

AD B  
0042208

~~AD B 056248 \$16.50~~

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER EM-CR-74051	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) EVALUATION OF TEST METHODS FOR PYROTECHNIC HAZARD CLASSIFICATION		5. TYPE OF REPORT & PERIOD COVERED Technical Report September 1973-September 1974
7. AUTHOR(s) Wayne R. Wilcox		6. PERFORMING ORG. REPORT NUMBER EA-4D01
9. PERFORMING ORGANIZATION NAME AND ADDRESS NASA National Space Technology Laboratories General Electric Company Engineering and Science Services Laboratory Bay St. Louis, Mississippi 39520		8. CONTRACT OR GRANT NUMBER(s) NAS8-27750 MIPR B4030
11. CONTROLLING OFFICE NAME AND ADDRESS Commander, Edgewood Arsenal Attn: SAREA-TS-R Aberdeen Proving Ground, MD 21010		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS PEMA 4932 Project 5744099
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Commander, Edgewood Arsenal Attn: SAREA-MT-TS Aberdeen Proving Ground, MD 21010 (CPO Mr. W. P. Henderson, 671-2301)		12. REPORT DATE March 1975
		13. NUMBER OF PAGES 163
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE NA
16. DISTRIBUTION STATEMENT (of this Report) Distribution limited to US Government agencies only because of test and evaluation; March 1975. Other requests for this document must be referred to Commander, Edgewood Arsenal, Attn: SAREA-TS-R, Aberdeen Proving Ground, Maryland 21010.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
Pyrotechnic Transportation Storage	Hazard classification Testing Initiation sensitivity	Environment Parameter Instrumentation
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The hazard classification procedures of TB 700-2 are improperly applied to pyrotechnics. Forty-six test methods were proposed as replacements for the currently applied methods. The proposed test methods were subjected to engineering review and analysis including the testing of two materials by six methods. Fifteen test methods were recommended for inclusion in a pyrotechnics supplement to TB 700-2.		

DDC  
RECEIVED  
JUN 2 1975  
RLIGHTED  
D



## METHOD 108

### ELECTRICAL SPARK SENSITIVITY

#### 1. SCOPE

1.1 This test determines the sensitivity of pyrotechnic mixtures to ignition by electrostatic charge. The sensitivity is expressed in terms of the minimum energy in an electrical spark discharge which will ignite the pyrotechnic mixture.

#### 2. SPECIMEN

2.1 The specimen shall consist of 10 to 15 milligrams of the pyrotechnic mixture to be tested. The specimen shall be prepared by sieving it through a 50-mesh screen prior to testing.

#### 3. MATERIALS

3.1 Materials required for this test are as follows:

- (a) A Fluke Model 410B high voltage power supply or equivalent
- (b) Capacitors: 0.002, 0.01, 0.02, 0.05, 0.1 and 1 microfarad
- (c) Needle point voltage probe
- (d) Aluminum plate
- (e) A spark gap test fixture
- (f) A limiting resistor
- (g) Suitable switches for charging and discharging capacitor

#### 4. PROCEDURE

4.1 Assemble the material described in 3.1 into the test configuration shown on figure 1. Initially, use the 1 microfarad capacitor. Connect the positive terminal of the condenser to the needle point voltage probe and the negative terminal to the aluminum plate. After verifying that the high voltage power supply is off, place the specimen in an even layer on the aluminum plate. Ground the specimen. Using approved safety operating procedures, turn on the high voltage power supply. Caution: Because of the high voltages present in the following procedure, use extreme caution to prevent accidental contact with points of high voltage. With all output voltage switches at zero, turn the high voltage power switch on.

With approximately five seconds between steps, advance the output voltage switches to the test voltage. Record the final voltage on a data sheet similar to the one shown on figure 2.



#### Method 108

Using the control knob, lower the spark gap probe toward the specimen until a spark occurs. Return the probe to this original position. Return the high voltage power supply output switches to zero. Observe the specimen for smoke, flame, or other evidence of ignition or for a lack of reaction and record the observation on the data sheet. Calculate the joules of energy to which the specimen was subjected as described on the data sheet.

4.2 In the first series of trials, use the 1 microfarad capacitor and the test voltages shown on figure 3. It is suggested that a test voltage of 1 kilovolt be used for the first trial. Conduct additional trials using the test voltages shown on figure 3 until at the lower of two consecutive test voltages no ignition is observed and at the higher test voltage evidence of ignition is observed. Then, using smaller capacitors and higher test voltages, determine as accurately as possible the amount of energy below which no ignition is observed and above which ignition is observed. Upon completion of all trials, turn the high voltage power supply off.

#### 5. EVALUATION

5.1 Electrostatic charges may present potential hazards during the manufacturing, storage, and transportation of pyrotechnic mixtures because the energy involved may be great enough to cause ignition. This test provides information on the sensitivity of pyrotechnic mixture to the energy released by an electrostatic discharge.

#### 6. REFERENCES

- (a) GE-MTSD-R-057
- (b) GE-MTSD-R-059
- (c) TM9-1910
- (d) Bureau of Mines Bulletin No. 346
- (e) Tomlinson and Sheffield, PATR 1740
- (f) AMCP 706-177
- (g) AMCP 706-186
- (h) Bureau of Mines Report of Investigations 3852, (Brown, F. W. et al)



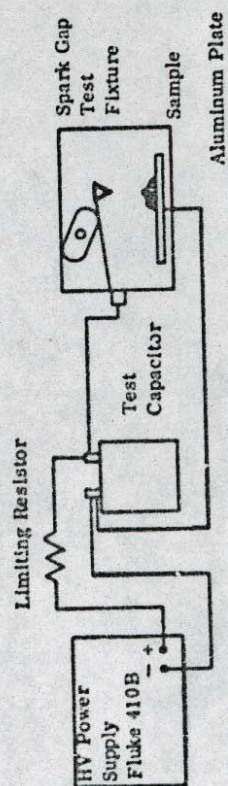


Figure 1. Electrostatic Ignition Susceptibility Test Setup