

GARWOOD LABORATORIES, INC.

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December 26, 2006

Report No.: R3247
Rev.: N/C
Page 1 of 7

Since 1954

ENVIRONMENTAL TEST REPORT

ON
ONE (1) OHMETER
P/N: 620A-4
FOR
AMPTEC RESEARCH

PERFORMED For: AMPTECH RESEARCH
10900 Research, Ste 160C1
Austin, TX 78759

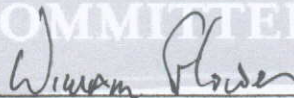
PERFORMED By: GARWOOD LABORATORIES, INC.
7829 Industry Ave.
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ENVIRONMENTAL TEST REPORT

1.0 PURPOSE

- 1.1 The purpose of this report is to present the procedures employed and the results obtained, while conducting the Environmental Test of Explosive Environment, on one (1) Ohmeter, P/N: 620A-4, S/N: 620A4-1470, submitted by Amptech Research.
- 1.2 The Environmental Test specified herein was performed in accordance with the references of Para. 2.0 of this report.
- 1.3 The matrix/sequence of the program is tabulated in Para. 5.0 of this report.

2.0 REFERENCES

- 2.1 07126KC Amptech Research, Purchase Order
- 2.2 MIL-STD-810F Military Specification, Environmental Test Methods
- 2.4 ANSI/NCSL Z540-1-1994 Calibration Laboratories and Measuring and Test Equipment General Requirements

3.0 SUMMARY

- 3.1 The one (1) Ohmeter, P/N: 620A-4, S/N: 620A4-1470, was subjected to and completed the specified Environmental Test with no visible evidence of damage, or deterioration noted due to testing. There were no main chamber explosions. See data sheets.
- 3.2 The Ohmeter was considered to have met the requirements of the specified Environmental Test, as conducted by Garwood Laboratories, Inc., in accordance with the references shown in Para. 2.0 of this report.
- 3.3 The Ohmeter was then returned to Amptech Research for further evaluation after completion of testing.



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4.0 TEST CONDITIONS AND EQUIPMENT**4.1 Ambient Conditions:**

Unless otherwise specified herein, all tests were performed at an atmospheric pressure of 28 \pm 2.5 inches of mercury absolute, a temperature of 75 \pm 15°F, and a relative humidity of 50 \pm 30%.

4.2 Instrumentation and Equipment:

4.2.1 Measuring and test equipment, utilized in the performance of these tests, was calibrated in accordance with ANSI/NCSL Z540-1-1994, by Garwood Laboratories, Inc., or a commercial facility, utilizing reference standards (or interim standards) whose calibrations have been certified as being traceable to the National Institute of Standards & Technology (NIST). All reference standards utilized in the above calibration system are supported by certificates, reports, or data sheets attesting to the date, accuracy, and conditions under which the results furnished were obtained. All subordinate standards, measuring and test equipment are supported by like data, when such information is essential to achieve the accuracy control required by the procedure.

4.2.2 Garwood Laboratories, Inc., attests that the commercial sources providing calibration services on the above referenced equipment, other than the NIST Standards are in fact capable of performing the required services to the satisfaction of Garwood Laboratories, Inc., Quality Assurance. Certifications of all calibrations performed are retained on file in the Garwood Laboratories, Inc., Quality Assurance Department, and are available for inspection upon request by customer representatives.

4.2.3 The test equipment utilized during this test program is listed on individual Data Sheets, beginning on page number A1 of Appendix A of this report.

4.3 Tolerances:

4.3.1 Unless otherwise stated, test conditions were maintained within the tolerances specified in the references of Para. 2.0 of this report.



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5.0 TEST SEQUENCE

5.1 The specified Environmental Test was conducted on December 15, 2006.

6.0 TEST METHODS AND RESULTS

6.1 EXPLOSIVE ATMOSPHERE:

(Ref.: Meth. 511.4, Proc. I, of MIL-STD-810E)

- 6.1.1 One (1) Ohmeter, P/N: 620A-4, S/N: 620A4-1470, was installed inside an explosive atmosphere test chamber, at station ambient conditions, with an electrical set-up capable of performing the required functional check during the test. See photo of test set-up.
- 6.1.2 The fuel used to conduct the explosive atmosphere testing was n-hexane. Thermocouples were mounted to the chamber wall, the test unit, and placed into the chamber air, for the measurement and recording of temperature.
- 6.1.3 With the test unit de-energized, the chamber door was sealed and the chamber temperature was ramped to +50°C.
- 6.1.4 With chamber pressure at site level, fuel was introduced, allowing three (3) minutes for vaporization. The potential explosiveness of the air-vapor mixture was verified by igniting a sample of the mixture with a spark gap and the results observed for any evidence of ignition. The test unit was then operated by opening and closing the unit's contacts four-hundred (400) times, verifying the explosiveness of the air-vapor mixture periodically.
- 6.1.5 periodically during the four-hundred (400) successful operations (no resulting explosion), the potential explosiveness of the air-vapor mixture was verified by igniting a sample of the mixture with a spark gap and the results observed for any evidence of ignition.
- 6.1.6 Chamber pressure was not increased to simulate an altitude below sea level. The rate of change in pressure did not exceed 2,000 feet per minute.
- 6.1.7 Upon completion of the Explosive Atmosphere Test, the chamber controls were turned off and the test unit was allowed to stabilize at station ambient conditions.



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- 6.1.8 The Ohmeter completed the specified Explosive Atmosphere Test with no visible evidence of damage or deterioration noted. There were no main chamber explosions detected throughout the test.
- 6.1.9 The one (1) Ohmeter, P/N: 620A-4, S/N: 620A4-1470, was considered to have met the requirements of the Explosive Atmosphere Test, as conducted by Garwood Laboratories, Inc., in accordance with MIL-STD-810E.
- 6.2 The one (1) Ohmeter, P/N: 620A-4, S/N: 620A4-1470, was returned to Amptech Research, for further evaluation after completion of testing.



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ENVIRONMENTAL TEST DATA

APPENDIX A



Garwood Laboratories Inc.

"EXCELLENCE BUILT ON INTEGRITY"

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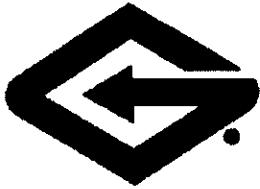
JOB NO.: 3247

Page No.: A-2

*** GENERAL DATA LOG SHEET ***

Customer: Amptec Research		Date: 15 Dec 06	
Test Title: Explosive Atmosphere		Witness? yes Photos: 0019,20,21	
Test Item: Ohmmeter		Quantity: 1	
Part/Model No.: 620A-4	Serial No(s): 620A4-1470		
Specification: Mil Std 810	Rev: F	Method/Para 511.4 Pro. 1	
DATE	TIME	LOG ENTRIES	Initials
15 Dec 06	-----	Test Unit shall be placed into Explosive Atmosphere test chamber with all Electrical connectors connected to make operational / functional testing possible.	D.G
		Test chamber shall be sealed and internal chamber air temperature shall be increased to the recommended high operating temperature of + 50 deg C.	
		Chamber Walls and test Unit shall be allowed to rise within 10 Deg C of chambers Air temperature. Then 125 ml. of n-Hexanes shall be introduced into test chamber	
		At site level ambient pressure / altitude then circulated for 3 to 4 minutes to insure a homogenous air / fuel mixture. A sample of air / fuel mixture shall be isolated from main chamber and ignited to verify potential explosiveness of test Mixture. Once mixture is verified explosive test specimen shall be operated by Customer by opening and closing contacts (400) times and visualizing proper Functioning of test specimen through chamber's glass	
		Vision port. Explosiveness of test mixture shall be verified periodically throughout Test. Following (400) operationals explosiveness of test mixture shall be verified Once more then test chamber shall be opened and test specimen shall visually Examined.	
		Test specimen in Explosive atmosphere test chamber.	
		Data Logger channels are as follows:	
		CH 1 = Chamber Ambient Air temperature deg C	
		CH 2 = Test Specimen temperature deg C	
		CH 3 = Chamber Wall temperature. deg C	
		All testing will be performed at site level ambient pressure / altitude.	
		n-Hexane shall be used to create an explosive atmosphere	
		Customer shall perform related functionals / operational.	

Sub-Page: 2 of 3	Test Technician: <u>[Signature]</u>	Test Engineer: <u>JG</u>
	Inspector: <u>GL 1 QA</u>	DCMC:



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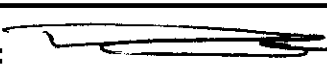

JOB NO.: 3247

Page No.: A-3

*** GENERAL DATA LOG SHEET ***

Customer: Amptec Research		Date: 15 Dec 06
Test Title: Explosive Atmosphere		Witness? yes Photos: 0019,20,21
Test Item: Ohmmeter		Quantity: 1
Part/Model No.: 620A-4	Serial No(s): 620A4-1470	
Specification: Mil Std 810	Rev: F	Method/Para 511.4 Pro. 1

DATE	TIME	LOG ENTRIES	Initials
15 Dec 06	0900	Increase test chamber air temperature to a high operating temperature of +50 deg C And stabilize walls and test specimen within 11 deg C of air temperature.	D.G
	1030	Test chamber ambient air, test chamber walls and test specimen all within 11 deg C Of one-another.	
	1035	Introduce 171 ml. of n-Hexane into test chamber and circulate for 3 to 4 minutes To ensure a homogeneous air / fuel / vapor mixture.	
	1039	3 to 4 minutes of circulation satisfied. Isolate a sample of fuel / vapor mixture in Sample vessel then ignite to verify potential explosiveness of mixture. Results: Test mixture is deemed explosive.	
	1040	Customer shall begin operationals / functionals by opening and closing contacts (400) times and visually verifying test specimen.	
	1045	Isolate a sample of fuel / vapor mixture in Sample vessel then ignite to verify potential explosiveness of mixture. Results: Test mixture is deemed explosive.	
	1050	Isolate a sample of fuel / vapor mixture in Sample vessel then ignite to verify potential explosiveness of mixture. Results: Test mixture is deemed explosive.	
	1055	Isolate a sample of fuel / vapor mixture in Sample vessel then ignite to verify potential explosiveness of mixture. Results: Test mixture is deemed explosive.	
	1100	Isolate a sample of fuel / vapor mixture in Sample vessel then ignite to verify potential explosiveness of mixture. Results: Test mixture is deemed explosive.	
	1105	Isolate a sample of fuel / vapor mixture in Sample vessel then ignite to verify potential explosiveness of mixture. Results: Test mixture is deemed explosive.	
	1110	Customer has performed 400 functionals in an explosive environment and at a High Op Temp of +50 deg C and did not cause an explosion to surrounding area.	

Sub-Page: 3 of 3	Test Technician: 	Test Engineer: <u>JG</u>
Inspector: 	DCMC:	



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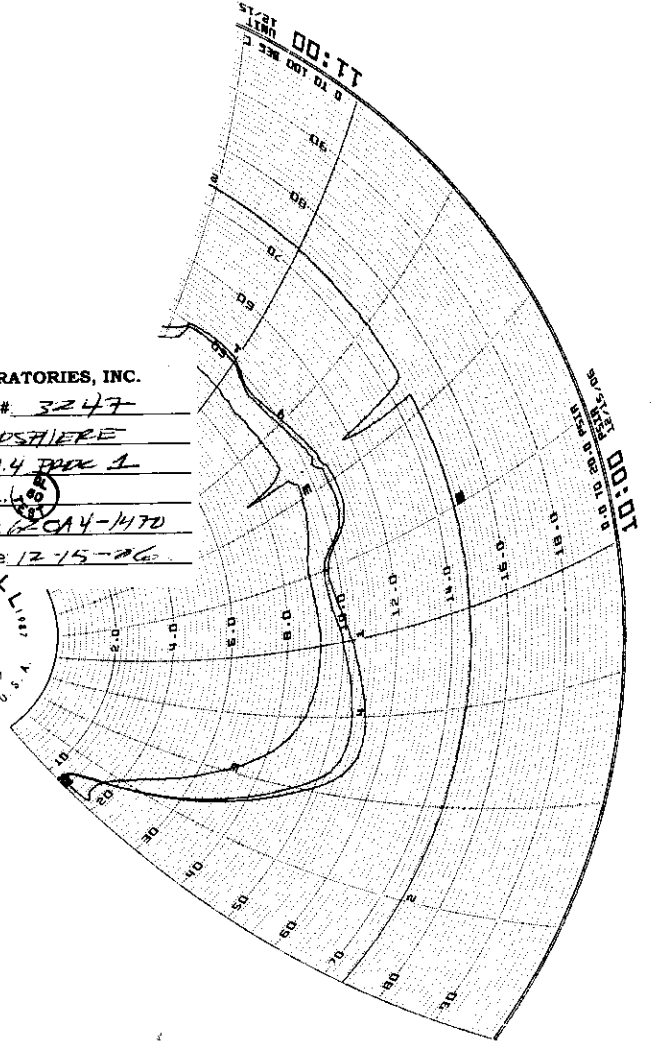
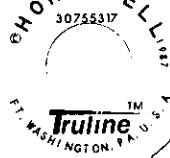
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Cust: AMTAC Job #: 3247
 Test: EXPLOSION ATMOSPHERE
 Spec: MILSTD 810F 511.4 PART 1
 Test Unit: DYNAMETER
 P/N: 02DA-4 S/N: 6204-1170
 Tech / Engr: LOONEY Date: 12-15-26





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ENVIRONMENTAL TEST PHOTOGRAPH(S)

APPENDIX B



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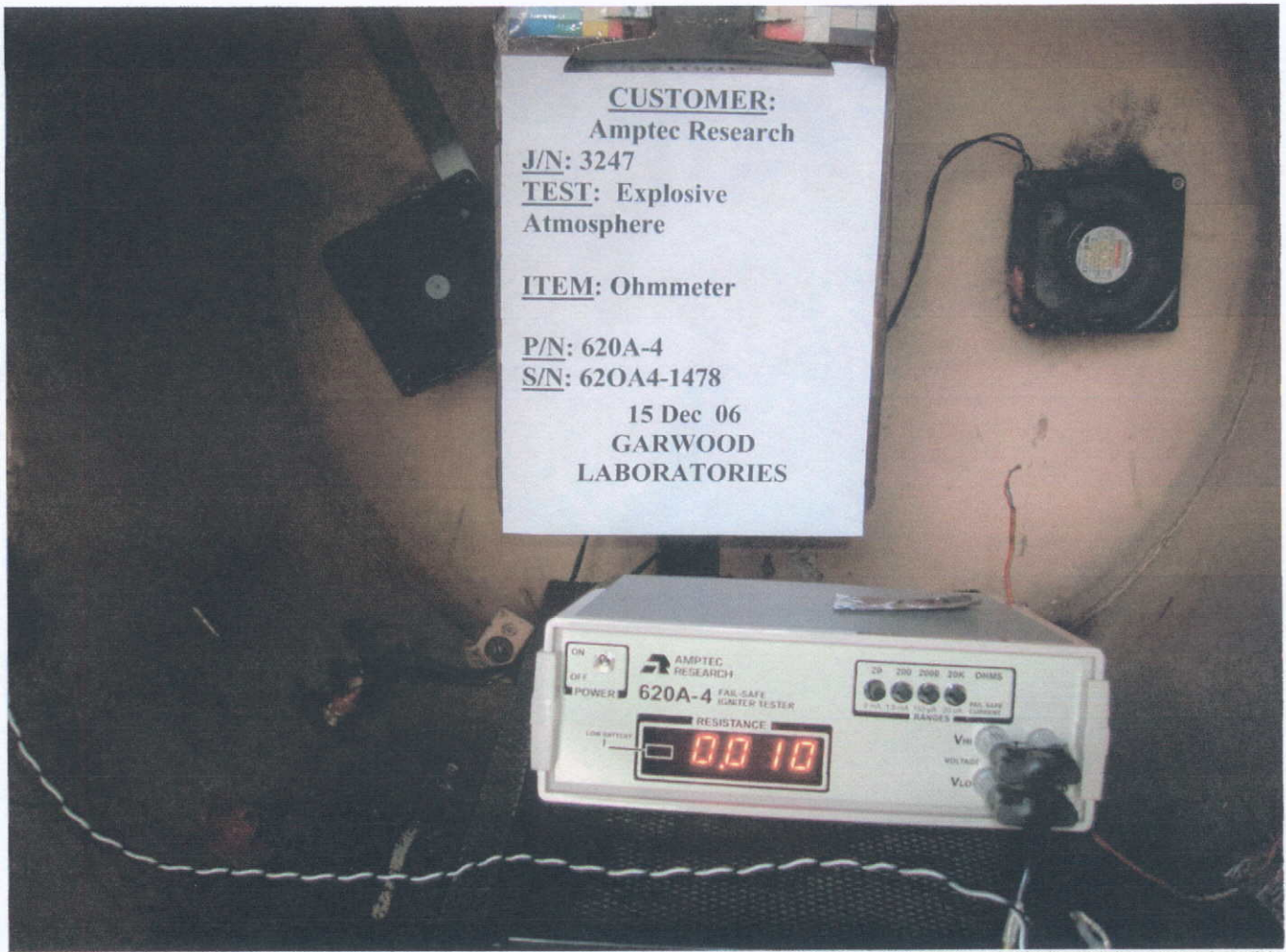
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ENVIRONMENTAL TEST PHOTOGRAPH(S)

EXPLOSIVE ATMOSPHERE
ONE (1) OHMMETER
P/N: 620A-4, S/N: 620A4-1470





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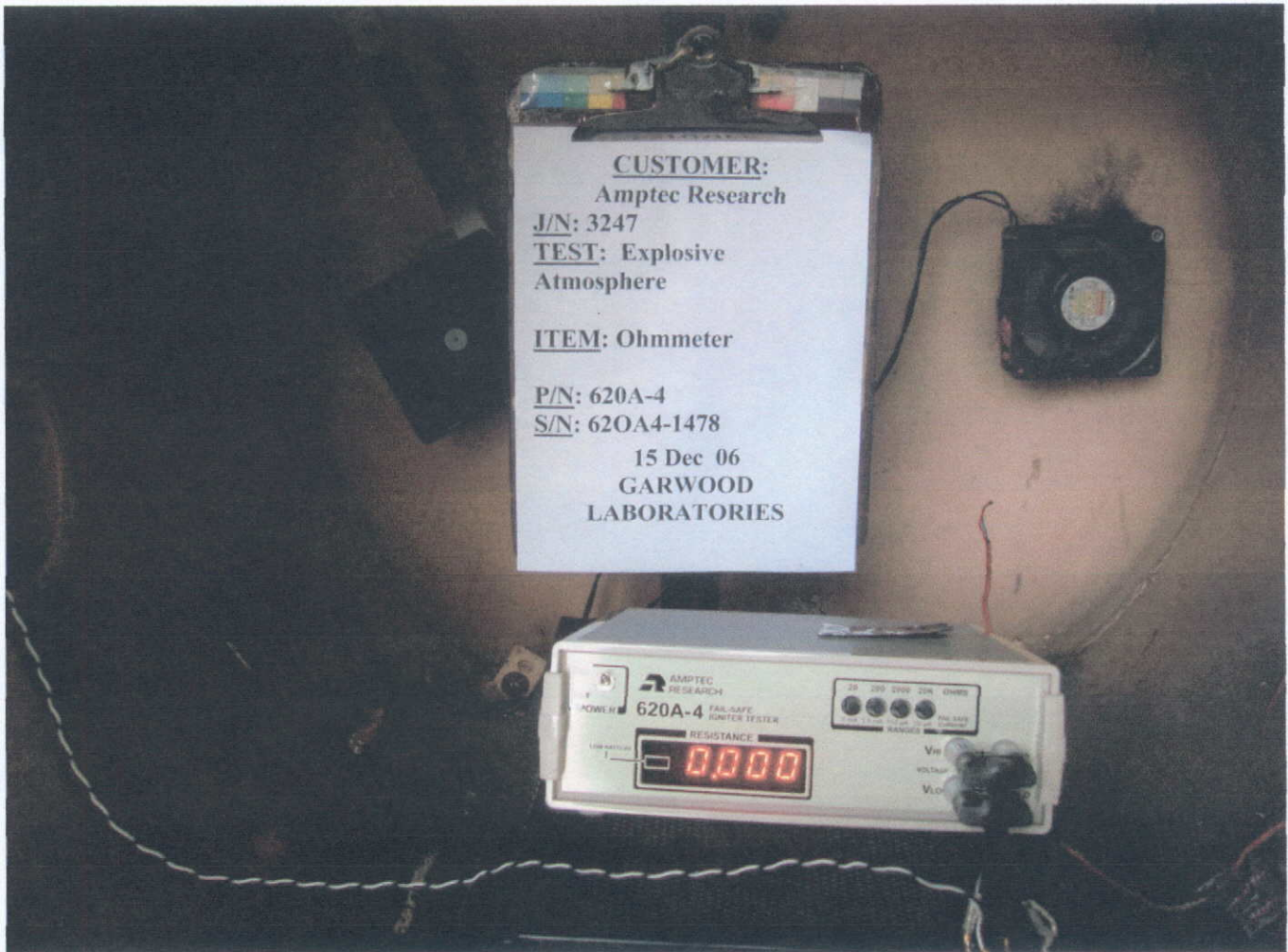
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ENVIRONMENTAL TEST PHOTOGRAPH(S)

EXPLOSIVE ATMOSPHERE
ONE (1) OHMMETER
P/N: 620A-4, S/N: 620A4-1470





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ENVIRONMENTAL TEST PHOTOGRAPH(S)

EXPLOSIVE ATMOSPHERE
ONE (1) OHMMETER
P/N: 620A-4, S/N: 620A4-1470

