



## 1 INTRODUCTION

### 1.1 Scope

This report summarizes performance testing of Glenair SuperNine (MIL-DTL-38999 type) connectors to determine conformance to the requirements of Bell Helicopter Report No. 299-100-829 (Rev. Basic) for the following tests: Random Vibration, Low Frequency Spectrum Vibration (Sine over Random), and Mating Durability. The information in this report was obtained from tests conducted by Vertical Laboratories. These documents are on file at Glenair, Glendale California, and are available upon request.

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Test Report # 18109D1DS0417V2

### 1.2 Conclusion

The SuperNine connectors have been shown to be capable of meeting the specified requirements of Bell Helicopter Report No. 299-100-829 (Rev. Basic), for the testing performed.

### 1.3 Product Description

Shell size 11, 17, and 25 circular MIL-DTL-38999 type connectors, plugs and receptacles, "SuperNine" series.

### 1.4 Test Specimens

Shell Size	Component	Part No.	Sample Label
11	Plug	233-205-G6ME11-35SN	1-1P
	Receptacle	233-205-00ME11-35PN	1-1R
17	Plug	233-205-G6ME17-8SN	2-1P
	Receptacle	233-205-00ME17-8PN	2-1R
25	Plug	233-205-G6ME25-29SN	3-1P
	Receptacle	233-205-00ME25-29PN	3-1R

The test specimen harnesses were built in accordance with Bell Helicopter document number 299-100-829 (Rev. Basic), Section 3.2 and Figure 3.1, with one exception. The braid sock specified (20-094) was not readily available so similar braid material was used. Two braid socks were installed, one inside the other, thus replicating the configuration and weight of the double layered 20-094 braid sock. All contacts of all test samples were wired and monitored for continuity during vibration.

### 1.5 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.

1.6 **Qualification Test Summary Matrix**

Bell Spec. Paragraph	TEST	AXIS	Shell Size
4.9	Mating Durability	-	11
			17
			25
4.11.6	Random Vibration	Perpendicular	11
		Parallel	17
4.11.7	Low Frequency Spectrum Test	Perpendicular	25
		Parallel	11
4.11.6	Random Vibration	Parallel	17
		Perpendicular	25
4.11.7	Low Frequency Spectrum Test	Parallel	11
		Perpendicular	17
			25

**2 SUMMARY OF QUALIFICATION TESTING**

2.1 **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.

2.1.1 **Mating Durability**

Test Method:

Mating durability testing was performed on each test sample in accordance with paragraph 4.9 of the product test specification. Each test sample had 100 mating cycles performed before the vibration testing.

Requirement:

The connectors shall show no evidence of defects detrimental to its mechanical or electrical performance, after 100 cycles of mating and unmating.

Results:

PASS. All specimens met the requirement.

2.1.1.1 Prior to final mating and torque of connectors for vibration tests, the mating face of the receptacle connectors were filled with MIL-H-5606 hydraulic oil, per paragraph 4.10 of the Bell Helicopter document.

2.1.2 **Random Vibration, Ambient Temperature**

Test Method:

Random vibration testing was performed on the test samples in accordance with paragraph 4.11.6 of the

test specification. Testing was performed for 8 hours in the parallel axis and 8 hours in the perpendicular axis, for a total duration of 16 hours. **Figure 1** in Appendix shows a snapshot of the spectral density graph. Testing was performed using the test setup defined in figure 3-2 and 3-3 of the test specification (see **Photo 1 & Photo 2** in the appendix.) A discontinuity monitor capable of detecting a 1 microsecond interruption was used to monitor the test samples throughout the duration of testing.

Requirement:

See **Table A** for vibration levels. No interruption in current, one (1) microsecond or greater, shall occur. No evidence of cracking, breaking or loosening of parts shall be observed. No movement of the coupling inspection mark shall be observed.

Results:

PASS. All specimens met the requirement. No physical damage or discontinuity greater than 1 microsecond was observed on any of the test samples. No evidence of cracking, breaking or loosening of parts, or de-mating was observed.

**2.1.3 Low Frequency Spectrum Test (Sine over Random)**

Test Method:

Low frequency spectrum testing was performed on the test samples in accordance with paragraph 4.11.7 of the test specification. Testing was performed for 2 hours in the parallel axis and 2 hours in the perpendicular axis for a total duration of 4 hours. **Figure 2** in Appendix shows a snapshot of the spectral density graph. In order to account for the time it takes for the profile to equalize at given levels, an additional 2 minutes was added to the duration of each test. Testing was performed using the test setup defined in figure 3-2 and 3-3 of the test specification (see **Photo 1 & Photo 2** in the appendix.) A discontinuity monitor capable of detecting a 1 microsecond interruption was used to monitor the test samples throughout the duration of testing.

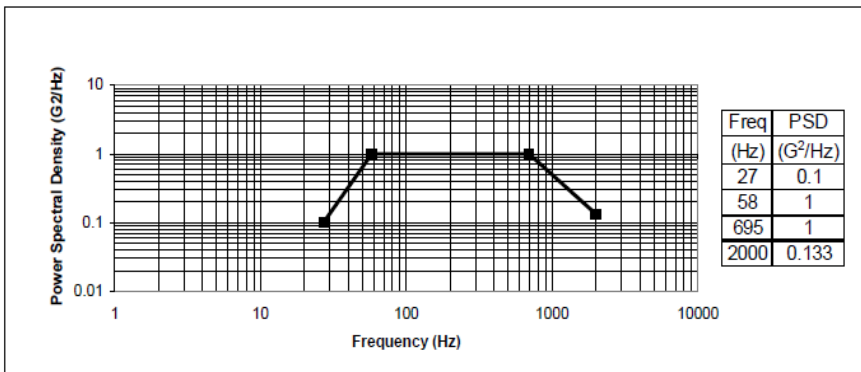
Requirement:

See **Table B**, below, for vibration levels. No interruption in current, one (1) microsecond or greater, shall occur. No evidence of cracking, breaking or loosening of parts shall be observed. No movement of the coupling inspection mark shall be observed.

Results:

PASS. All specimens met the requirement. No physical damage or discontinuity greater than 1 microsecond was observed on any of the test samples. No evidence of cracking, breaking or loosening, or de-mating was observed.

**Table A:** (Figure 4-5 of Bell Product Spec)

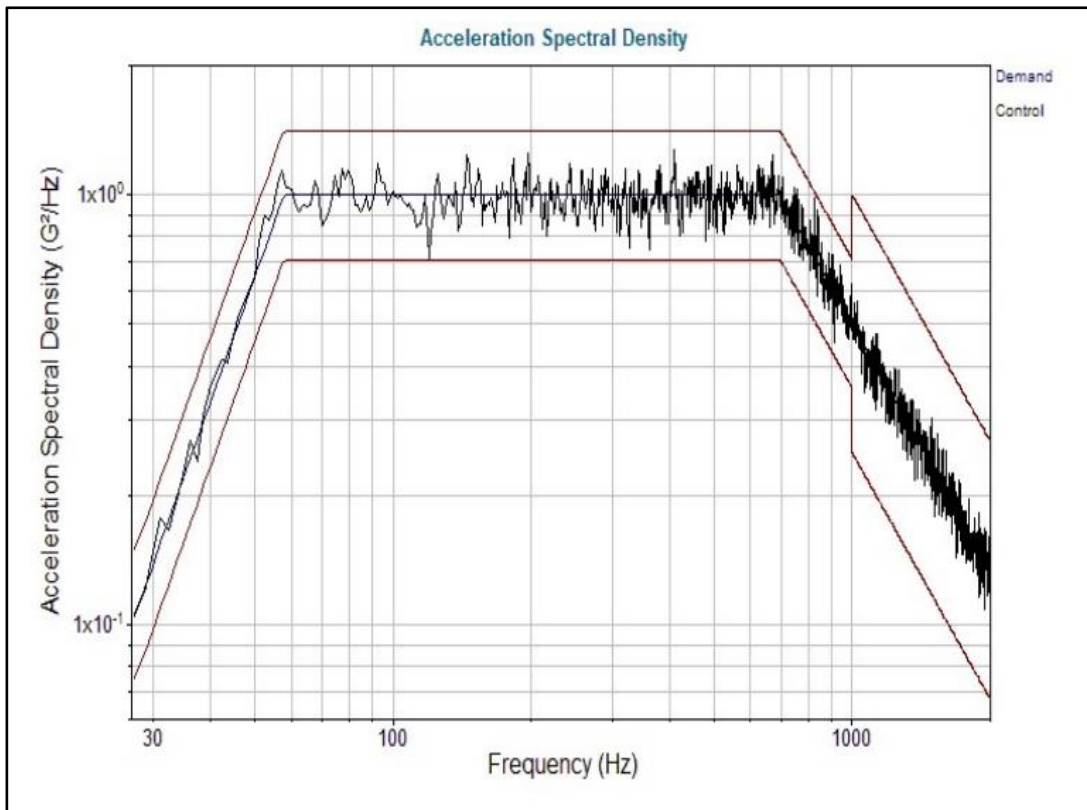


**Table B:** (Table 4-4 of Bell Product Spec)

	Frequency	Amplitude
Random	10-500 Hz	0.02 G <sup>2</sup> /Hz
Sine Tones	16.6 Hz	4.93 G-Peak
	19.8 Hz	5.43 G-Peak
	33.2 Hz	1.94 G-Peak
	39.7 Hz	5.53 G-Peak

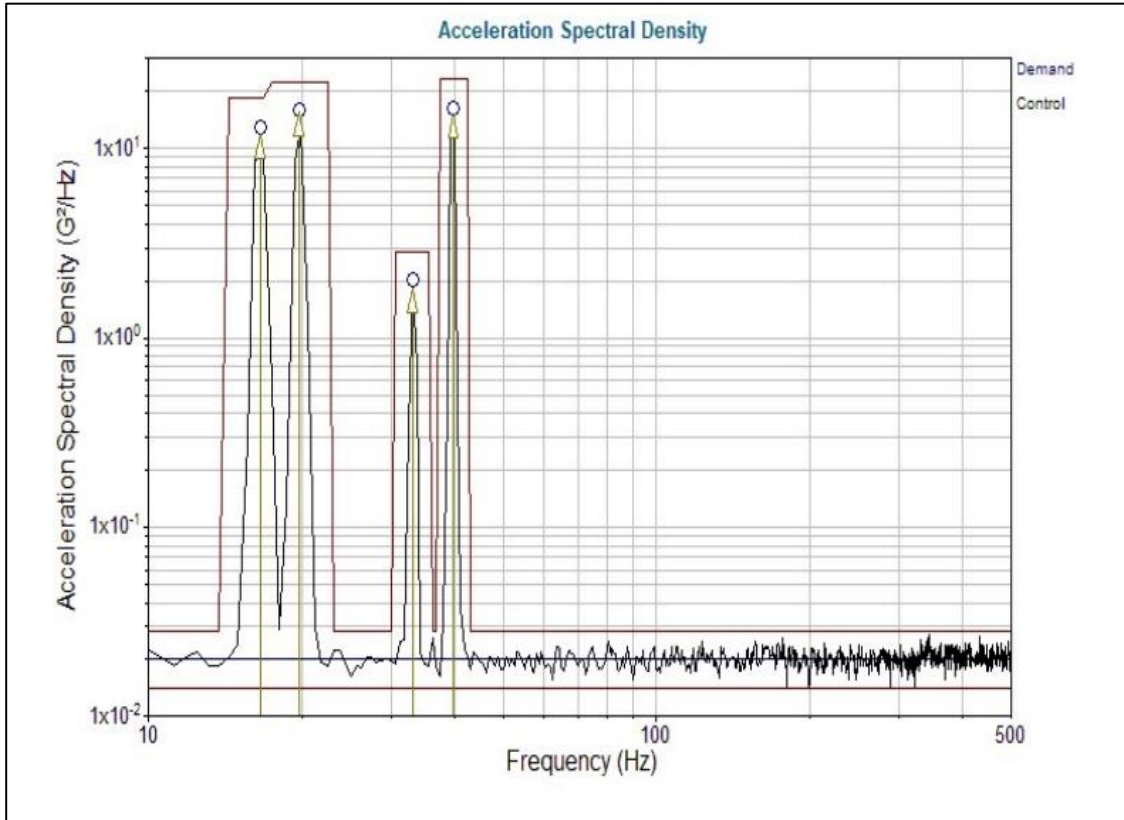
## APPENDIX: GRAPHS AND PHOTOS

Figure 1:



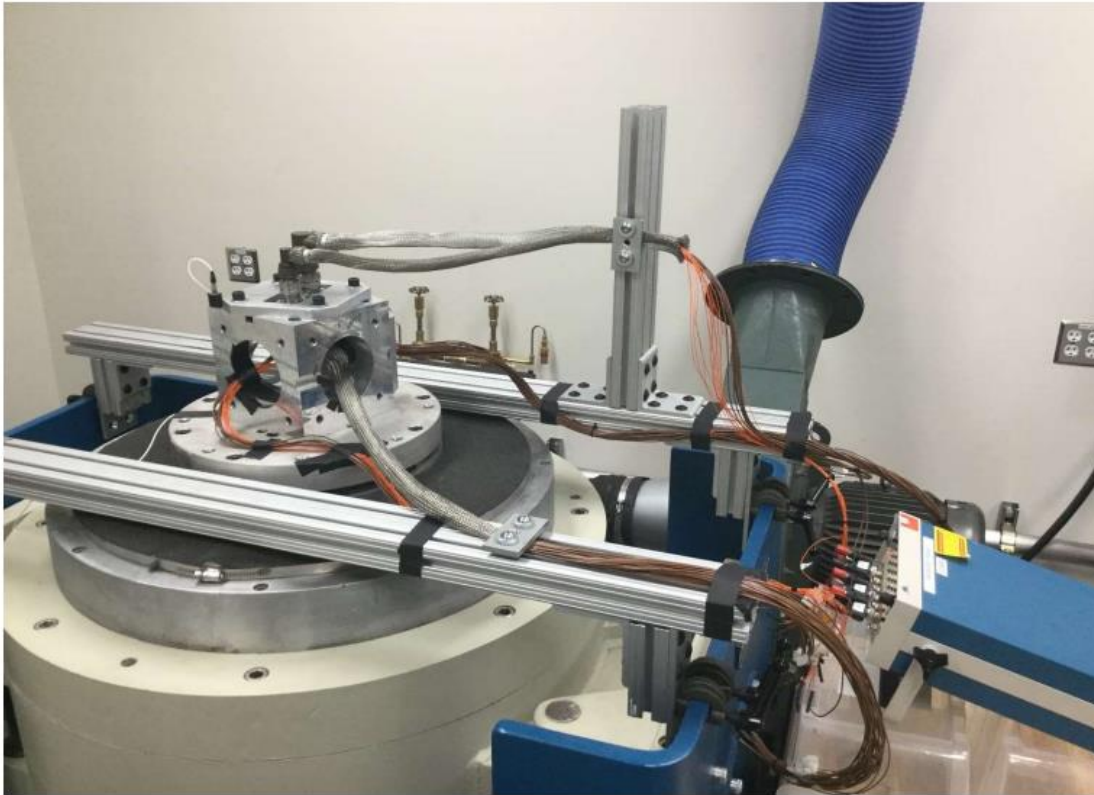
Random Vibration Test  
Performed April 4, 2018 & April 9, 2018

Figure 2:



Low Frequency Spectrum Test  
Performed April 4, 2018 & April 10, 2018

**Photo 1:**



**Photo 2:**

