UNCLASSIFIED [redacted]

AUG 2 0 1956

1285

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 7/15/98
Authority: LADC ADD
Name: [illegible]
2nd Review Date: 7/20/98
Authority: ADD
Name: WC Layne
Determination (Circle Number)
1 Classification Retained
2 Classification Changed to: UNCC
3 Contains No DOE Classified Information
4 Coordinate With:
5 Contains UCAI
6 Comments: Redoubtedly

RECEIVED
AUG [illegible] 56
R & D FILES

Z-27, 3-2
Case No. 435.02
Ref. Sym: 1611 (334)
Project No. ET-3337
Completed 4/24/56

TO: DISTRIBUTION

Re: Nylon Pellet Test of Impact Fuses (TX-27)

No.
NTABILITY
BM
LE No. TX-27
3-2

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SEP 14 '6
3428-3

Object of Test

The object of this test was to determine whether rain or hail, simulated by projecting nylon pellets against the nose of the weapon, could cause premature or accidental detonation.

Authorization for Test

This test was requested by Division 1461 in a Work Order Authorization dated April 16, 1956. Mr. G. J. Janser was the consultant.

Procedure and Results

The nose section was supported so that its polar axis was horizontal. Nylon pellets 3/16-inch in diameter were projected at approximately 1000 feet per second against the nose. The trajectory of the pellets was parallel to the polar axis of the weapon.

There were four types of piezoelectric crystals mounted in the nose section. Three of these types were variations of the XMC-811: XMC-811 with a 42 gm brass weight incorporated in its construction, XMC-811A utilizing a Mallory Metal mass of 83.5 grams, and XMC-811B with a brass weight of 54.5 grams. The fourth type was an XMC-565. The specified load for each of the first three types was two megohms resistance and 400 micromicrofarads capacitance, including the capacitance of the crystals, the connecting cable, and the input capacitance of the oscilloscope used. The impedance for the XMC-565 was to be two megohms and 850 micromicrofarads including the capacitances mentioned above.

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One of each of the types of crystals was mounted on a ring 15.25 inches in diameter at the flattened portion of the nose. The crystals were spaced equidistantly about the circle.

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The same arrangement of the fuses was maintained on a circular bracket well back on the swell of the nose section where the diameter of the weapon became 30.25 inches. All pellets fired against these crystals necessarily impinged upon the skin at a flat angle, and the total shot pattern could not be achieved.

Insofar as was possible, a shot pattern was fired along vertical and horizontal lines extending six inches in all four directions from the center of the crystal.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP
CLASSIFICATION CHANGED TO: U
Emelda Selph 7/21/98
PERSON CHANGING MARKING & DATE
WC Layne 7/22/98
PERSON VERIFYING MARKING & DATE
AUTHORITY: W.C. Layne
RECORD ID: 98SN3051
DATED: 7/20/98

[redacted]

CENTRAL M & R 60340
CONTROL NO. Q
APR 1 1957
2143

Ref. Sym: 1611 (334)
Project No. ET-3337

To: Distribution

The individual shots were spaced one inch apart. The crystals were individually shot tested, with a photographic record being made of the oscilloscope screen showing peak output voltage and time from impact to the peak.

The cold-cathode thyratrons of the firing circuit may require a voltage of 115 to 215 volts for triggering, so an output of 50 volts or less from the crystals would give a generous safety factor.

Tables I and II list the complete data from the test. This tabulation shows plainly that a minimum safety factor of three exists between voltage output of the crystals and the triggering voltage of the firing circuit.

R. G. Hamilton

Test Conducted by R. G. HAMILTON - 1611-2

M. A. Richter

Approved by M. A. RICHTER - 1611-2

RGH:1611-2:dr

DISTRIBUTION:
1/11 A - W. O. McCord, 1460
Attn: R. D. Wehrle, 1461-1
2/11 A - W. A. Gardner, 1610
3/11 A - G. C. McDonald, 2530
4/11 A - W. C. Kraft, 2540
5/11 A - D. Williams, Jr., 1611
6/11 A - R. E. Fisher, 1621
7/11 A - J. R. Hoffman, 5133
8/11 A - J. R. Harrison, 5522
9/11 A - C. L. Gomel, 5523
10/11 A - R. K. Smeltzer, 7222-2
11/11 A - K. M. Sadler, 7222-3
Attn: Tech. Ref. File

Ref. Sym: 1611 (334)
Project No. ET-3337

TABLE I

Peak Voltage Output and Time to Peak of Crystals on Nose (TX-27)

XMC-811

	Inches Left							Inches Right						Inches Up						Inches Down					
	0	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Peak volts	35	35	33	28	34	25	16	35	28	30	12	15	20	35	32	12	25	20	25	35	26	20	22	25	16
Msec to peak	.3	.1	.3	.3	.1	.1	.3	.3	.2	.1	.3	.2	.1	.1	1.3	.3	.3	.6	.2	.3	.3	.3	.5	1.	.5
XMC-811A																									
Peak volts	35	35	35	18	18	28	28	32	25	25	12	18	25	28	35	-	22	20	22	35	30	30	17	12	12
Msec to peak	.1	.1	.1	.1	.3	.3	.7	.1	.8	.7	-	.3	.3	.1	.1	-	.2	.2	.4	.1	.1	.1	.2	.2	.5
XMC-811B																									
Peak volts	35	35	32	25	20	20	10	32	28	20	15	10	8	30	30	20	20	17	18	35	15	20	20	18	18
Msce to peak	.1	.1	.1	.1	.1	.1	2.2	.1	.1	.1	.1	.2	2.3	.1	2.	.7	.7	.3	.2	.1	.1	.2	.3	.3	.3
XMC-565																									
Peak volts	32	32	30	30	17	20	22	32	20	8	12	20	20	32	22	20	17	10	10	25	22	32	12	12	14
Msec to peak	.2	.6	1.7	2.1	.3	.3	2.3	.2	.2	.2	.3	.2	.7	.7	.6	.5	.7	.7	.8	.1	.6	.5	.2	.3	.7

[redacted]

TABLE II

Peak Voltage Output and Time to Peak of Crystals on Swell (TX-27)

	Inches Left			Inches Right		Inches Up		Inches Down	
	0	1	2	1	2	1	2	1	2
XMC-811									
Peak Volts	3	3	-	3	-	3	3	5	5
Msec to peak	-	.5	-	.3	-			3.5	2
XMC-811A									
Peak Volts	14	12	5	5	-	8	-	12	-
Msec to peak	.2	.1	.2	.3	-	.2	-	.1	-
XMC-811B									
Peak Volts	-	12	-	8	-	10	-	12	10
Msec to peak	-	.2	-	.2	-	.3	-	.1	.1
XMC-565									
Peak Volts	10	-	-	12	10	12	-	8	-
Msec to peak	.2	-	-	.2	1.8	.8	-	.6	-