



QUALIFICATION TEST REPORT
Code Red, Sealed Light Weight
Hermetic Receptacle,
D38999/23 Type

No.:
Date:
Sheet
Rev.

GT-16-223 Abstract
April 6, 2017
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B

1 **INTRODUCTION**

1.1 **Purpose**

Testing was performed on Glenair Code Red, Light Weight Hermetically Sealed receptacle connectors to determine their conformance to the performance requirements of MIL-DTL-38999/23.

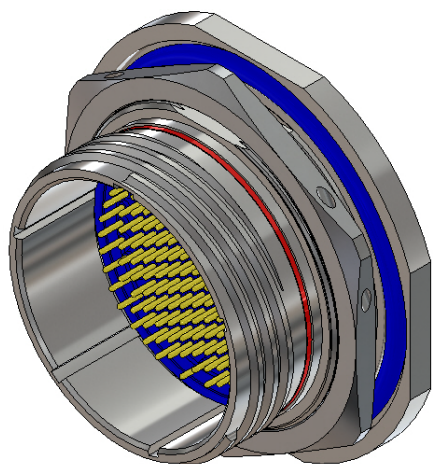
1.2 **Scope**

This report summarizes electrical, mechanical and environmental performance testing of Glenair Code Red, Light Weight Hermetically sealed receptacle connectors. The information in this report was obtained from tests conducted by Environmental Associates, Santa Ana, California, and Glenair, Glendale, California. These documents are on file at Glenair, Glendale California and are available upon request.

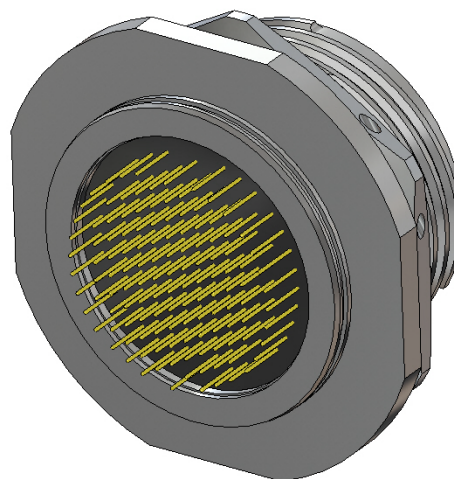
Testing Agency	Location	Date	Test Report Title	Test Report Number
Environment Associates	Santa Ana, CA	February 22, 2017	Environmental Test Report for the Light Weight Hermetic, Receptacle, Jam Nut, D38999/23 Style, PC Tail, Connector	OC26969-1019175
Glenair	Glendale, CA	December 8, 2016	Qualification Test Report for Light Weight Hermetic, Receptacle, Jam Nut, D38999/23 Style, PC Tail, Connector	GT-16-223

1.3 **Conclusion**

Glenair Code Red, Light Weight Hermetically Sealed connectors have been shown to be capable of meeting performance requirements of MIL-DTL-38999/23, Style C contacts.



Front View
D38999/23, Size 25-35, Pin



Rear View
D38999/23, Size 25-35, Pin



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1.4 **Product Description**

Glenair Code Red, Light Weight Hermetically Sealed connector is a high density, multi-pin circular electrical connector intended for application in hostile environments subject to high vibration and high temperature while maintaining maximum leak rate of 1×10^{-7} cc/sec Helium at 1 atmosphere. Code Red connector is designed to meet all the requirements of MIL-DTL-38999/23 (Connectors, Electrical, Circular, Threaded, Receptacle, Jam Nut Mounting, Hermetic, Hermetic Solder Contracts, Series III, Metric) but with lighter weight and superior electrical conductivity. Instead of stainless steel, Code Red connector shell and Jam nut are made of Aluminum alloy and high conductivity Copper alloy contacts are used. A Glenair Code Red Sales Drawing is included in this report and contains the complete listing of materials used.

1.5 **Test Specimens**

TEST NO.		QTP 542	OC26969-1019175
TESTING AGENCY		Glenair	Environment Associates
Glenair Sales Drawing Part Number	Test unit Part Number	Group 1	Group 2
233-250ME09-35PN	237-437-07ME09-35PN	2	2
233-250ME11-98PN	237-437-07ME11-98PN	2	-
233-250ME13-35PN	237-437-07ME13-35PN	1	-
233-250ME15-97PN	237-437-07ME15-97PN	2	-
233-250ME17-06PN	237-437-07ME17-06PN	2	2
233-250ME19-32PN	237-437-07ME19-32PN	2	-
233-250ME21-11PN	237-437-07ME21-11PN	2	-
233-250ME23-21PN	237-437-07ME23-21PN	2	-
233-250ME25-04PN	237-437-07ME25-04PN	2	-
233-250ME25-08PN	237-437-07ME25-08PN	3	-
233-250ME25-23PN	237-437-07ME25-23PN	2	-
233-250ME25-35PN	237-437-07ME25-35PN	-	2

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

Test Description	MIL-DTL-38999 Para No.	Group 1	Group 2	Results
Visual and mechanical inspection	3.1, 3.3-3.5	X	X	Passed
Insulation resistance at ambient temperature	3.14.1	X		Passed
Dielectric withstanding voltage	3.15	X		Passed
Contact retention	3.24	X		Passed
Air leakage, 1x10 ⁻⁷ cc/sec Helium @ 1 atm	3.10	X		Passed
Temperature cycling (10 cycles) , -65°C to +200°C	3.8	X		Passed
Air leakage, 1x10 ⁻⁷ cc/sec Helium @ 1 atm	3.10	X		Passed
Insert retention	3.16	X		Passed
High temperature exposure, 1000 hrs @ 200°C	3.38.2	X		Passed
Air leakage, 1x10 ⁻⁷ cc/sec Helium @ 1 atm	3.10	X		Passed
Temperature cycling (100 cycles), -65°C to +200°C	3.8		X	Passed
Air leakage, 1x10 ⁻⁷ cc/sec Helium @ 1 atm	3.10		X	Passed
Thermal shock, +4°C to +90°C	3.7		X	Passed
Air leakage, 1x10 ⁻⁷ cc/sec Helium @ 1 atm	3.10		X	Passed
Random vibration, elevated temp, 43.9 g rms	3.4.6.2.2		X	Passed
Mechanical shock, 300 g	3.28		X	Passed
Air leakage, 1x10 ⁻⁷ cc/sec Helium @ 1 atm	3.10		X	Passed
Insulation resistance at ambient temperature	3.14.1		X	Passed
Dielectric withstanding voltage	3.15		X	Passed
Humidity	3.30		X	Passed
Insulation resistance (humidity)	3.14.1		X	Passed
Dielectric withstanding voltage (humidity)	3.15		X	Passed
Air leakage, 1x10 ⁻⁷ cc/sec Helium @ 1 atm	3.10		X	Passed



2 SUMMARY OF QUALIFICATION TESTING

2.1 Visual and mechanical inspection

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

2.2 Insulation Resistance at Ambient Temperature

Test Method

MIL-DTL-38999M Para. 4.5.10.1

EIA-364-21

@ 500 VDC

Requirement:

5,000 MΩ minimum; after humidity - 100 MΩ minimum

Results:

PASS. All specimens met the requirement.

2.3 Dielectric Withstanding Voltage at Sea Level

Test Method:

MIL-DTL-38999M Para. 4.5.11.1

EIA-364-20

Vrms, 60 Hz

Mated connectors

Requirement:

No breakdown or flashover, 2 mA maximum leakage current

Test voltages (service rating):

1,300 Vrms size 22 contact arrangements

1,800 Vrms size 20, 16 & 12 contact arrangements

Results:

PASS. All specimens met the requirement.

2.4 Contact Retention

Test Method

MIL-DTL-38999M Para. 4.5.20.1

EIA-364-29

Requirement

Axial loads are applied per table below, .012 inch maximum displacement is allowed.

Results

PASS. All samples met the requirement.

Contact Retention Test Data				
Contact Arrangement	Contact Size	Load ±10% (lbs.)	Contacts Tested	Maximum Measured Displacement (inches)
9-35	22	10	ALL	.0001 - .0010
15-97	20	15	A, B, D, E, F, H, J, K	.0020 - .0030
15-97	16	25	C, G, L, M	.0040 - .0045
17-06	12	25	ALL	.0035 - .0045
25-08	8	25	ALL	.0025 - .0040



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2.5 Temperature Cycling (10 cycles)

Test Method

MIL-DTL-38999M Para. 4.5.4

EIA-364-32

Requirement

No signs of damage detrimental to connector operation after 10 cycles of temperature cycling.

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

30 minutes dwell time at each extreme.

Results

PASS. No specimens showed signs of damage.

2.6 Air Leakage

Test Method

MIL-DTL-38999M Para. 4.5.6

EIA-364-02

Requirement

Leak rate 1×10^{-7} cc/sec Helium @ 1 atm. Maximum.

Results

PASS. No test samples showed evidence of damage.

2.7 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.

2.8 High Temperature Exposure

Test Method

MIL-DTL-38999M Para. 4.5.32.2

Requirement

Connectors shall perform satisfactorily and pass succeeding tests.

1,000 hours at +200°C

Results

PASS. All specimens met the requirement.

2.9 Temperature Cycling (100 cycles)

Test Method

MIL-DTL-38999M Para. 4.5.4

EIA-364-32

Requirement

No signs of damage detrimental to connector operation after 100 of cycles of temperature cycling.

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

30 minutes dwell time at each extreme.

Results

PASS. No specimens showed signs of damage.



2.10 **Thermal Shock**

Test Method

MIL-DTL-38999M Para. 4.5.3

Requirement

No signs of damage detrimental to connector operation after 10 cycles of thermal shock.

Temperature extremes +4°C and +90°C.

10 minutes dwell time at each extreme in water baths.

Results

PASS. No specimens showed signs of damage.

2.11 **Random Vibration, Elevated Temperature**

Test Method

MIL-DTL-38999M Para. 4.5.23.3

Requirement

43.9 Grms, 4 hours for each X and Y axes @ +200°C.

Air leakage test performed with connectors still installed on the test plates.

Results

PASS. All specimens met the requirements of the test.

2.12 **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. Air leakage test performed with connectors still installed on the test plates.

Results

PASS. All specimens met the requirement.

2.13 **Humidity**

Test Method

MIL-DTL-38999M Para. 4.5.26

EIA-364-31 Test Method IV

Requirement

100 megohms minimum insulation resistance; and DWV (1,300 and 1,800 Vrms) following final cycle, no deterioration which will adversely affect performance.

Results

PASS. All specimens met the requirement.



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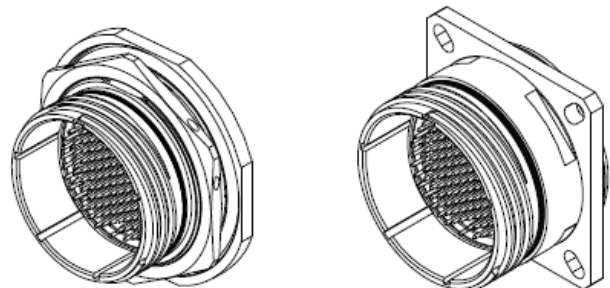
REVISIONS			
SYM.	DESCRIPTION	DATE	APPROVED
E	REVISED PER DCN #68300	12/15/17	DLU
F	REVISED PER DCN #68649	1/12/18	DLU
G	REVISED PER DCN #69028	2/9/18	DLU
H	REVISED PER DCN #87369	7/9/21	DLU

TABLE I - MATERIAL/FINISH			
SYM	MATERIAL	FINISH	TEMP. RANGE
AB	MARINE BRONZE	NONE (CLEAN ONLY)	
M*	ALUMINUM ALLOY	ELECTROLESS NICKEL	-65° TO +200°C
MA		ELECTROLESS NICKEL, MATTE FINISH	
ME		ELECTROLESS NICKEL	
NF		CAD/O.D. OVER ELECTROLESS NICKEL	-65° TO +175°C
ZN		ZINC NI, OLIVE DRAB	
ZR		ZINC NI, BLACK (TRI-VALENT CR)	

TABLE II - CONNECTOR STYLE	
SYM	DESCRIPTION
-00	RECEPTACLE, WALL MOUNT WITH SLOTTED HOLES
-CM	RECEPTACLE, WALL MOUNT WITH METRIC CLINCH NUTS
-CS	RECEPTACLE, WALL MOUNT WITH STANDARD CLINCH NUTS
-DO	RECEPTACLE, WALL MOUNT WITH ROUND HOLES
-HM	RECEPTACLE, WALL MOUNT WITH METRIC HELICOIL
-HS	RECEPTACLE, WALL MOUNT WITH STANDARD HELICOILS
-T0	RECEPTACLE, WALL MOUNT WITH TAPPED HOLES
BLANK	RECEPTACLE, JAM NUT MOUNT

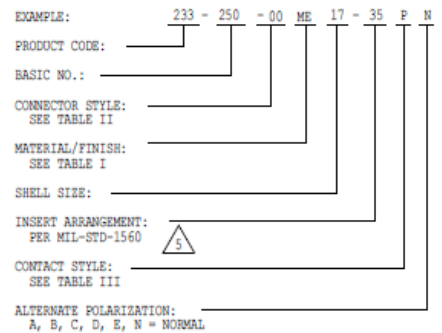
TABLE III - CONTACT STYLE	
SYM	DESCRIPTION
P	PIN, SOLDER CUP
S	SOCKET, SOLDER CUP
C	PIN, PC TAIL
D	SOCKET, PC TAIL

* INACTIVE FOR NEW DESIGN



- 10 FLYCUTS (WRENCH FLATS) ARE AN OPTIONAL DESIGN.
- 9 HELICOIL AND TAPPED HOLE CONNECTOR STYLES (HM, HS, & T0) USE DIMENSION G ONLY.
- 8 MODIFIED MAJOR DIAMETER 31.80-31.95 (1.252-1.257).
- 7 FRONT PANEL MOUNT ONLY.
- 6 CONNECTORS MEET ALL APPLICABLE DIMENSIONS, MECHANICAL, ELECTRICAL, ENVIRONMENTAL AND SEALING REQUIREMENTS OF MIL-DTL-38999/23, PC TAILS.
- 5 INSERT ARRANGEMENT MIL-STD-1560. PIN INTERFACE SHOWN FOR REFERENCE ONLY. CONTACT MANUFACTURER FOR ADDITIONAL ARRANGEMENT OPTIONS.
- 4 GLENAIR ENVIRONMENTAL CONNECTORS ARE DESIGNED TO MATE WITH ANY QPL MANUFACTURER'S MIL-DTL-38999, SERIES III MATING PLUG HAVING THE SAME SHELL SIZE, INSERT ARRANGEMENT, OPPOSITE CONTACT GENDER AND POLARIZATION.
- 3 ASSEMBLY IS IDENTIFIED WITH GLENAIR'S NAME, CAGE CODE, PART NUMBER & DATE CODE, SPACE PERMITTING.
- 2 PERFORMANCES:
 OPERATION TEMPERATURE RANGE: SEE TABLE I.
 LEAK RATE: 1 X 10⁻⁷ cc/s MAX HELIUM, 1 ATM.
 IR: 5,000 MEGOHMS MIN AT ROOM TEMPERATURE PER MIL-DTL-38999.
 DWV: SEE SERVICE RATING PER APPLICABLE MIL-STD-1560 ARRANGEMENTS.
- 1 MATERIAL / FINISH:
 CODE RED signature blend

PART NUMBER DEVELOPMENT



UNLESS OTHERWISE SPECIFIED	DRAWN D. LU 3/24/17	GLENAIR, INC. 1211 AIR WAY - GLENDALE - CALIFORNIA 91201 CONNECTOR, RECEPTACLE, CODE RED, LIGHTWEIGHT HERMETIC, MIL-DTL-38999/23 TYPE
DIMENSIONS ARE IN INCHES	CHECK J. DO 3/28/17	
TOLERANCES:	ENGR D. LU 3/28/17	
FRACTIONS ± 1/16		
DECIMALS .XX ±.03		

NOTES: UNLESS OTHERWISE SPECIFIED

4	C	233-250	REV. H
WEIGHT	N/A	SHEET	1 OF 4

Glenair Sales Drawing