



REPORT OF EXPLOSIVE ATMOSPHERE TEST
 ON
 TWO (2) NIGHTSTAR FLASHLIGHTS
 FOR
 APPLIED INNOVATION TECHNOLOGIES, INC.
 FORT LUPTON, COLORADO

WRITTEN BY	<i>Salim Khabieh</i>	REPORT	3-4493
CHECKED BY	<i>Denese Pootan</i>	AERO NAV S.O.	4493
APPROVED BY	<i>Gyanchand Pooles</i>	CUSTOMER P.O.	399
DATE	June 16, 2003	CONTRACT NO.:	
GOVERNMENT QAR	NO INSPECTION REQUIRED	NONE	

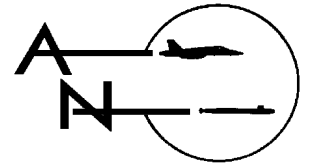
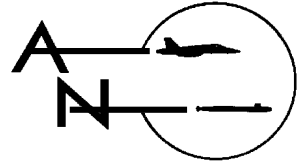


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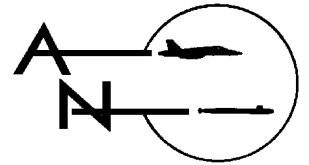
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REVISION HISTORY

Paragraphs/Sections Affected

Change



ADMINISTRATIVE DATA

PURPOSE OF TEST: To determine the effects of operating the NightStar Flashlight in various Explosive Atmospheres.

MANUFACTURER: Applied Innovative Technologies, Inc.
1310 Factory Circle
FT. Lupton CO, 80621

MANUFACTURER'S NOMENCLATURE: As specified on Purchase Order, the following nomenclature applies:
NightStar Flashlight.

DRAWING (S) AND / OR SPECIFICATIONS: Tested in accordance with MIL-STD-810F, Method 511.3, dated January 1, 2000, Aero Nav Labs Test Procedure 4493 and detailed instructions of client.

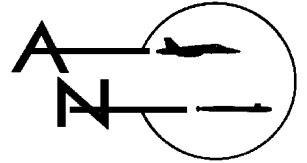
QUANTITY OF ITEMS TESTED: Two (2)

DATE TEST COMPLETED: May 23, 2003

TEST CONDUCTED BY: AERO NAV LABORATORIES, INC.
14-29 112th Street
COLLEGE POINT, NEW YORK 11356

DISPOSITION OF SPECIMEN: Returned to client.

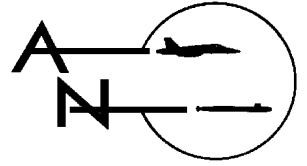
ABSTRACT: It is the function of Aero Nav Laboratories, Inc., as an impartial testing agency in performing tests, to subject the equipment to environmental conditions as specified in the detailed specifications.



1.0 DESCRIPTION OF TEST APPARATUS:

1.1 Explosion Chamber, Model No. 3D4, S/N 2705,
Manufactured by Tenney Engineering.
Calibration Due: December 2, 2003.

1.2 Thermocouple Meter, Model 650-T-X-DSS, S/N AN054
Manufactured By Omega Engineering.
Calibration Due: June 6, 2003.



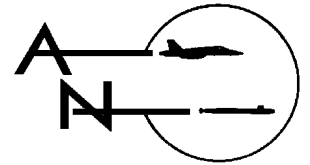
2.0 NAMEPLATE DATA:

NONE

3.0 TEST SEQUENCE AND COMPLETION DATES:

3.1 Explosive Atmosphere

May 23, 2003



4.0 METHOD OF TESTS:

4.1 Explosive Atmosphere Test:

The Explosive Atmosphere test was conducted with the following fuels/gases. One fuel/gas per test. All tests were performed at sea level.

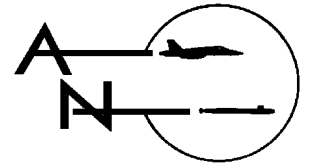
- a. Acetylene
- b. Hydrogen
- c. Ethylene
- d. Hexane
- e. Natural gas
- f. Aviation Gas (Av/Gas 100)

The following mixture of the fuel and air were used during the testing:

TABLE I

Gas	Lower Explosive Limit	Upper Explosive Limit	*Test Mixture
Acetylene	2.5%	100%	30%
Hydrogen	4%	75%	30%
Ethylene	2.7%	36%	22%
Hexane	1.2%	7.4%	3.82%
Natural gas	5%	15%	7.5%
Aviation Gas (Av/Gas 100)	0.9%	7%	3.5%

* The mixture of each gas approximated the stoichiometric ratio of gas/fuel and air. This mixture was between the Lower & Upper Explosive Limit for each gas. As specified herein, if a sample of the injected mixture did not explode in the sample chamber, the mixture was adjusted and the test was repeated.



METHOD OF TESTS (continued):

4.1.1 Explosive Atmosphere Test (The First NightStar Flashlight):

The NightStar Flashlight was charged for a total period of three (3) minutes and subjected to the Explosive Atmosphere Test as follows:

The NightStar Flashlight was placed in the test chamber in such a manner that it can be shaken and operated from outside of the chamber. The test altitude was at sea level. The highest operating temperature for the NightStar was 55°C.

The test chamber was sealed and the ambient temperature within was raised to 55 °C (131 °F). The temperature of the NightStar Flashlight and the chamber walls were raised to within 11 °C (20 °F) of that of the chamber ambient air, prior to the introduction of the fuel/gas.

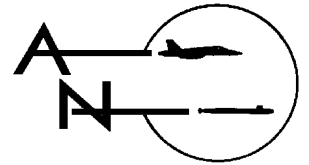
After stabilization was attained, the internal pressure was reduced to the appropriate level to allow introduction of the fuel/gas. The weight/percentage of fuel/gas necessary to produce the desired air vapor ratio was introduced and a period of 3 ± 1 minutes was allowed for the introduction, vaporization and mixing of the fuel/gas.

The NightStar Flashlight was turned ON-OFF ten times, shaken 90 strokes, and once again turned ON-OFF ten times.

If no explosion resulted, the potential explosiveness of the air vapor was verified. This was accomplished by drawing off a sample of the mixture into a sampling chamber and igniting it. Ignition was verified to occur at the test altitude. If the sampled mixture was not found to be explosive, the test was considered void and the entire procedure was repeated.

4.1.2 Explosive Atmosphere Test, Simulated Housing Seal Rupture (The Second NightStar Flashlight):

The above Explosive Atmosphere Test (paragraph 4.1.1) was repeated using Hydrogen, except the NightStar Flashlight housing seal was ruptured to allow for the explosive mixture penetration.



5.0 RESULTS OF TESTS:

5.1 Explosive Atmosphere Test (The First NightStar Flashlight):

5.1.1 Explosive Atmosphere Test (Conducted With Hexane Fuel):

The operation of the test unit did not cause the explosive mixture to ignite at the sea level test altitude.

The presence of explosive mixture was verified at the sea level test altitude by igniting a sample of the test mixture.

There was no evidence of external physical damage to the test unit as a result of this test.

5.1.2 Explosive Atmosphere Test (Conducted With Hydrogen Fuel):

The operation of the test unit did not cause the explosive mixture to ignite at the sea level test altitude.

The presence of explosive mixture was verified at the sea level test altitude by igniting a sample of the test mixture.

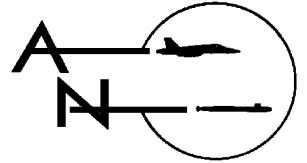
There was no evidence of external physical damage to the test unit as a result of this test.

5.1.3 Explosive Atmosphere Test (Conducted With Acetylene Fuel):

The operation of the test unit did not cause the explosive mixture to ignite at the sea level test altitude.

The presence of explosive mixture was verified at the sea level test altitude by igniting a sample of the test mixture.

There was no evidence of external physical damage to the test unit as a result of this test.



RESULTS OF TESTS (continued):

Explosive Atmosphere Test (continued):

5.1.4 Explosive Atmosphere Test (Conducted With Ethylene Fuel):

The operation of the test unit did not cause the explosive mixture to ignite at the sea level test altitude.

The presence of explosive mixture was verified at the sea level test altitude by igniting a sample of the test mixture.

There was no evidence of external physical damage to the test unit as a result of this test.

5.1.5 Explosive Atmosphere Test (Conducted With Natural Gas Fuel):

The operation of the test unit did not cause the explosive mixture to ignite at the sea level test altitude.

The presence of explosive mixture was verified at the sea level test altitude by igniting a sample of the test mixture.

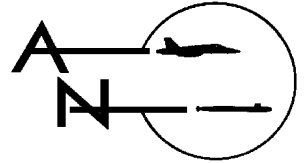
There was no evidence of external physical damage to the test unit as a result of this test.

5.1.6 Explosive Atmosphere Test (Conducted With Aviation Gas (Av/Gas 100) Fuel):

The operation of the test unit did not cause the explosive mixture to ignite at the sea level test altitude.

The presence of explosive mixture was verified at the sea level test altitude by igniting a sample of the test mixture.

There was no evidence of external physical damage to the test unit as a result of this test.



RESULTS OF TESTS (continued):

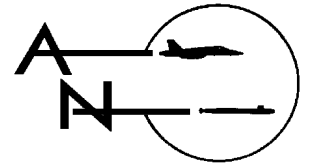
5.2 Explosive Atmosphere Test, Simulated Housing Seal Rupture (The Second NightStar Flashlight):

5.2.1 Explosive Atmosphere Test (Conducted With Hydrogen Fuel):

The operation of the test unit did not cause the explosive mixture to ignite at the sea level test altitude.

The presence of explosive mixture was verified at the sea level test altitude by igniting a sample of the test mixture.

There was no evidence of external physical damage to the test unit as a result of this test.



6.0 VISUAL POST TEST EXAMINATION:

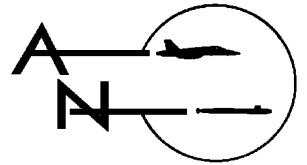
Visual post test examination revealed no evidence of physical damage or electrical malfunction as a result of the stress of the testing herein.

7.0 RECOMMENDATIONS:

None, data merely submitted.

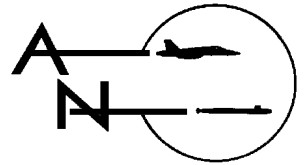
8.0 CONCLUSIONS:

Final evaluation of the submitted TWO (2) NIGHTSTAR FLASHLIGHTS for conformance to the requirements of the detailed specifications will be accomplished by APPLIED INNOVATION TECHNOLOGIES, INC. and the cognizant government agency upon review of results reported herein and further examination as required.



APPLIED INNOVATION TECHNOLOGIES, INC.
FORT LUPTON, COLORADO
The First NightStar Flashlight
Explosive Atmosphere Test Setup (Photograph #1)





APPLIED INNOVATION TECHNOLOGIES, INC.
FORT LUPTON, COLORADO
The Second NightStar Flashlight
Explosive Atmosphere Test Setup (photograph #2)

