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GD CONVAIR (ASTRONAUTICS) DIVISION
GENERAL DYNAMICS CORPORATION

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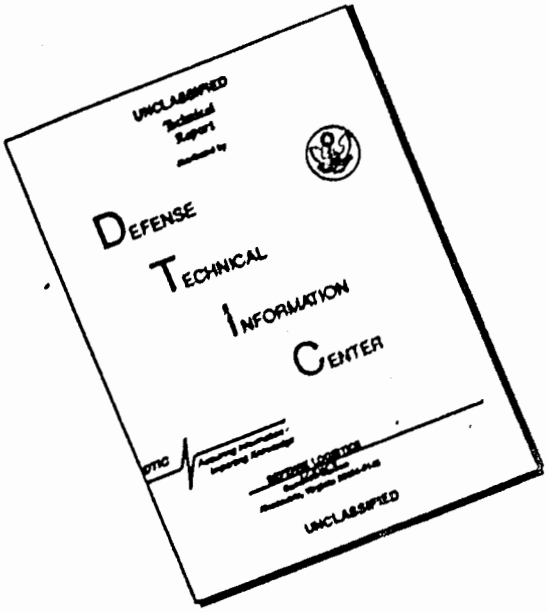

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CONVAIR | ASTRONAUTICS

CONVAIR DIVISION OF GENERAL DYNAMICS CORPORATION

REPORT NO. 27A230

ASTRONAUTICS

FLIGHT PROOFING TEST REPORT

FOR

MAIN MISSILE REMOTELY ACTIVATED

PRIMARY BATTERY, E.S.B.

Dwg. No. 27-06359-3

CONVAIR-ASTRONAUTICS
NOV 9 1959
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sf/

REVISIONS

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SUMMARY

A total of six (6) specimens were subjected to the tests as outlined in this procedure. The results are as follows:

(1) Specimen S/N 904-0055 was discharged at ambient atmospheric conditions after a stand time of 1 hour and 12 minutes. Following the discharge the canister failed and leaked electrolyte. (See Data Sheets.)

(2) Specimen S/N 904-0057 was subjected to the 2.5 hour heater test and a discharge at +40°F. The stand time was 4 hours and 50 minutes and the discharge was satisfactory.

(3) Specimen S/N 904-0051 was activated at +125°F. The stand time was 4 hours and 30 minutes. Before the discharge could be performed, the canister failed and electrolyte leakage occurred. The output voltage then dropped below the minimum of 26 VDC.

(4) Specimen S/N 904-0048 was activated and discharged at +80°F as a replacement for S/N 904-0051. The stand time was 3 minutes. After the discharge the canister failed and electrolyte leakage occurred.

(5) Specimen S/N 904-0045 was discharged at a rate of 60 amperes for 10 minutes while at an altitude of one (1) millimeter of mercury. After this discharge it was found that electrolyte had leaked out around the Cannon Plug. Four (4) hours and 35 minutes after activation, the acceleration tests were performed with satisfactory results.

(6) Specimen S/N 904-0047 was subjected to Proof Cycle "B" as specified in Paragraph 4.1.9.2 of this procedure. After a stand time of 6 hours and 7 minutes the specimen was vibrated in thd Z axis (See Figure 3 for axis designation) while being discharged at ten (10) amperes. While the vibration equipment was being set up to accommodate the remaining axes, the canister heated and bulged at the sides. The specimen was then vibrated in the Y-axis and the output voltage fell below the 26 volt minimum.

A typical discharge circuit is shown in Figure 4.

1.0 GENERAL INFORMATION:

1.1 PURPOSE - The purpose of this report is to describe the test equipment and procedure required for the Flight Proofing of components in accordance with the latest issue of Convair Specification No. 7-00210.

1.2 ENVIRONMENTAL TESTS - The environmental tests prescribed in this procedure are written to conform to the individual component specification and the current issue of Convair Specification No. 7-00210. In the event of conflict between specifications the component specification shall take precedence.

1.3 NOMENCLATURE - The specific component under test shall be referred to as, "Test Specimen" in this procedure.

1.4 TEST DATA - One copy of this report shall be bound into a data book and all original data and operating time, in minutes, recorded therein. The data book shall be kept on file in the Components Test Laboratory.

1.5 WITNESSING - Data from all tests outlined in this procedure shall be witnessed and signed by a Air Force Representative or his designated alternate.

1.6 SEQUENCE OF TESTS - The Initial Satisfactory Performance Test shall be performed on the "Test Specimen" prior to all other tests. The sequence of subsequent tests shall be determined by the availability of environmental facilities.

1.7 VARIATIONS - Variations to Convair Specification No. 7-00210 and/or the individual component specification shall be issued in the form of a memorandum to the applicable portions of this procedure.

Deviations to the above specification shall be processed by the Design Engineering Group based on the variations, if any, outlined in this procedure.

2.0 DESCRIPTION AND REQUIREMENTS:

2.1 DESCRIPTION OF TEST SPECIMEN - The test specimens covered by this procedure consist of five (5) remotely activated, Main Missile, Primary Batteries as outlined in Convair Spec. No. 27-06359.

2.2 REFERENCES - Applicable portions of the following publications shall form part of this procedure:

a) Convair Spec. No. 7-00210 B - "Environmental Requirements and Test Procedures for WS-107A-1 Equipments".

b) Convair Spec. No. 27-06359F - "Battery Pack-Main Missile Power, Primary Type, Missile-borne, Specification For".

2.3 OPERATING REQUIREMENTS AND TOLERANCES:

2.3.1 OUTPUT VOLTAGE - The output voltage shall be, with a discharge current between 60 and 145 amperes, as follows:

a) The voltage shall be less than 32.0 vdc within 0.025 seconds.

b) The voltage shall remain between 26.0 and 30.0 vdc from 0.5 minutes to 10 minutes.

2.3.2 NOISE - The electrical noise (ripple) on the 28.0 vdc level shall not exceed 0.03 volts measured peak-to-peak.

2.3.3 ACTIVATION TIME - The time required for the test specimen to attain full power output after the start of electrolyte transfer to the cells shall not exceed 2 minutes when activated with an open circuit condition.

2.3.4 STAND TIME - The test specimen shall have a maximum stand time (non-operating time after activation) of 10 hours.

2.3.5 SPECIAL INSTRUCTIONS - When the test specimen is discharged at 10 amperes the criteria for unsatisfactory operation is ripple or erratic operation.

3.0 TEST FACILITIES AND EQUIPMENT:

3.1 INITIAL SATISFACTORY PERFORMANCE TEST EQUIPMENT - The following equipment shall be used for the Initial Satisfactory Performance Test and for the subsequent proof cycles:

a) Voltmeter, Non-Linear, Model 4513, Accuracy ± 0.01% or 1 count, whichever is greater.

b) Voltmeter, Weston, Model 931, Accuracy ± 0.5%.

c) Ammeter, Weston, Model 931, Accuracy ± 0.5%.

d) Recorder, CEC, Accuracy ± 2.0%.

e) Potentiometer, Leeds and Northrup, Model 8662, accuracy 0.1% from 0 to 80 millivolts.

3.2 ENVIRONMENTAL EQUIPMENT:

3.2.1 TEMPERATURE-ALTITUDE-HUMIDITY EQUIPMENT - HEMCO Environmental Chamber, Model WFA-100-45.

3.2.2 VIBRATION EQUIPMENT - LAB Vibration Exciter, C-25-H, or equivalent, with associated monitoring equipment.

3.2.3 ACCELERATION TEST EQUIPMENT - Genisco Centrifuge, Model C-159.

4.0 TEST PROCEDURES:

4.1 TEST CONDITIONS:

4.1.1 ATMOSPHERIC CONDITIONS - Unless otherwise specified herein or in the test specimen specification, all tests shall be performed at an atmospheric pressure between 28 inches and 32 inches of mercury, a temperature between +60°F, and 95°F, and a relative humidity of not more than 90%. Data from tests performed at other than the atmospheric conditions specified shall include corrections for instrument compensation.

4.1.2 TOLERANCES - The maximum allowable tolerances on test conditions shall be as follows:

a. Temperature.....±4°F

b. Barometric Pressure.....±5%

c. Relative Humidity.....±10%

d. Vibration Amplitude.....±10%

e. Vibration Frequency.....±2%

f. Acceleration.....±10%

4.1.3 MEASUREMENTS - All measurements shall be made with instruments whose accuracies have been certified by the Astronautics Standards Laboratory and which bear a current calibration decal.

4.1.4 TEST SPECIMEN OPERATION - Operational and functional tests of the test specimen shall be conducted as outlined in this procedure.

4.1.5 ADJUSTMENTS AND REPAIRS DURING TESTS - No adjustments, maintenance, or repairs of the test specimen, other than those specifically stated in this procedure shall be allowed after the start of the Initial Satisfactory Performance Tests. Exceptions to this shall be made when in the opinion of the Components Test Lab and designated witnesses, adjustments, repairs, or maintenance are not due to faults in design, workmanship, materials, or to the test conditions imposed.

4.0 TEST PROCEDURES: Continued

4.1.6 TEMPERATURE STABILIZATION - Temperature stabilization has been reached when the temperature of the largest centrally located mass of the test specimen does not vary more than 5°F from the temperature ambient to the equipment.

4.1.7 PRELIMINARY INSPECTION - The test specimen shall be examined visually prior to any other test to determine that the specimen meets the requirements of workmanship, identification markings, external dimensions, and proper inspection approval.

4.0 TEST PROCEDURES: (Continued)

4.1.8 INITIAL SATISFACTORY PERFORMANCE TEST - The following tests shall constitute the Initial Satisfactory Performance Test for the test specimen.

The proof cycle "A" designated in Paragraph 4.2.1.1 a shall satisfy the requirement for an Initial Satisfactory Performance Test.

4.1.9 OPERATING TEST - The following shall constitute the Operating Test, the results of which shall form the basis for indicating satisfactory performance of the test specimen under applicable environmental tests.

Five (5) test specimens will be used throughout this test. All specimens are to be subjected to all environmental tests until discharged. Discharging of the specimens will be accomplished in accordance with the following schedule.

Specimen No.	Discharge Para. No.	Proof Cycle
1	4.2.1.1 a	4.1.9.1
2	4.2.1.1 c	4.1.9.1
3	4.2.1.1 f	4.1.9.1
4	4.2.1.1 d	4.1.9.3 (a)
	4.4.1	4.1.9.3 (b)
5	4.3.1	4.1.9.2
		4.1.9.3 (c)

4.1.9.1 PROOF CYCLE "A" - To be performed after or during tests where Proof Cycle "A" is specified. (See preceeding paragraph).

a) Energize heater and allow sufficient time for the test specimen to reach an operating temperature level. Operating temperature level is reached when the heater does not operate continuously with power applied.

b) Activate test specimen. Measure and record time to come up to full voltage.

c) Allow to stand for a minimum of 2.0 minutes.

d) Measure and record voltages (Open Circuit).

e) Measure and record voltages and noise while discharging the test specimen at a rate of 145 amperes for a period of 10 minutes.

4.0 TEST PROCEDURES: (Continued)

4.1.9.2 PROOF CYCLE "B" - To be performed, using an activated test specimen where Proof Cycle "B" is specified.

a) Place the test specimen in a temperature chamber.

b) Stabilize the test specimen temperature at +40°F.

c) Apply 117 vac, 60 cps to the heater system.

d) Increase the chamber temperature to +120°F in increments of 20°F. Allow the test specimen to stand for one hour at each increment.

e) Measure and record heater cycle operation during each temperature interval.

4.1.9.3 PROOF CYCLE "C" - To be performed where Proof Cycle "C" (a, b, or c) is specified.

a) Perform Proof Cycle "A", steps a through d, then measure and record voltage and noise while discharging the test specimen at a rate of 60 amperes for 10 minutes.

b) Measure and record the voltage and noise while discharging the test specimen at 145 amperes. This test shall be performed on the same specimen used in the preceeding paragraph (4.1.9.3 a).

c) Perform Proof Cycle "A", steps a through d, and measure and record voltage and noise while discharging the test specimen at 10 amperes.

4.0 TEST PROCEDURES: (Continued)

4.2 TEMPERATURE-ALTITUDE-HUMIDITY TESTS:

4.2.1 MISSILEBORNE EQUIPMENT - Missileborne equipment shall be subjected to the following test sequences, as applicable.

4.2.1.1 MISSILEBORNE POD MOUNTED CANISTERS - The following test sequence shall be conducted in a Temperature-Altitude-Humidity Test chamber in order specified. A thermocouple shall be placed in good thermal contact on the largest centrally located external mass of the test specimen, or in any other location deemed necessary to check temperature stabilization.

a) The test specimen shall be placed within the chamber and the chamber maintained at atmospheric conditions as specified in Paragraph 4.1.1. The test specimen shall be operated through one proof cycle "A", and a record made of all data necessary to determine compliance with the performance requirements of this specification.

b) The test specimen temperature shall be stabilized and maintained at plus 125°F for a period of one hour. The chamber temperature shall be maintained and the test specimen subjected to radiant heat at the rate of 360 BTU/sq. ft./hr. upon its largest surface area for a period of 4 hours.

c) The chamber temperature shall be reduced to minus 65°F at a rate of 0.75 to 1.25°F per minute, and maintained at this temperature for a period of 8 hours. The test specimen shall then be removed from the chamber and placed in an ambient temperature between +60°F and +95°F until the test specimen temperature stabilizes. The test specimen shall then be operated through steps (a), (b), and (c) of proof cycle "A". The chamber shall then be brought to a temperature of +40°F and the test specimen returned to the chamber. After the test specimen temperature stabilizes, the heater shall be turned on for a period of 2.5 hours. At the start of the final hour of the 2.5 hour period, the chamber absolute internal pressure shall be reduced to 3.44 inches of mercury for a period of at least one hour and then returned to approximately 30 inches of mercury. The test specimen shall then be operated through steps (d) and (e) of proof cycle A while supplied with sufficient cooling or heating air to maintain the external ambient temperature at +40°F. A record shall be made of all data necessary to determine compliance with the performance requirements of this specification.

4.0 TEST PROCEDURES: (Continued)

4.2.1.1 MISSILEBORNE POD MOUNTED CANISTERS - Continued

d) The chamber temperature shall be increased at a rate of 0.75 to 1.25°F per minute to +160°F, and maintained with a relative humidity of not less than 95 percent, for a period of 4 hours, or until the test specimen temperature stabilizes, whichever is longer. At the end of this period the chamber temperature shall be reduced to +125°F at a rate of 0.75 to 1.25°F per minute, and maintained at this temperature until the test specimen temperature stabilizes. The unit shall then be operated through steps (a), (b), and (c) of proof cycle A. The chamber internal absolute pressure shall be reduced to 3.44 inches of mercury for a period of at least 1 hour, and then returned to approximately 30 inches of mercury. During this one hour period, relative humidity may be decreased but shall be returned to 95 percent at a pressure of 30 inches of mercury. The chamber shall then be allowed to return to ambient temperature until the test specimen temperature stabilizes. The test specimen shall then be operated through steps (d) and (e) of proof cycle A while supplied with sufficient heating or cooling air to maintain the external ambient temperature at +80°F. A record shall be made of all data necessary to determine compliance with the performance requirements of this specification.

The heating or cooling air to the test specimen shall be cut off and the test specimen operated through proof cycle C, step a, while the chamber internal absolute pressure is reduced to not more than 1 mm of mercury as rapidly as possible, but not to exceed 10 minutes (no humidity control). A record shall be made of all data necessary to determine compliance with performance requirements of this specification.

4.0 TEST PROCEDURES: (Continued)

4.3 OPERATING VIBRATION TESTS - Prior to this test perform proof cycle B. Proof cycle C, step c, shall be performed while the test specimen is subjected to the tests described in paragraph 4.3.1. A record shall be made of all data necessary to determine compliance with the performance requirements of this specification.

4.3.1 DETERMINATION OF RESONANT FREQUENCY - The test specimen shall be subjected to a slow speed scanning sweep at frequencies and amplitudes of sinusoidal vibration as shown in Figure 1, 2 and 3, as applicable, and a sweep period as shown in Figure 4 along any three mutually perpendicular axes of the test specimen. The resonant frequencies for each axis shall be determined by the following methods.

a. Increased accelerations measured on the test specimen with constant input accelerations, measured at the test specimen mounting points.

b. Excessive noise emitted from the equipment.

c. Erratic Operation, or failure of the equipment.

4.4 OPERATING ACCELERATION TESTS - Perform proof cycle C, step b, while the test specimen is subjected to the tests described in paragraph 4.4.1. A record shall be made of all data necessary to determine compliance with the performance requirements of this specification.

4.4.1 STANDARD TEST -

Step 1 The equipment shall be subjected to 10.0 G, ± 1.0 G for a period of at least 30 seconds along the axis, corresponding to the air vehicle longitudinal axis, forward.

Step 2 The test specimen shall be subjected to 2 G $^{+10}_{-0}$% for a period of at least 15 seconds along the axis corresponding to the air vehicle longitudinal axis, in a reverse direction.

Step 3 The test specimen shall be subjected to 3 G $^{+10}_{-0}$% along each of the two axis mutually perpendicular to each other and to the air vehicle longitudinal axis, for a period of at least 15 seconds in each direction.

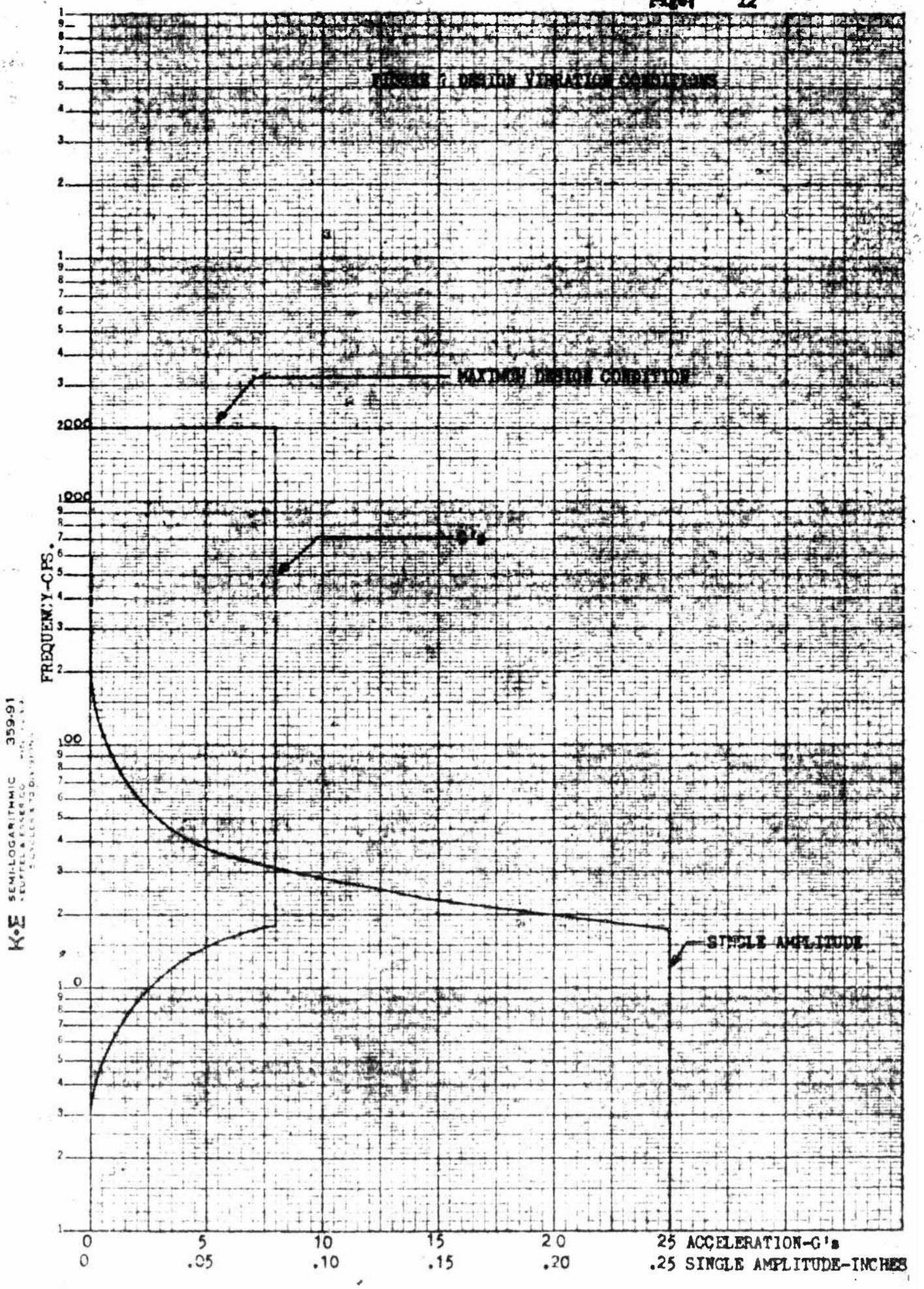


FIGURE 7 DESIGN VIBRATION CONDITIONS
MAXIMUM DESIGN CONDITION
FREQUENCY-CPS.
SINGLE AMPLITUDE
0 5 10 15 20 25 ACCELERATION-G's
0 .05 .10 .15 .20 .25 SINGLE AMPLITUDE-INCHES
K+E SEMI-LOGARITHMIC 359-91

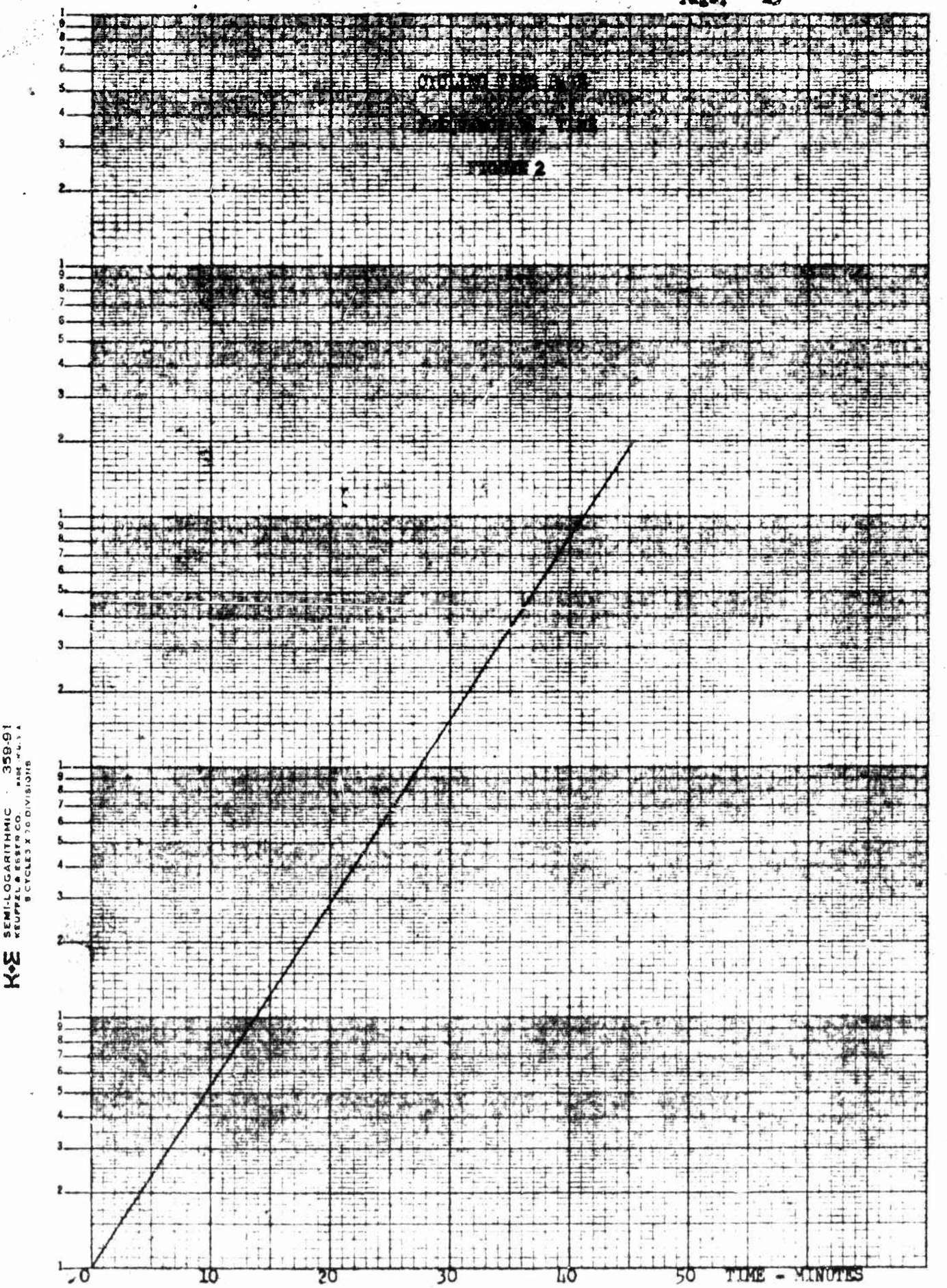
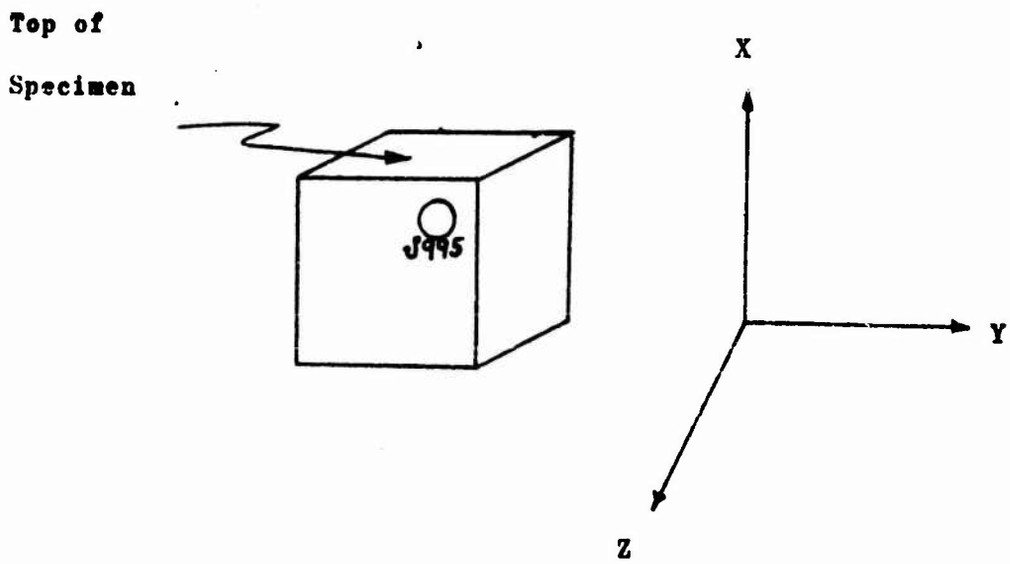


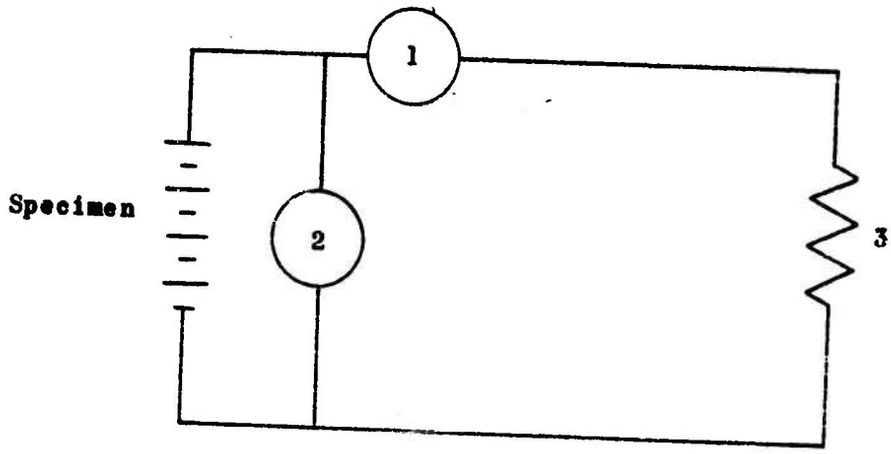
FIGURE 2
0
10
20
30
40
50
TIME - MINUTES
K+E SEMI-LOGARITHMIC 359-91
KEUFFEL & ESSER CO.
8 CYCLES X 70 DIVISIONS



27A230 Main Missile Battery. Flight Proof Test.

Diagram showing axes of vibration.

FIGURE 3



1. Ammeter

2. Voltmeter, Oscilloscope, and C.E.C. Recorder.

3. Variable resistance loads

27A230 Main Missile Battery. Flight Proof Test.

Typical discharge test set-up.

FIGURE 4

CONVAIR ASTRONAUTICS

Reference Pars. No. 4.2.1.1 a

Date 21 Sept. 1959

Specimen S/N ESB-904-0055

Test Engr. Lamoureux

Test Conditions ambient atmospheric +77°F

CVAC Insp. L. Ortiz

CEC Magazine No. 26146

USAF Insp. R. Howard

Record No. 9446

A) Heater warmup time. Start 2040 hrs Stop 2046 hrs Current 0 amps.

B) Activation. Start 2041 hrs Current _____ amps

Voltage at 2 min. 34.69 vdc. Time to attain full voltage 0.2 min.

C) Discharge. Open circuit voltage 35.5 vdc. Start 2046 hrs.

Time (min.)	Volts	Amps	Noise (PtoP)	Comments
0	8 17.8	145		
25 sec.	at this	time the	battery	cable began to
smoke.	The B-	lead charred and	the test was	
stopped.	The area	beneath	the battery was	
examined and	electrolyte	seems to have	leaked out.	
The vent hole	gave off a	brown	gas. The sensing	
leads developed a	short circuit.	The	leads were replaced	
and test	continued on next	page.		
0.025	18.3			

Reference Para. No. 4.2.1.1 a

Date 21 Sept. 1959

Specimen S/N ESB904-0055

Test Engr. Lamoureux

Test Conditions Ambient Atmospheric +77°F

CVAC Insp. L. Ortiz

CEC Magazine No. ~~26146~~ 135 2.2

USAF Insp. R. Howard

Record No. ~~9446~~ 2.2 9449

A) Heater warmup time. Start_____hrs Stop_____hrs Current_____amps.

B) Activation. Start_____hrs Current_____amps

Voltage at 2 min._____vdc. Time to attain full voltage_____min.

C) Discharge. Open circuit voltage 36.88 vdc. Start 2153 hrs.

Time (min.)	Volts	Amps	Noise (PtoP)	Comments
0	28.46	145	0	
0.5	28.15	145	0	
1.0	28.12	145	0	
1.5	28.13	145	0	
2.0	28.15	145	0	
2.5	28.18	145	0	
3.0	28.20	145	0	
3.5	28.22	145	0	
4.0	28.24	145	0	
4.5	28.24	145	0	
5.0	28.23	145	0	
5.5	28.22	145	0	
6.0	28.20	145	0	
6.5	28.17	145	0	
7.0	28.14	145	0	
7.5	28.11	145	0	
8.0	28.07	145	0	
8.5	28.05	145	0	
9.0	28.00	145	0	
9.5	27.98	145	0	
10.0	27.93	145	0	
at 0.025	26.3	145	0	

at 2315 the battery case bulged, split and spewed electrolyte. Extremely hot to the touch.

Reference Para. No. 4.2.1.1c

Date 23 Sept. 1959

Specimen S/N ESB 904-0057

Test Engr Lamoureux

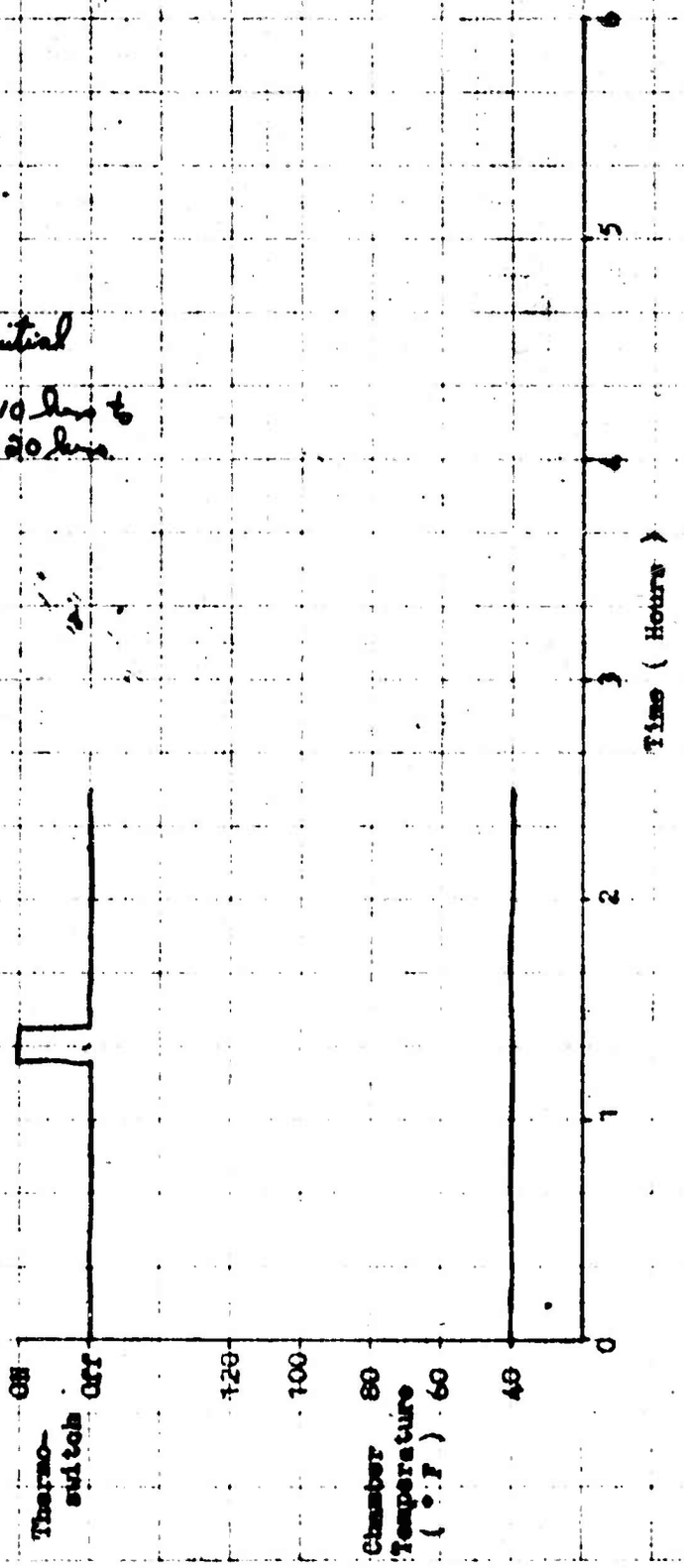
CVAC Insp D. A. Squibb

USAF Insp R. HOWARD

Test Conditions

2.5 hr heater test

heater current 0 amps. } Initial
heaters on 2155 hrs }
heaters drew 2.5 amps } 2310 hrs to 2320 hrs.



Reference Para. No. 4.2.1.1 c

Date 23 Sept 1959

Specimen S/N ESB 904-0057

Test Engr. Lamoureux

Test Conditions activate ambient atmospheric +75°F Discharge +40°F

CVAC Insp. D. R. Squibb

CEC Magazine No. 26135

USAF Insp. R. Howard

Record No. 9459

A) Heater warmup time. Start 1920 hrs Stop 1938 hrs Current 2.6 amps.

B) Activation. Start 1940 hrs Current 4.2 amps 5.8 amps at 7.5 sec.

Voltage at 2 min. 35.91 vdc. Time to attain full voltage 0.2 min.
2.5 hr heater test on separate data sheet.

C) Discharge. Open circuit voltage 36.17 vdc. Start 0030 hrs.

Time (min.)	Volts	Amps	Noise (PtoP)	Comments
0	27.85	145	0	
0.5	27.50	145	0	
1.0	27.59	145	0	
1.5	27.69	145	0	
2.0	27.77	145	0	
2.5	27.89	145	0	
3.0	27.97	145	0	
3.5	28.06	145	0	
4.0	28.14	145	0	
4.5	28.20	145	0	
5.0	28.25	145	0	
5.5	28.29	145	0	
6.0	28.33	145	0	
6.5	28.34	145	0	
7.0	28.36	145	0	
7.5	28.35	145	0	
8.0	28.35	145	0	
8.5	28.34	145	0	
9.0	28.31	145	0	
9.5	28.29	145	0	
10.0	28.28	145	0	
0.025	25.89	145	0	

CONVAIR ASTRONAUTICS

Reference Para. No. 4.2.1.1 d

Date 24 Sept. 1959

Specimen S/N ESB-AMF 904-0051

Test Engr. Lamoureux - Smith

Test Conditions ~~+80°F~~ 2.2 +125°F

CVAC Insp. D. R. Squibb

CEC Magazine No. _____

USAF Insp. R. HOWARD

Record No. _____

A) Heater warmup time. Start _____ hrs Stop _____ hrs Current _____ amps.

B) Activation: Start 1130 hrs. Current 4.0 amps

Voltage at 2 min. 36.0 vdc. Time to attain full voltage 0.2 min.

C) ~~Discharge.~~ Altitude of 3.44 inches of mercury from 1145 to 1245 Open circuit voltage _____ vdc. Start _____ hrs.

Note:

Time (min.)	Volts	Amps	Noise (PtoP)	Comments
At 4.5 hours it was discovered that the battery ~~voltage~~ voltage (open circuit) had begun to drop. The sides had bulged and the top seam had split. Electrolyte had filled the air in the chamber. The specimen voltage at 1707 hrs was 23.43 volts. The specimen was removed from the chamber and 904-0048 was activated and discharged.				

Reference Para. 4.2.1.1d * Date 24 Sept. 1959

Specimen S/N. AMF-ESB 904-0048 Test Engr. Lamoureux

Test Conditions Ambient atmospheric +80°F QVAC Insp. L. Ortiz

[illegible] 26073 QVAC Insp. R. Howard

[illegible] 9462

[illegible] 1750 [illegible] 1751 [illegible] 0 [illegible]

[illegible] 1751 [illegible] 3.4 [illegible]

[illegible] 33.9 vdc. [illegible] 0.2 [illegible]

[illegible] 34.09 vdc. Start 1754 [illegible]

[illegible]	Volts	[illegible]	[illegible] (Ptot)	[illegible]
0	29.43	145	0	
0.5	29.21	145	0	
1.0	29.08	145	0	
1.5	29.05	145	0	
2.0	29.01	145	0	
2.5	28.99	145	0	
3.0	28.95	145	0	
3.5	28.93	145	0	
4.0	28.92	145	0	
4.5	28.90	145	0	
5.0	28.88	145	0	
5.5	28.86	145	0	
6.0	28.83	145	0	
6.5	28.80	145	0	
7.0	28.76	145	0	
7.5	28.74	145	0	
8.0	28.70	145	0	
8.5	28.65	145	0	
9.0	28.60	145	0	
9.5	28.52	145	0	
10.0	28.44	145	0	
0.025	29.18	145	0	

Test performed in lieu of normal discharge when specimen failed during the +80°F stabilization period.
Top seam split after discharge - Small amount of electrolyte appears to have leaked out.

CONVAIR ASTRONAUTICS

[illegible] 4.2.11d Date 24 Sept. 1959

Specimen S/N ESB-AMF 904-0046 Test [illegible] Lamoureux

Test [illegible] altitude of .1mm Hg. +78°F [illegible] Insp. D. R. Squibb

[illegible] 27148 [illegible] Insp. R. Howard

[illegible] 9465

[illegible] Start 1915 hrs Stop 1919 hrs Current 0 [illegible]

[illegible] Start 1920 hrs Current 3.6 [illegible]

[illegible] 34.01 vdc. Time to attain full voltage 0.2 [illegible]

C) D. [illegible] voltage 35.84 vdc. Start 1935 [illegible]

[illegible]	Volts	[illegible]	Noise (Ptol)	[illegible]
0	30.34	60	0	
0.5	30.21	60	0	
1.0	30.09	60	0	
1.5	30.04	60	0	
2.0	30.03	60	0	
2.5	29.99	60	0	
3.0	29.99	60	0	
3.5	29.99	60	0	
4.0	29.99	60	0	
4.5	29.99	60	0	
5.0	29.97	60	0	
5.5	29.99	60	0	
6.0	29.95	60	0	
6.5	29.96	60	0	
7.0	29.95	60	0	
7.5	29.95	60	0	
8.0	29.95	60	0	
8.5	29.95	60	0	
9.0	29.93	60	0	
9.5	29.94	60	0	
10.0	29.91	60	0	
0.025	28.75	60	0	

Small amount of electrolyte seeked around Cannon plug.

CONVAIR ASTRONAUTICS

Reference Para. No. 4.4.1 Date 24 Sept 1959

Specimen S/N ESB-AMP 404-0045 Test Engr. [illegible]

Test Conditions CVAC Insp. [illegible]

USAF Insp. R. Howard

Open Circuit 33.6 vdc

Axis	Accel.	Time	Volts	Amps	Noise	Comment
Z axis forward	10 G's	0	29.03	145	0	O.C. 33.6 vdc
2355 hrs		30 sec	28.35	145	0	
Z axis reverse	2 G's	0	29.07	145	0	O.C. 32.3 vdc
		10 sec	28.83	145	0	
		15 sec	28.64	145	0	
X axis forward	3 G's	0	28.62	145	0	31.89 O.C.
		10 sec	28.30	145	0	
		15 sec	28.12	145	0	
X axis reverse	3 G	0	28.80	145	0	32.30 O.C.
0155 hrs		10 sec	28.44	145	0	
		15 sec	28.33	145	0	
Y axis forward	3 G's	0	29.04	145	0	O.C. 32.36 V
		10 sec	28.62	145	0	
		15 sec	28.43	145	0	
			25 d.			
Y axis reverse	2 G's	0	28.5	145	0	O.C. 32.33 V
		15 sec	28.0	145	0	

Reference Para. No. 4.31

Date 25 September 1959

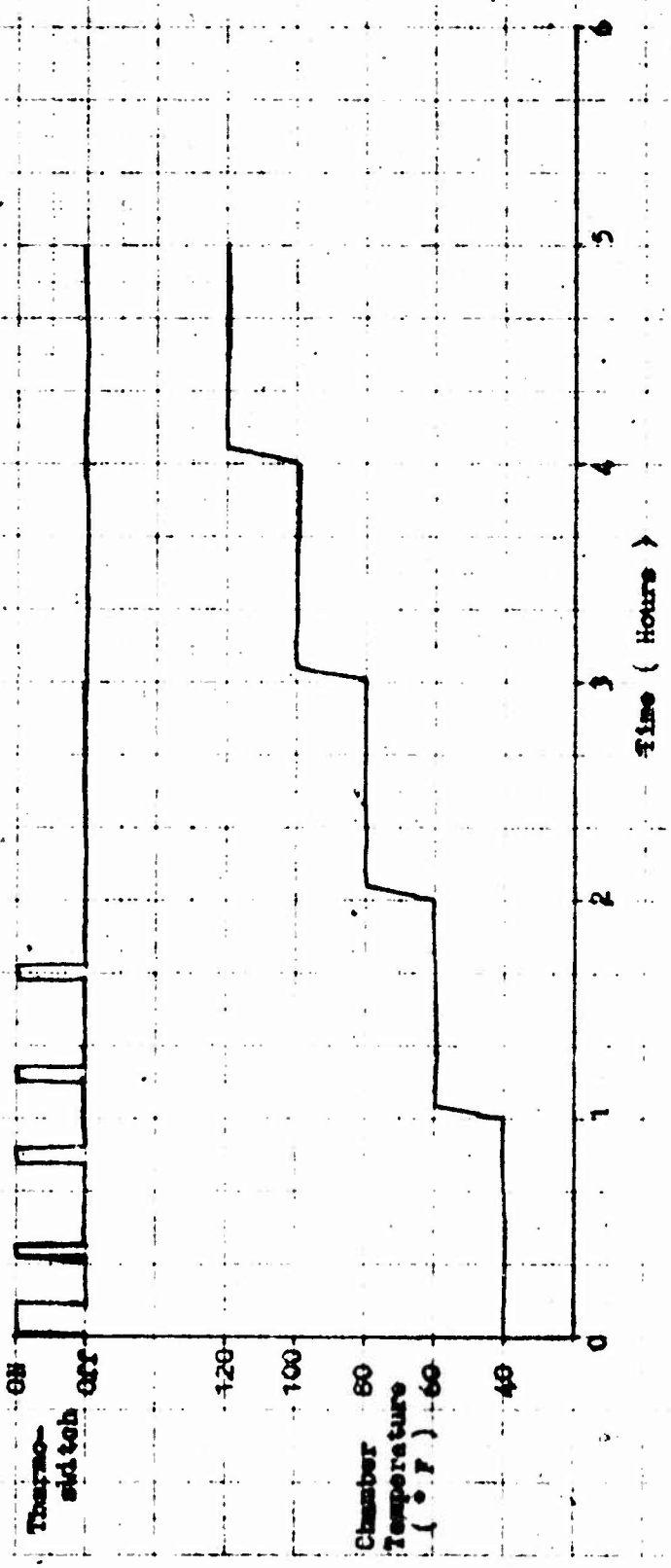
Specimen S/N E2R-AMF904-0047

Test Engr [illegible]

CVAC Insp D. R. Squibb

USAF Insp R. Howard

Test Conditions
+40 till stabilized and one hour
+60 one hour
+80 one hour
+100 one hour
+120 one hour
Heater current 2.6 amperes



CONVAIR ASTRONAUTICS

Reference Para. No. 4.3.1

Date 25 Sept. 1959

Specimen S/N E3B-AMF 904-0047

Test Engr. [illegible]

Test Conditions Activate +40°F Vibrate Z axis

CVAC Insp. D. R. Squibb

CEC Magazine No. _____

USAF Insp. R. Howard

Record No. _____

A) Heater warmup time. Start 1725 hrs Stop 2225 hrs Current 2.66 amps.

B) Activation. Start 1720 hrs Current 4.2 amps

Voltage at 2 min. 33.62 vdc. Time to attain full voltage 0.45 min.

C) Discharge. Open circuit voltage 36.80 vdc. Start 2327 hrs.

Time (min.)	Volts	Amps	Noise (PtoP)	Comments
0	31.65	10		Extraneous noise level too
0.5	31.66	10		high
1.0	31.64	10		
1.5	31.65	10		
2.0	31.64	10		
2.5	31.63	10		
3.0	31.63	10		
3.5	31.60	10		
4.0	31.62	10		
4.5	31.62	10		
5.0	31.59	10		
8.0	31.60	10		
10.0	31.60	10		
13.0	31.63	10		
15.0	31.63	10		
18.0	31.58	10		
21.0	31.55	10		
24.0	31.53	10		
26.0	31.53	10		
28.0	31.47	10		
30.0	31.48	10		
32.0	31.47	10		
34.0	31.47	10		
36.0	31.48	10		

CONVAIR ASTRONAUTICS

Reference Para. No. 4.3.1 Date 25 Sept. 1959

Specimen S/N ESB-AMF 904-0047 Test Engr. Lamoureux

Test Conditions Vibrate Yaxis CVAC Insp. D. R. Squibb

CEC Magazine No. _____ USAF Insp. R. Howard

Record No. _____

A) Heater warmup time. Start_____hrs Stop_____hrs Current_____amps.

B) Activation. Start_____hrs Current_____amps

Voltage at 2 min._____vdc. Time to attain full voltage_____min.

C) Discharge. Open circuit voltage 33.5 vdc. Start 0035 hrs.

Before sweep started battery heated and the sides bulged.

Time (min.)	Volts	Amps	Noise (PtoP)	Comments
0	30.27	10		Extraneous noise level
1.0	30.20	10		too high
2.0	29.44	10		
3.0	29.29	10		
4.0	29.18	10 ~~20~~ 25.		
5.0	29.05	10		
6.0	28.92	10		
7.0	28.81	10		
8.0	28.73	10		
9.0	28.66	10		
10.0	28.58	10		
11.0	28.48	10		
12.0	28.33	10		
13.0	27.56	10		
14.0	27.05	10		
15.0	26.81	10		
16.0	26.57	10		
17.0	26.90	10		
18.0	26.86	10		
19.0	26.83	10		
20.0	26.81	10		
21.0	26.76	10		
22.0	26.75	10		
23.0	26.69	10		

Continued on next page.

Reference Para. No. 4.3.1 Date 25 Sept. 1959

Specimen S/N ESB-AMP 904-0047 Test Engr. Lamoureux

Test Conditions Vibrate Y axis CVAC Insp. D. R. Squibb

CEC Magazine No. _____ USAF Insp. R Howard

Record No. _____

A) Heater warmup time. Start_____hrs Stop_____hrs Current_____amps.

B) Activation. Start_____hrs Current_____amps

Voltage at 2 min._____vdc. Time to attain full voltage_____min.

C) Discharge. Open circuit voltage_____vdc. Start _____hrs.

Continued from preceding page.

Time (min.)	Volts	Amps	Noise (PtoP)	Comments
24.0	26.63	10		
25.0	26.54	10		
26.0	26.18	10		
27.0	25.70	10		
28.0	25.36	10		
29.0	25.44	10		
30.0	25.35	10		
31.0	25.31	10		
32.0	25.24	10		
33.0	25.10	10		
34.0	25.00	10		
35.0	25.00	10		
36.0	25.01	10		