

<u>Altitude (feet)</u>	<u>Voltage</u>
50,000	20HD 1000
50,000	22HD 800
70,000	20HD 1000
70,000	22HD 800
100,000	20HD 1000
100,000	22HD 800

Results

PASS. All specimens met the requirement.

3.1.3 **Insulation Resistance at Ambient Temperature**

Test Method

MIL-DTL-38999M Para. 4.5.10.1

EIA-364-21

500 VDC

Requirement

5000 megohms minimum

Results

PASS. All specimens met the requirement.

3.1.4 **Insulation Resistance at Elevated Temperature**

Test Method

MIL-DTL-38999M Para. 4.5.10.2

EIA-364-21

500 VDC

Requirement

1000 megohms minimum

Results

PASS. All specimens met the requirement.

3.1.5 **Contact Resistance at 25 °C**

Test Method

MIL-DTL-38999M Para. 4.7.5

EIA-364-06

Requirement

AS39029 Table 6 Type A, nickel-plated wire

#26 AWG, 2.0A test current, 80 millivolts maximum voltage drop

Results

PASS. All specimens met the requirement. Maximum measured millivolt drop 46.8 (#22HD) and 44.8 (#20HD).

3.1.6 **Contact Resistance at 200 °C**

Not tested

3.1.7 **Low Level Contact Resistance**

Test Method

AS39029C Para. 4.7.4



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Requirement

AS39029 Table 4 Type A, nickel-plated wire

#26 AWG, 100 milliohms test current, 31 milliohms maximum resistance

Results

PASS. All specimens met the requirement. Maximum measured resistance 23.15 ohms (#22HD) and 22.16 ohms (#20HD).

3.1.8 Shell-to-Shell Conductivity

Test Method

MIL-DTL-38999M Para. 4.5.25

EIA-364-83

Requirement

1 mV maximum voltage drop at 1A test current, 2 mV maximum following conditioning

Electroless nickel plated connectors

Results

PASS. All specimens met the requirement. In Group 4, 18 mated pairs were tested with an average of .232 mV and a maximum of .280 mV. In Group 5, three mated pairs were tested following 500 mate/de-mate cycles. The measured voltage drops were .638, .334 and .303 mV.

3.1.9 Backshell Shield Braid to Shell Conductivity

Test Method

MIL-DTL-38999M Para. 4.5.25

EIA-364-83

Requirement

3.0 mV maximum drop with 1A test current

Electroless nickel plated connectors

Results

PASS. All specimens met the requirement. Three mated pairs were tested, with 2.5, 1.8 and 1.7 millivolts measured voltage drop.

3.1.10 Indirect Lightning Strike

Test Method

MIL-DTL-38999M Para. 4.5.47

EIA-364-75 Type B Level 2

Requirement

10,000A applied 3 times in positive and negative polarities. No evidence of damage which could impair proper functioning.

Results

PASS. Three mated pairs were tested, shell sizes 8, 11 and 12. All specimens were intact and showed no signs of damage after indirect lightning tests.



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3.1.11 EMI Shielding

Test Method

MIL-DTL-38999M Para. 4.5.28

Requirement

Minimum leakage attenuation shall meet MIL-DTL-38999M Table X, Class F

Results

PASS. Three mated pairs were tested, shell sizes 8, 11 and 12. All specimens met the EMI shielding requirement.

EMI Shielding Test Results				
Frequency MHz	Leakage Attenuation, (dB) minimum			
	Requirement	Shell Size		
		8	11	12
100	90	97.55	105.10	93.03
200	88	95.23	101.07	92.63
300	88	93.58	98.05	91.78
400	87	92.22	96.52	90.51
800	85	92.72	95.62	88.44
1,000	85	92.67	96.20	89.85
1,500	76	96.30	86.75	101.45
2,000	70	98.43	85.34	102.04
3,000	69	94.32	83.00	91.27
4,000	68	92.45	79.89	88.59
6,000	66	92.18	81.55	73.79
10,000	65	72.26	68.36	72.45

3.1.12 Durability

Test Method

MIL-DTL-38999M Para. 4.5.8

EIA-364-09

Requirement

500 cycles of mating and unmating.

No evidence of damage which could impair proper functioning.

Results

PASS. Three mated pairs, shell sizes 8, 11 and 12 showed no defects detrimental to their operation upon completion of 500 cycles.

3.1.13 Coupling and Uncoupling Torque

Test Method

MIL-DTL-38999M Para. 4.5.7

EIA-364-114

Requirement

Maximum engagement force and minimum disengagement force shall meet Series 806 Product Specification 806-014 Para. 5.3 requirements.

Results

PASS. All specimens had coupling and uncoupling torque within the specified requirements. Six mated pairs were tested of each of three shell sizes: 8, 11 and 12.



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3.1.14 Insert Retention

Test Method

MIL-DTL-38999M Para. 4.5.12

EIA-364-35

Requirement

No evidence of cracking, breaking, separation from the shell, or loosening of parts when a pressure of 100 ±5 pounds per square inch is applied in both directions (alternative minimum force 25 pounds).

Results

PASS. No test samples showed evidence of damage. Test samples included contact arrangements 8-7, 11-19, and 12-26. Two plugs and two receptacles of each contact arrangement were tested. A 25 pound pressure was used for the 8-7 and 11-19 arrangements.

3.1.15 External Bend Moment

Test Method

MIL-DTL-38999M Para. 4.5.16

Requirement

No evidence of damage detrimental to normal operation and no interruption of electrical continuity when subjected to the bend moment force of Product Specification 806-014 Para. 5.5.

Results

PASS. All specimens met the requirement. One mated pair of each shell size was tested. The load was further increased until failure and the force was recorded.

Bend Moment Test Data				
Shell Size	Requirement Pound inches	Calculated Load (lbs.)	Load at Failure (lbs.)	Mode of Failure
8	100	67	225	Plug accessory thread barrel broke inside of coupling nut.
11	100	214	350	Receptacle flange distorted.
12	100	267	440	Receptacle flange distorted.

3.1.16 Contact Retention

Test Method

MIL-DTL-38999M Para. 4.5.20.1

EIA-364-29

Requirement

10 pounds axial load, no damage to contacts or inserts, .012 inch maximum displacement.

Results

PASS. All samples met the requirement. Two pin connectors and two socket connectors of each of three contact arrangements were tested: 8-7, 11-19 and 12-26.

Contact Retention Test Data			
Contact Arrangement	Requirement (lbs.)	Contacts Tested	Maximum Measured Displacement (inches)
8-7	10	1, 3, 5	.003
11-19	10	1, 5, 9, 15	.002
12-26	10	1, 6, 12, 16, 20, 26	.003



3.1.17 Magnetic Permeability

Test Method

MIL-DTL-38999M Para. 4.5.48

EIA-364-54

Requirement

Less than 2 μ

Results

NOT TESTED

3.1.18 Contact Engaging/Separation Force

Test Method

SAE AS39029C Para. 4.7.6

EIA-364-37

Requirement

Contact forces shall meet AS39029C Table 9 requirements.

Results

PASS. All specimens met the requirement. Five samples of each size were tested.

Contact Separation Force Test Data		
Contact Size	Minimum Sep Force (ounces)	Measurements (ounces)
20HD	0.7	2.2, 2.4, 4.5, 2.4, 3.0
22HD	0.7	1.4, 2.0, 2.2, 2.4, 1.6
Contact Engaging Force Test Data		
Contact Size	Maximum Engagement Force (ounces)	Measurements (ounces)
20HD	18	6.6, 7.6, 9.6, 6.8, 7.4
22HD	12	7.6, 7.4, 6.4, 6.2, 6.2

3.1.19 Temperature Cycling

Test Method

MIL-DTL-38999M Para. 4.5.4

EIA-364-32

Requirement

No signs of damage detrimental to connector operation after 5 cycles of temperature cycling.

Temperature extremes -65°C and +200°C.

One hour dwell time at each extreme.

Results

PASS. No specimens showed signs of damage.

3.1.20 Random Vibration, Elevated Temperature

Test Method

MIL-DTL-38999M Para. 4.5.23.3

Requirement

43.9 Grms

+200°C.



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No discontinuities of 1 microsecond or longer, no resonance at frequencies less than 300 Hz.

Results

PASS. All specimens met the requirements of the test. Testing was stopped to repair broken accessory cable clamps and a broken wire outside the connector, then resumed. No connector damage or electrical discontinuities were observed.

3.1.21 Random Vibration, Ambient Temperature

Test Method

MIL-DTL-38999M Para. 4.5.23.2.4

Requirement

49 Grms, 8 hours X and Y axes.

Results

PASS. No electrical discontinuity, damage or visual anomalies noted. 2 mated pairs of each contact arrangement were tested. Contact arrangements tested included 8-7, 11-19, and 12-26.

3.1.22 Sine Vibration at Temperature

Test Method

MIL-DTL-38999M Para. 4.5.23.2.1

Requirement

60G

4 hours at ambient, 4 hours at -55°C, 4 hours at +200°C in each of 3 axes

Results

PASS. All specimens met the requirement. No electrical discontinuity greater than 1 microsecond, no evidence of cracking, breaking or loosening, no de-mating. 2 mated pairs of each contact arrangement were tested. Contact arrangements tested included 8-7, 11-19, and 12-26.

3.1.23 Mechanical Shock, 300G

Test Method

MIL-DTL-38999M Para. 4.5.24.1

EIA-364-27

Requirement

Connector shall show no evidence of cracking, breaking or loosening of parts. No disengagement of the mated connector. No electrical discontinuity greater than 1 microsecond.

Results

PASS. All specimens met the requirement. Six mated pairs of each contact arrangement were tested, consisting of contact arrangements 8-7, 11-19 and 12-26.

3.1.24 High Impact Shock

Test Method

MIL-DTL-38999M Para. 4.5.24.2

MIL-S-901 Grade A

Requirement

No discontinuities of 1 microsecond or longer, no evidence of damage which could impair proper functioning.

Results

PASS. Two mated pairs of each of three contact arrangements, 8-7, 11-19, and 12-26 were tested. No electrical discontinuities or damage were observed.



3.1.25 Humidity, Cyclic

Test Method

MIL-DTL-38999M Para. 4.5.26

EIA-364-31 Test Method IV

Requirement

100 megohm minimum insulation resistance and DWV following final cycle, no deterioration which will adversely affect performance.

Results

PASS. All specimens met the requirement. Six mated pairs of three contact arrangements were tested, 8-7, 11-19 and 12-26.

3.1.26 Ozone Exposure

Test Method

MIL-DTL-38999M Para. 4.5.29

EIA-364-14

Requirement

No evidence of damage detrimental to the function of the connector.

Results

Qualified by similarity. See section 2 for details.

3.1.27 Fluid Immersion

Test Method

MIL-DTL-38999M Para. 4.5.30

EIA-364-10

Requirement

No damage to plastic, elastomeric and bonding materials detrimental to the function of the connector. Connector shall meet coupling torque and DWV requirements when tested within 3 hours of immersion.

Results

Qualified by similarity. See section 2 for details.

3.1.28 Altitude Immersion

Test Method

MIL-DTL-38999M Para. 4.5.9

EIA-364-03

Requirement

Three cycles of exposure to simulated altitude of 75,000 feet.

Results

PASS. All samples met insulation resistance and DWV requirements while still immersed. No ingress of solution was observed. Some effects of corrosion were observed on one receptacle. One mated pair of each of four contact arrangements was tested (8-3, 8-7, 11-19, 12-26).

3.1.29 Altitude – Low Temperature

Test Method

MIL-DTL-38999M Para. 4.5.21

EIA-364-105

Requirement

100,000 Ft. altitude

-65°C.



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Results

PASS. All samples met DWV and IR requirements. Six mated pairs of three contact arrangements were tested, 8-7, 11-19 and 12-26.

3.1.30 **Thermal Vacuum Outgassing**

Test Method

MIL-DTL-38999M Para. 4.5.42

ASTM E595

Requirement

All nonmetallic materials shall not exceed 1.0% Total Mass Loss and 0.1% Total Volatile Condensable Materials. Applicable to connectors that have been subjected to optional thermal vacuum outgassing processing.

Results

Qualified by similarity. See section 2 for details.