(NASA-CR-129974) APOLLO CSM 101 GUIDANCE AND NAVIGATION FILTER BOX ASSEMBLY QUALIFICATION TEST, P/N V36-442330 P.W. Edwards (North American Rockwell Corp.) Aug. 1968 245 p

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SD 68-687

APOLLO CSM 101 GUIDANCE AND NAVIGATION FILTER BOX ASSEMBLY QUALIFICATION TEST V36-442330

August 1968

Contract NAS9-150, SA 300, Exhibit I, Paragraph 7.7

ATR 492117B CTR 25492117 LR 6227-9001

Prepared by

Electrical Systems Unit

Approved by

D K Bailey

D.K. Bailey, Manager
Laboratories and Test

SPACE DIVISION
NORTH AMERICAN ROCKWELL CORPORATION

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TECHNICAL REPORT INDEX/ABSTRACT

ACCESSION NUMBER							DOCUMENT SECURITY CLASSIFICATION	
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TITLE OF DOCUMENT

APOLLO CSM 101 GUIDANCE AND NAVIGATION FILTER BOX ASSEMBLY QUALIFICATION TEST, P/N V36-442330

LIBRARY USE ONLY

AUTHOR(S)

EDWARDS, P.W.

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DESCRIPTIVE TERMS

*APOLLO PROJECT, *GUIDANCE AND NAVIGATION FILTER BOX ASSEMBLY V36-442330, *QUALIFICATION TESTING, *ELECTRICAL, *FUNCTIONAL, *VIBRATION, *SALT FOG, *OXYGEN-HUMIDITY, *HIGH/LOW TEMPERATURE-LIFE, *VACUUM/TEMPERATURE, *ACCELERATION, *SHOCK.

ABSTRACT

THIS REPORT DESCRIBES THE QUALIFICATION TEST OF THE APOLLO GUIDANCE AND NAVIGATION FILTER BOX ASSEMBLY, P/N V36-442330, S/N 06362AAH3858, CONDUCTED TO DEMONSTRATE THE ELECTRO-MECHANICAL AND ENVIRONMENTAL CAPABILITIES OF THE TEST SPECIMEN.

THE ELECTRICAL TESTS PERFORMED WERE INSULATION RESISTANCE, CONTINUITY, CAPACITANCE, AND DIELECTRIC STRENGTH.

THE MECHANICAL TESTS PERFORMED WERE VIBRATION, ACCELERATION, AND SHOCK.

THE ENVIRONMENTAL TESTS PERFORMED WERE SALT FOG, OXYGEN-HUMIDITY, HIGH/LOW TEMPERATURE-LIFE, AND VACUUM/TEMPERATURE.

TEST RESULTS, INCLUDING TABULATED DATA, ARE DOCUMENTED IN THIS REPORT AND DEMONSTRATE THE CAPABILITY OF THE G&N FILTER BOX ASSEMBLY TO MEET THE REQUIREMENTS OF ATR 492117B.

FOREWORD

This document was prepared by the Electrical Systems Unit, Electronic Systems Branch of Laboratories and Test, for the Apollo Equipment Group in accordance with ATR 492117B. It is submitted as a final report of the qualification testing to remove a flight constraint on CSM 101.

All testing of the guidance and navigation filter box assembly, P/N V36-442330, S/N 06362 AAH3858, was accomplished within the Downey Facility from 10 July through 15 August under the cognizance of NASA and North American Rockwell Quality Control. The testing was a coordinated effort within Laboratories and Test under the direction of D.K. Bailey, Manager.

SUMMARY

Qualification testing of the Apollo guidance and navigation filter box assembly, P/N V36-442330, S/N 06362 AAH3858 was accomplished to the requirements of ATR 492117B per Laboratories and Test Qualification Test Plan QTP IL 6227-801A. The electrical functional tests, insulation resistance, continuity, and capacitance tests were performed before and after each environmental exposure and at selected times during the exposure. Dielectric strength tests were performed before and after each test phase and at selected intervals during the oxygen-humidity exposure.

The test results met the requirements of ATR 492117B.

CONTENTS

ILLUSTRATIONS

INTRODUCTION

The Apollo guidance and navigation (G&N) filter box assembly is used as an integral component of the guidance and navigation system and is used to attenuate noise on selected signal lines during launch and mission operations.

Electrically, the G&N filter consists of 49 feed-through circuits. Twelve of these circuits contain miniature Pi (π) type filter networks; the remainder (37) are jumper wires from one connector to the other.

TEST OBJECTIVE

The objective of this qualification test was to provide data to Apollo Engineering on the functional capability of the G&N filter box when exposed to the environmental conditions defined by ATR 492117B.

TEST SPECIMEN

The G&N filter box, P/N V36-442330, S/N 06362 AAH3858, manufactured by North American Rockwell Corporation was the subject of the qualification test. No other components of the G&N system were required for this test.

TEST SETUP

Block diagrams of the functional test setups appear at the end of detailed test procedure IL 6227-801A, Appendix B. Figures 1 through 4 and 6 illustrate the test specimen mounted for vibration, corrosive-contaminants/oxygen humidity (CCOH), high/low temperature, and vacuum tests. Photographs of the test setup for acceleration and shock are not shown because their setups were similar to that of vibration.

Test equipment lists and pertinent test system diagrams are found in the respective functional test data or environmental test data (Appendixes C through I).

TEST OPERATIONS AND RESULTS

TEST PROCEDURES

The requirements of ATR 492117B were implemented through use of a detailed test procedure (QTP). The procedure IL 6227-801A defines test operational details and sequences, and is included as Appendix B. The test sequences and location of related documentation are summarized in Table 1.

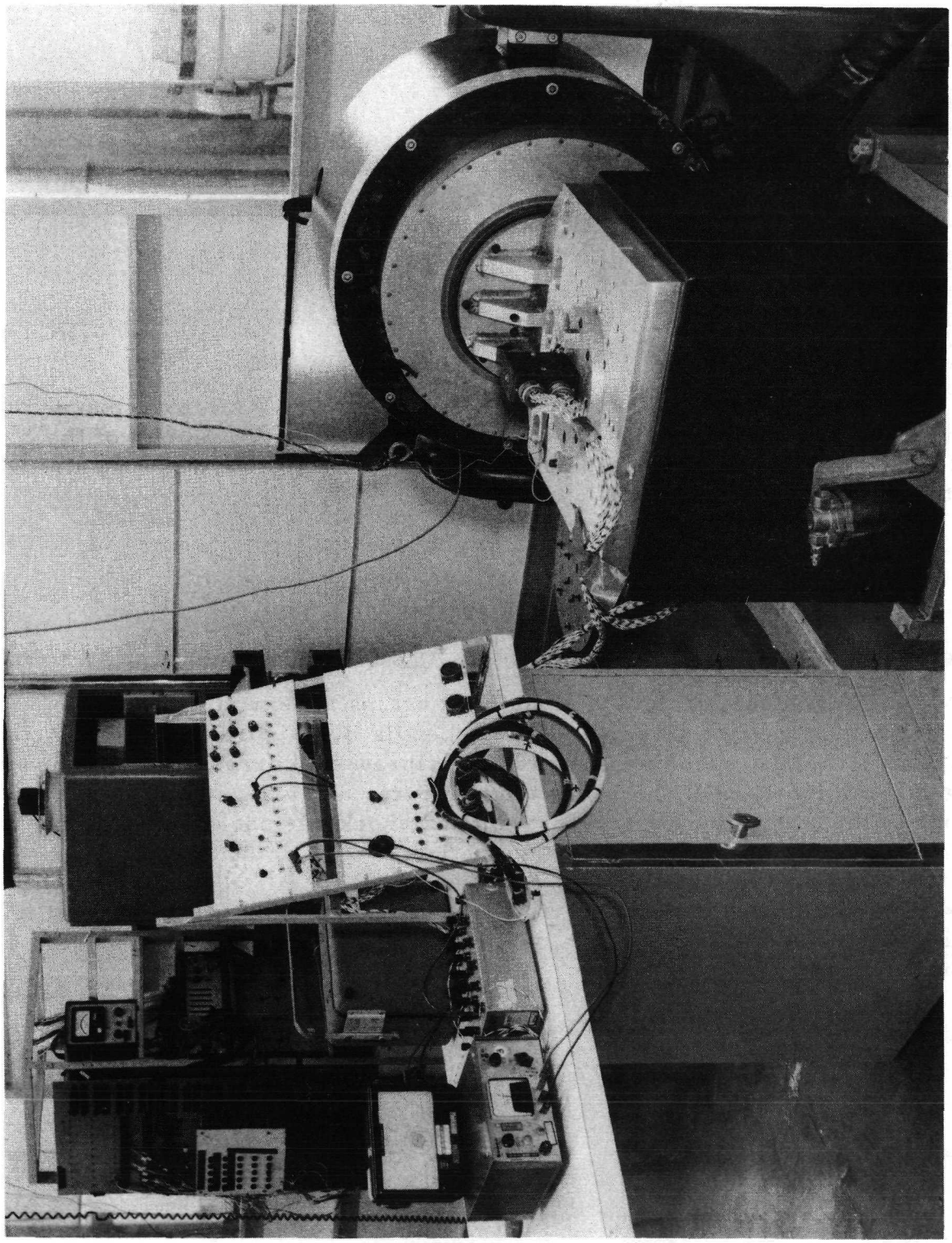

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Figure 1. Vibration Test Setup

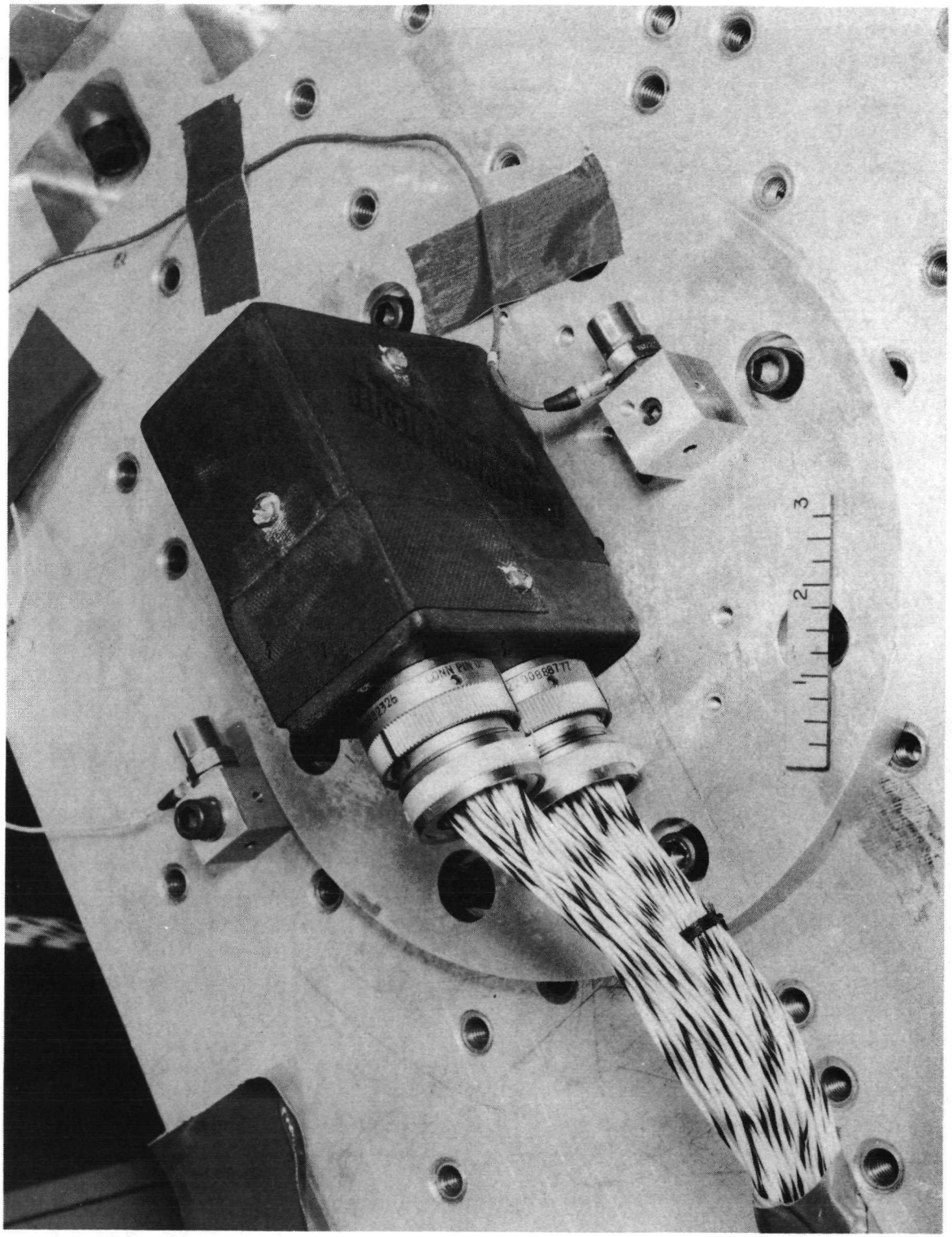

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Figure 2. Y Axis Vibration

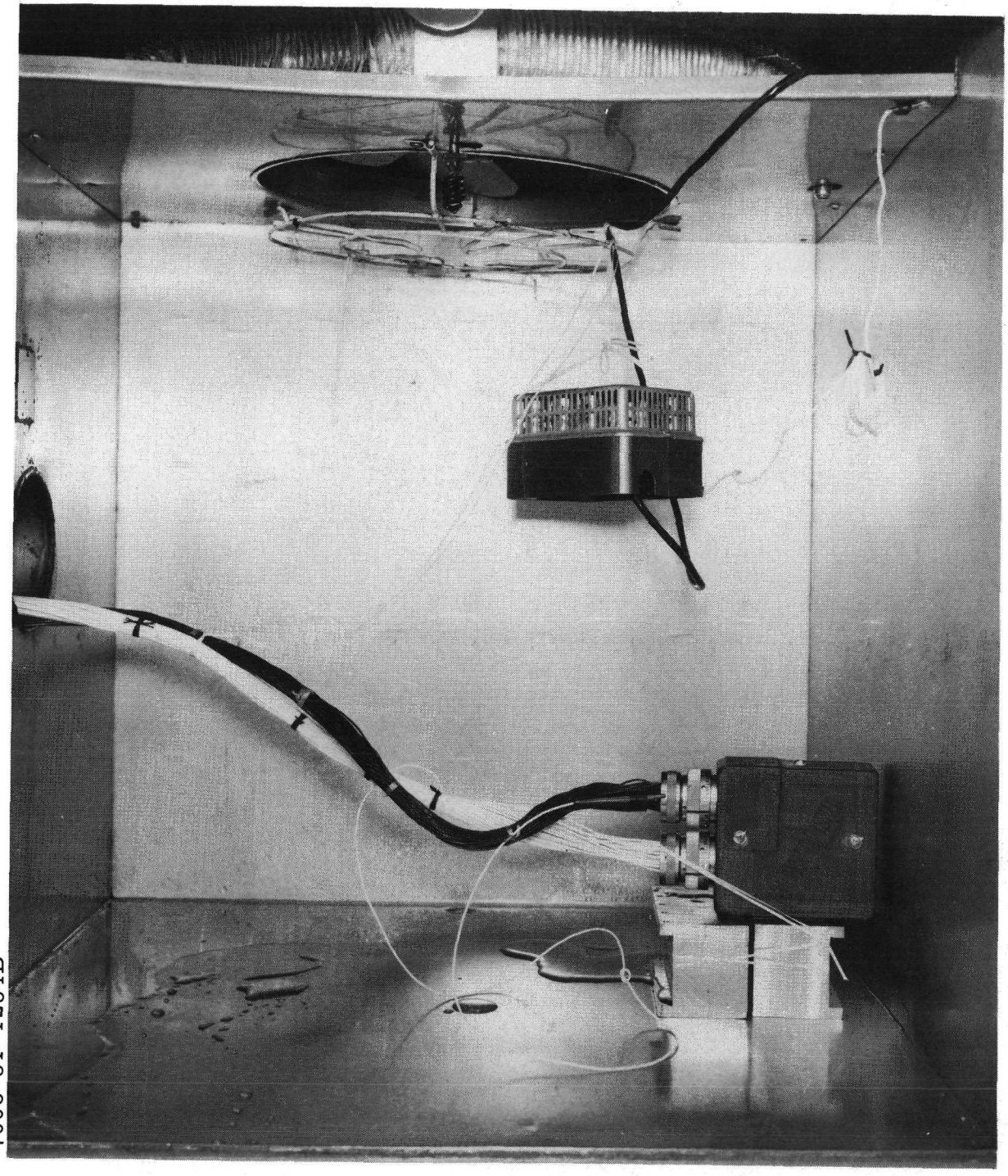

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Figure 3. Oxygen-Humidity Chamber

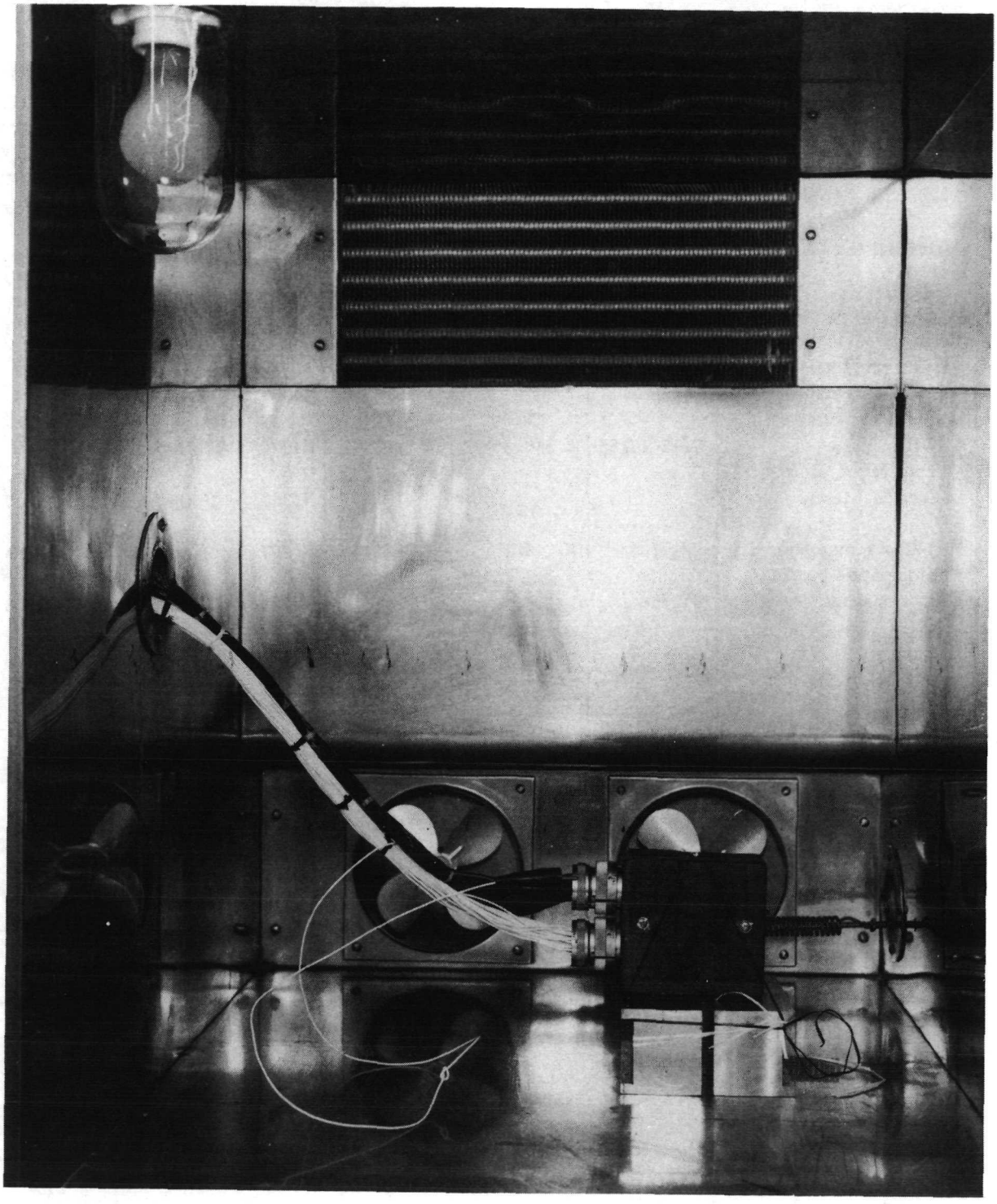

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Figure 4. High/Low Temperature - Life Chamber

Table 1. Test Sequence

Test	Date	Procedure IL-6227-801A Appendix B		Laboratory Notes		
		Paragraph No.	Report Pages	Book No.	Pages	Report Page
Examination of product	7/10/68	5.1/6.1.1	B-6	N1997	4	C-3
*Functional test (initial)	7/10/68	5.2.3/6.1.2	B-6, 7	N1997 N6097	9 through 12 1 through 24	C-4-7 C-40-62
Vibration Spectrum plots Functional tests	7/10-11/68	5.4/6.2	B-8, 9	N5778 N1997	16 through 23 12 through 15	D-1-8 D-9-38 C-7-10
CCOH Temperature plots Functional tests	7/11-17/68	5.5/6.3	B-8, -11	N4694 N1997	29 through 36 16 through 22	E-1-8 E-9-15 C-11-17
High/low temperature-life Temperature plots Functional tests	7/17/68 through 8/3/68	5.6/6.4	B-12	N1997 N1997	40 and 41 23 through 33	F-18, 19 F-1-17 C-18-28
Vacuum Functional tests	8/3-7/68	5.7/6.5	B-13	N2907 N1997	1 through 10 33 through 39, 42, 43	G-1-10 C-28-36
Acceleration Functional tests	8/8/68	5.8/6.6	B-13	N5778 N1997	28 through 30 44	H-1-3 C-37
Shock Impulse data Functional End of test	8/8-9/68 8/12/68	5.9/6.7 6.8	B-14 B-24	N5778 N1997 N1997	31 through 33 44 through 46 45 and 46	I-1-3 I-4-11 C-37, 39 C-38, 39

*All insulation resistance, continuity and capacitance test data were recorded in tabular form to facilitate comparison and evaluation (Reference Laboratory Notebook N6097, Pages 1-24).

EXAMINATION OF PRODUCT

The test specimen was visually inspected for quality craftsmanship. The assembly housing and connectors were found to be free of cracks, scratches, and surface contamination.

FUNCTIONAL TEST

The functional test consisted of four steps.

Step 1: Insulation Resistance

Insulation resistance (IR) was measured using a megohm bridge. Initially (prior to any environmental exposure), the applied potential was 200 ±10 vdc, with a limit of 90 megohms minimum. Following vibration, high/low temperature-life, vacuum, acceleration, and shock tests, the applied voltage was 100 ±10 vdc, with a limit of 90 megohms minimum. After the salt fog and oxygen-humidity tests, the applied voltage was 100 ±10 vdc, with a limit of 10 megohms minimum.

Insulation resistance was measured between ground and each individual feed-through circuit. No out-of-tolerance (IR) conditions were observed throughout the qualification testing.

Step 2: Continuity

Continuity was measured using a multimeter VOM. Each feed-through circuit was measured on the RX1 range, with a resistance limit of 0.5 ohms maximum allowed (exclusive of harness resistance). Each circuit was measured from end-to-end. All continuity measurements were within the specified limit.

Step 3: Capacitance

The capacitance was measured using an impedance bridge. The shunt capacitance of each filter was measured between case ground and each terminal. The Pi (π) network being symmetrical, both values should be nearly identical. Initially, the specified minimum capacitance was 5500 picofarads. During the high/low temperature-life test, multiple test difficulties were encountered. Capacitance data obtained after eleven hours of exposure at 40 F indicated 14 of 24 readings were below specification limits. At this time, it was suspected by Engineering, that moisture accumulation in the test equipment connectors, as a result of exposure to the CCOH test, was affecting capacitance values. The connectors were thoroughly cleansed and dried, and sealing plugs were installed (Reference DR A96675, Appendix J, page J-1).

The high/low temperature-life test was restarted; and after approximately 24 hours of exposure to 40 F, the functional test data indicated that 6 of 24 readings were below the specification limit. An urgent temperature evaluation by North American Rockwell Corporation and the manufacturer, Allen Bradley, revealed this condition was normal. At high and low temperatures relative to ambient, the capacitance profile was "bell shaped." The enclosed test data obtained at ambient, +125 F, and +135 F temperatures indicate all capacitance readings were in excess of 5500 picofarads.

The specification limit was lowered to 3500 picofarads minimum at all temperatures outside the range of 70 to 78 F (Reference DR A110406, Appendix J, page J-2, and ATR 492117A, Appendix A).

No other capacitance test anomalies were observed for the remainder of qualification testing.

Step 4: Dielectric Strength

Dielectric strength was measured using an ac/dc Hypot instrument. The initial test was performed at a potential of 355 ±10 ac for a period of 5 (+0.0, -0.5) seconds between all pins of P1 and P2 tied together and ground. The inadvertent application of 355 vac rms (instead of 375 vdc) exceeded the ATR requirements by approximately 25 percent. The failure criterion was a current in excess of 2 milliamperes. All dielectric tests performed after and during the environmental exposure were conducted at a potential of 280 ±5 vdc. No discrepancies were observed on any dielectric strength test throughout the qualification testing.

ENVIRONMENTAL TESTS

Vibration

Vibration testing of the G&N filter box assembly was conducted per Paragraph 5.4 of the QTP (Appendix B). The test specimen was mounted typically as shown in Figures 1 and 2 (Y axis). No response accelerometers were mounted on the specimen because of the rigidity of the fixture (see IL SD/AD/68-055, letter of waiver Appendix J, page J-4).

The sequence of tests was as follows:

1. Resonance search in each axis.

2. Equalization and 2.5-minute high-level random vibration in each axis.

3. Equalization and 12.5-minute low-level random vibration in each axis.

Functional tests were performed per Paragraph 5.4 of the QTP (Appendix B) before and after resonance search and following the final random vibration in each axis. However, the post-vibration functional was performed after the test specimen was mounted in the salt spray chamber.

During each of the vibration runs, each circuit in the specimen was continuously energized with 100 milliamperes of dc current and was monitored for discontinuities greater than 70 microseconds. No discontinuities were observed.

Corrosive Contaminants, Oxygen-Humidity (CCOH)

The CCOH test was performed per Paragraph 5.5 of the QTP (Appendix B). The photograph (Figure 3) shows the specimen mounted in the oxygen-humidity chamber.

The specimen was subjected to a one-hour salt spray, preceded by a functional test and followed by a functional test and a visual examination. The filter box was then subjected to a 120-hour oxygen-humidity test, and functional testing was performed at the time interval indicated per Paragraph 5.5 of the QTP.

At the end of 96 hours (4 cycles of 24-hour temperature cycling), the specimen was inadvertently subjected to an additional cycle instead of being stabilized at 60 ±10 F for the remaining 24-hour period. Apollo Engineering and Reliability reviewed the over-test and granted a disposition to continue with the test. No anomalies were observed (Reference DR A110403, Appendix J, page J-3, and ATR 492117A, Appendix A).

High/Low Temperature-Life

As shown in Figure 4, the specimen was mounted in the temperature chamber and subjected to a 15-day temperature test per Paragraph 5.6 of the QTP (Appendix B). The temperature exposure was as follows:

1. 40 F for 96 hours
2. 125 F for 240 hours
3. 200 F for 30 minutes
4. Ambient for 2 hours
5. -20 F for 24 hours

All temperature transitions were accomplished at a rate that did not exceed 5 F per minute.

Functional testing was conducted periodically at specified intervals throughout the thermal exposure. No anomalies, except as noted in the functional tests, were observed (Ref DR's A96675 and A110406, Appendix J, pages J-1, 2).

Vacuum

The vacuum test was conducted per Paragraph 5.7 of the QTP (Appendix B). Functional tests were performed periodically at specified intervals. The specimen temperature was reduced to 40 F, and then the chamber pressure was reduced to 1×10^{-4} millimeters of mercury (mm Hg). The temperature was maintained at 40±5 F for 50 hours and then increased to 135±10 F at a rate that did not exceed 5 F per minute. The temperature was maintained at 135±10 F for 50 hours, then reduced to ambient at the 5 F per minute maximum rate.

Figure 5 shows the vacuum test system and the functional test setup. Figure 6 is a photograph of the specimen mounted in the vacuum chamber. The specimen was turned on edge to show the location of the thermocouples. During the test, the side with the thermocouples was placed downward on the aluminum panel, separated from the panel only by the case screwheads.

At all times when functional testing was not in progress, each of the twelve filter circuits was continuously energized with an 800 Hz 110±10 milliampere a-c current. Prior to and following each functional test, the applied voltage and current through each filter were recorded in the laboratory notes. No discrepancies were observed.

Acceleration

The specimen was mounted on a centrifuge and subjected to six 5-minute exposures of 20 ±1 g continuously (each direction of the three mutually perpendicular axes). Each circuit was continuously monitored with a d-c current of 100 milliamperes for a discontinuity in excess of 70 microseconds. No discontinuities were observed.

Functional tests were performed while the specimen was mounted on the fixture prior to and following acceleration exposure; the dielectric strength was performed after acceleration exposure. No discrepancies were observed.

Shock

The specimen was mounted on the shock impulse machine and subjected to a mechanical shock test in each direction of the three mutually perpendicular axes. During each shock, all circuits were continuously energized with a d-c current of 100 milliamperes and monitored for a discontinuity in excess of 70 microseconds. No discontinuity was observed.

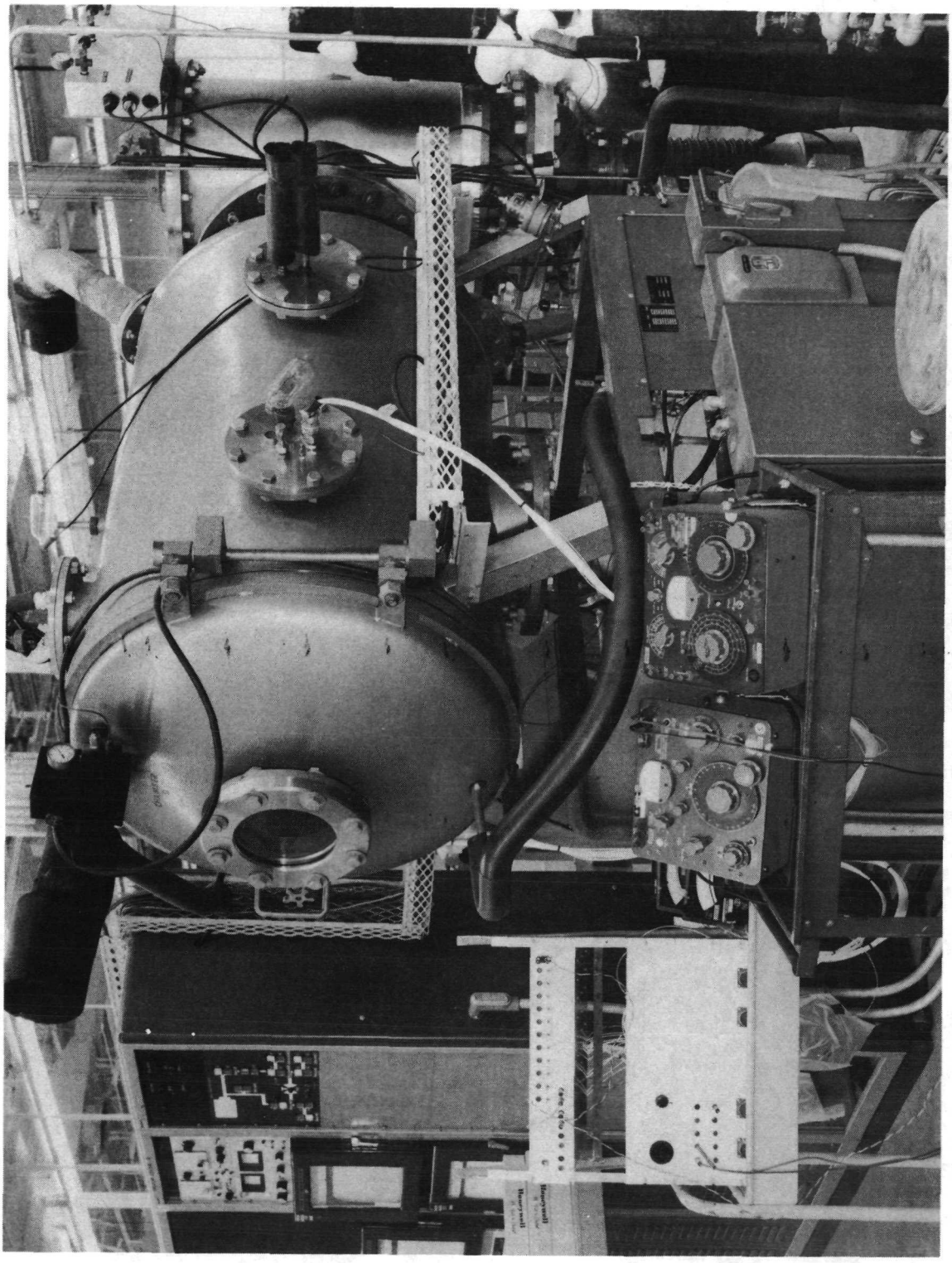

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Figure 5. Vacuum Test Setup

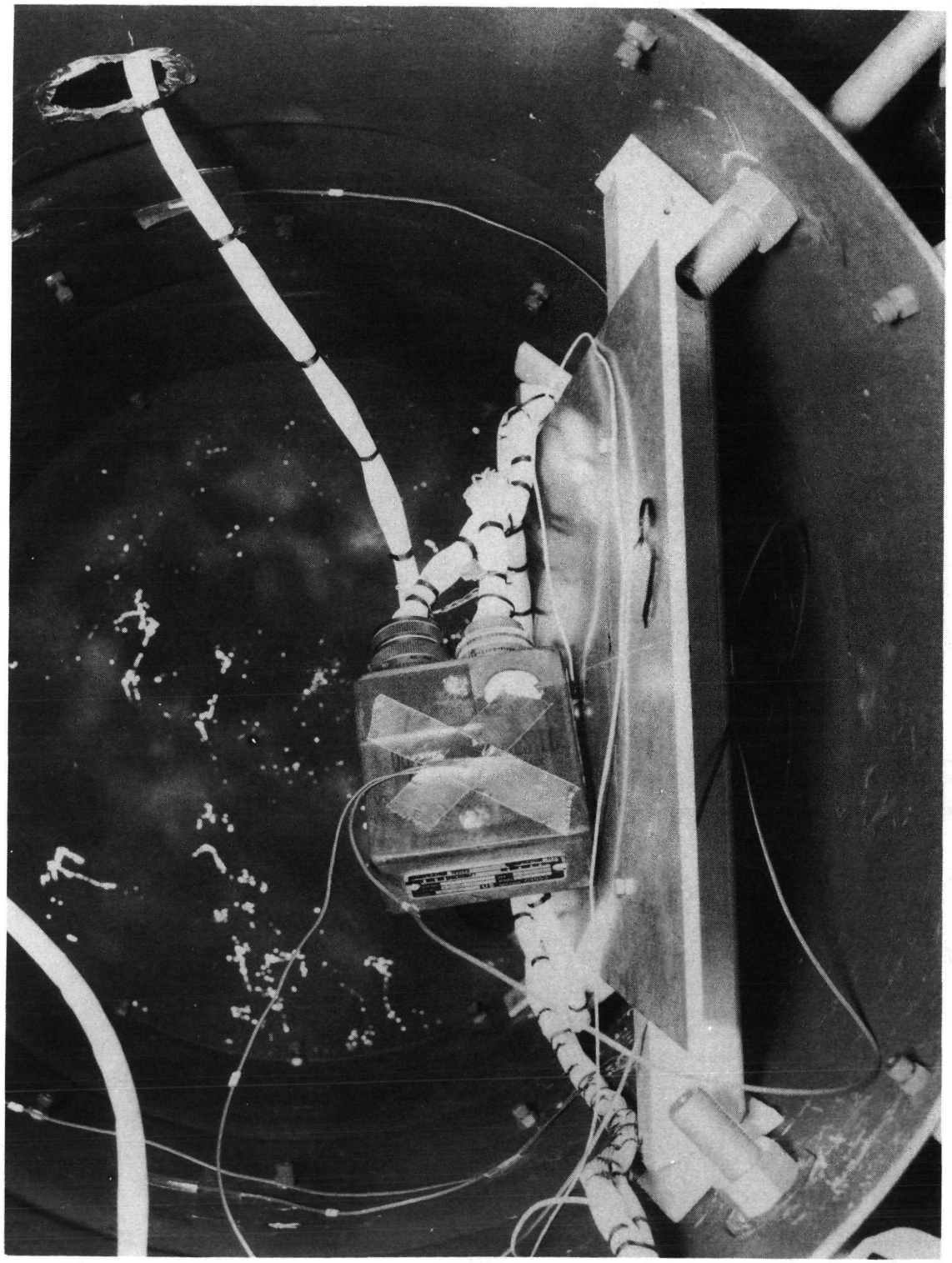

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Figure 6. Specimen Mounted in Vacuum Chamber

Functional tests were performed while the specimen was mounted on the fixture prior to and following the shock exposures; the dielectric strength test was performed after shock exposure. No discrepancies were observed.

POST TEST

PHYSICAL INSPECTION

The exterior and interior of the G&N filter box assembly (Figure 7) were inspected for damage resulting from exposure to the environmental tests. Figure 8 partially illustrates that there was no damage; i. e., dents, scratches, broken wires, or contamination inside or outside the box.

DISPOSITION OF TEST SPECIMEN

Parts Replacement Request No. S09143, NR Form 17A, was initiated by the RTE and approved by NR Inspection. The laboratory notebook was closed out, and the test specimen and control documents were shipped to Bonded Storage (D/052-343) via Material Requisition/Transfer Order No. S000502, NR Form M918-K.

CONCLUSION

The G&N filter box assembly V36-442330, S/N 06362 AAH3858, specimen performed satisfactorily when tested in accordance with ATR 492117B and QTP IL 6227-801A.

Although test difficulties did occur on three separate occasions, each of these cases was satisfactorily resolved (Reference DR's A96675, A110406, and A110403, Appendix J, pages J-1 through J-3).

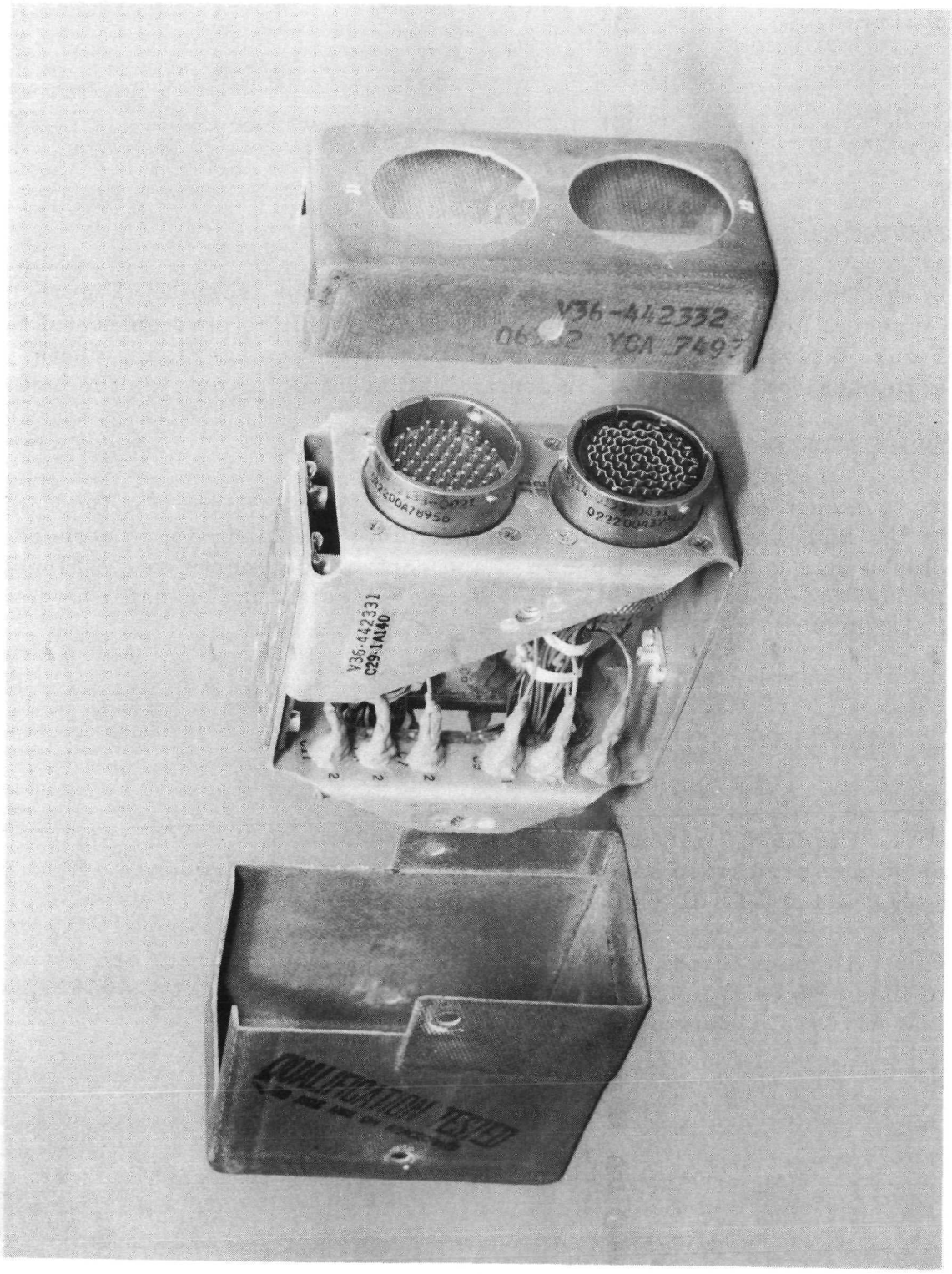

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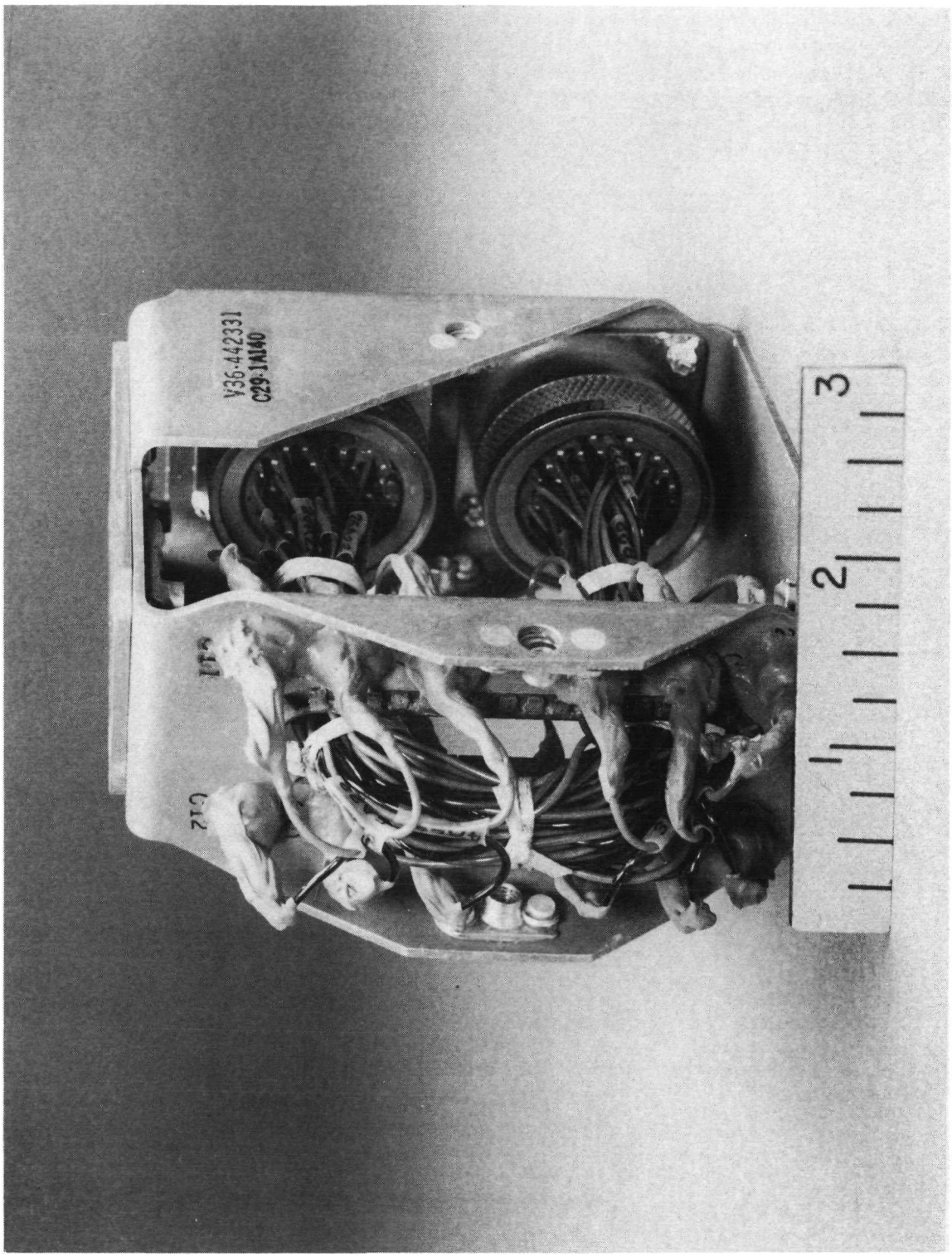
Figure 7. G&N Filter Box Assembly View



7008-66-50A

Figure 8. G&N Filter Box Chassis Inspection

APPENDIX A

APOLLO TEST REQUEST (ATR)

SPACE DIVISION
NORTH AMERICAN ROCKWELL CORPORATION

TEST REQUEST

45 ENGR PLNG

PROJECT: Apollo				TR NUMBER: 492117	CHG: B	
TITLE OF TEST: Guidance and Navigational Filter Box Assembly				PAGE 1 OF 12 TYPE OF TEST: QUALIFICATION		
ENG. ORIGINATOR: R. W. Gibb	ENG. COORDINATOR: S. V. McKeever	PHONE: 1305	LEDGER ACCT: 3501	G.O.: 7140	SUB-ACCT: 2144	
TEST AGENCY: L&T	TEST COORDINATOR: R.L.Beigay/C.C.Shepherd	PHONE: 5715	SWA: 20772	IDWA:	EOPR:	
FLIGHT CONSTRAINT: 101	VEHICLE EFFECTIVITY: 101 thru 104, 106 and Subs	TYPE OF REPORT: SD Cat. 1				

INSPECTION REQUIRED: YES X; NO; SD X; NASA X

TEST REPORT DISTRIB.:
R.W.Gibb 695-412
M.J.O'Toole 695-331
C.E.Farner 695-330
J.R.West,Jr. 099-220

SCHEDULE:
Start: 7-10-68
Complete: ~~8-9-68~~ 8-14-68
TAR: ~~8-22-68~~ 8-30-68

TEST SPECIMEN:
V36-442330 (Quantity 1)
Hardware shall be furnished by
Dept. 098-212
(Ref. EO M711570)

REFERENCES:
V36-442330
V34-945072
MC999-0050C
CTR 25492117
MCR 6783
MA0203-0622
V36-444011

TEST OBJECTIVE AND BRIEF DESCRIPTION OF EFFORT

OBJECTIVE: To qualify the above test specimen for S/C 101 thru 104, 106 and Subs

EFFORT: (See Sheet 2)

APPROVAL SIGNATURES (AS APPL.)

TEST REQUESTER: S.V. McKeever	6/25/68	OTHER: E. Edwards	6/27/68
REQUESTER SUPERVISION: R.W. Gibb	6-25-68	OTHER: L. Laboranti	7/1/68
PROJECT ENGINEER: W.B. Thurber	7-1-68	OTHER	
RELIABILITY: C.E. Farner	6-28-68	OTHER	
SYSTEMS INTEGRATION		OTHER	
TEST AGENCY: C.C. Shepherd	7-2-68	RELEASED BY DEVELOPMENT ANALYSIS: G.H. Billington	7/3/68

FORM 2924-S REV 10-67

SPACE DIVISION
NORTH AMERICAN ROCKWELL CORPORATION

TEST REQUEST
CHANGE NOTICE

PROJECT	TR NUMBER	CHG.
Apollo	492117	A

TITLE OF TEST
Guidance and Navigational
Filter Box Assembly

PAGE 1A OF 12

SCHEDULE CHANGE
8-16-68

DETAIL DESCRIPTION OF CHANGE(S) AND REASON FOR CHANGE

Ø Added test requirements in accordance with MCR 6783A as follows:

Low temperature - 20 F

Vacuum - 40 and 135 F at 1 x 10^{-4} mm Hg

Acceleration - 20 g's

Revised the capacitance measurement requirements during and after temperature environment. The original requirements did not consider the component parameter variation during temperatures. The tolerance range of the component consists of a barrel type of plot. This was verified by an individual component test (4 units) and by the supplier (Allen Bradley).

TEST REQUESTER	7/27/68	OTHER	7-29-68
REQUESTER SUPERVISION	7-29-68	OTHER	7/30/68
PROJECT ENGINEER	7-30-68	OTHER	
RELIABILITY	7-30-68	OTHER	
SYSTEMS INTEGRATION		OTHER	
TEST AGENCY	7/31/68	RELEASED BY DEVELOPMENT ANALYSIS	7/31/68

FORM 2924-R REV 10-67

1A

SPACE DIVISION
NORTH AMERICAN ROCKWELL CORPORATION

TEST REQUEST
CHANGE NOTICE

46 ENGR PLNG

PROJECT	TITLE OF TEST	TR NUMBER	CHG.
APOLLO	GUIDANCE AND NAVIGATIONAL FILTER BOX ASSEMBLY	492117	B
		PAGE 1a OF 12	
		SCHEDULE CHANGE —	

DETAIL DESCRIPTION OF CHANGE(S) AND REASON FOR CHANGE

Ø 1 Revised vacuum temperature monitoring method to agree with the capability of the vacuum chamber. The test specimen was monitored as follows: 40 ± 5°F and 135 ± 10°F.

TEST REQUESTER [illegible]	8/13/68	OTHER [illegible]	8/15/68
REQUESTER SUPERVISION RW Gibb/lwk	8/14/68	OTHER [illegible] 098/100	8/15/68
PROJECT ENGINEER [illegible]	8-15-68	OTHER	
RELIABILITY CDE [illegible]	8/15/68	OTHER	
SYSTEMS INTEGRATION		OTHER	
TEST AGENCY MM APO [illegible]	8/15/68	RELEASED BY DEVELOPMENT ANALYSIS [illegible]	8/15/68

FORM 2924-R REV 10-67

EFFORT: Perform the test program defined herein:

The test agency shall submit a detail test procedure to the requester for approval prior to start of testing. The test procedure shall specify applicable documents, drawings, step-by-step procedures, test equipment with range, accuracy and frequency of calibration, test setup schematics, and sample data sheets. Failure notification and failure reporting shall be in accordance with NR/SD Policies and Procedures J-403.

The laboratory test notes shall be arranged in such a manner that the discussion, notes, and any analysis appear in one separate section and the data sheets appear in a section by themselves. Data sheets shall be maintained for all tests specified herein, i.e., Insulation Resistance Tests, Performance Tests, etc.

1.0 Introduction

The following requirements constitute the Qualification Test Program for the Guidance and Navigation Filter Box Assembly, P/N V36-442330. The assembly, located in the Command Module, Right Hand Lower Equipment Bay (X_c = 30", Y_c = 20", and Z_c = 46"), is used to filter switching transients in the Guidance and Navigation System.

2.0 General Requirements

2.1 All test fixtures shall have the approval of Apollo CSM Dynamics, Dept. 099-220.

2.2 During all testing, the Safety Requirements specified in MA0203-0622, paragraph 3.2, shall be adhered to.

2.3 Parenthetical paragraphs refer to Specification MC999-0050 "C" unless otherwise specified.

2.4 One (1) Specimen shall be subjected to the tests described herein in the order listed.

2.5 Functional Test

The functional test shall be in accordance with specification MA0203-0622, paragraph 4.1, except for insulation resistance and capacitance requirements which vary as indicated for the following environments.

(A) Insulation Resistance

1. Initial - The applied voltage shall be 200 ± 10 vdc.

2. Vibration, High/Low Temperature - Life, Vacuum, Acceleration, and Shock - per Specification MA0203-0622.

3. Humidity, Oxygen, Corrosion Contaminants.

(a) Salt Fog - The Functional test before and after shall be per Specification MA0203-0622 with the exception that after the salt fog test the insulation resistance reading shall be 10 megohms minimum.

(b) Humidity, Oxygen - The Functional test per specification MA0203-0622 with the exception that the insulation resistance reading shall be 10 megohms minimum.

(B) Capacitance

The capacitance reading shall be greater than 5,500 picofarads at room ambient temperature (70 - 78°F) and shall be greater than 3,500 picofarads at all other test temperature conditions.

2.6 Dielectric Strength Test

Using a megohm bridge, apply a test potential of 375 ± 10 vdc for a period of 5.0 + 0.0, -0.5 seconds, between all pins of P1 and P2, tied together, and chassis ground. Rate of voltage application shall not exceed 100 volts per second. Leakage current shall be less than 2 milliamperes. Test shall be conducted in accordance with MIL-STD-202, Method 301.

3.0 Test Requirements

3.1 Visual Examination

Prior to test, the test specimen shall be visually inspected for Inspection Stamps or other evidence to verify that it has passed assembly and acceptance inspection and has been approved by Engineering.

3.2 Vibration

Perform a Functional and Dielectric Strength Test per paragraph 2.5 and 2.6 after test specimen is mounted to the vibrator head.

3.2.1 Resonance Search (4.8.2.1)

Subject the test specimen to a sinusoidal resonance search for 10 +1, -0 minutes in each of the orthogonal axes (see Figure I) in accordance with the requirements of Specification MC999-0050 except that the applied frequency shall be 10 - 2000 cps with an input of 2 g's peak (+0, -1g).

3.2.2 Random Vibration (4.8.2.2)

Level A - Subject the test specimen to the following vibration levels for 2.50 +0.25, -0.00 minutes per axis in each of the three orthogonal axes (see Figure I) as follows: 3 db/octave linear increase to 0.067 g^2/cps from 20 to 80 cps; constant at 0.067 g^2/cps from 80 to 2000 cps.

Level B - Apply for 12.5 +1, -0 minutes per axis in each of the three orthogonal axes (see Figure I) as follows: 3 db/octave linear increase to 0.003 g^2/cps from 20 to 80 cps; constant at 0.003 g^2/cps from 80 to 2000 cps.

3.2.3 Prior to and after the final random vibration exposure period in each level, perform the functional test as specified in paragraph 2.5. However, the final functional test may be performed after the test specimen is mounted in the salt spray chamber per paragraph 3.3.1.1.

3.2.4 During vibration all electrical circuits shall be monitored for discontinuity in excess of 70 ±7 microseconds. The electrical circuit shall be energized by applying to each of the positive (+)

3.2.4 (continued)

test points 28.5 plus or minus 1.5 vdc and connecting a suitable load resistor to the minus (-) test points. A dc current of 0.1 min., 0.15 maximum amperes shall flow through each circuit (see Table I for connecting points).

Table I (Monitoring Circuit)

From (+)	To (-)
J2-P	J2-H
J2-S	J2-W
J2-J	J2-F
J2-J	J1-GG
J2-BB	J2-DD
J2-Z	J2-T

3.2.5 When discontinuity occurs, an oscilloscope shall be connected in the circuit and the duration of the discontinuity shall be noted and recorded.

3.3 Humidity, Oxygen, Corrosion Contaminants

3.3.1 The test specimen shall be placed in the salt spray test cabinet in a position to simulate spacecraft installation, see Figure I. All electrical terminations shall be brought out separately; and all contacts (pin insert) of the test setup connectors shall contain termination lead or a connector sealing plug.

3.3.1.1 Prior to salt spray, perform a functional test as specified in paragraph 2.5.

3.3.1.2 Perform a salt spray test per Procedure 1, Method 509 of MIL-STD-810 with the following exceptions:

1. Salt solution shall be 1% by weight.
2. Test duration shall be one hour.
3. Cabinet conditions shall be ambient.

3.3.1.3 Upon completion of the salt spray test, while the test specimen is still in the cabinet perform a functional test as specified in paragraph 2.5.

3.3.1.4 Visual examination shall be performed on the external surfaces of the test specimen after the unit is removed from the salt spray cabinet. All deterioration or corrosion shall be recorded. No attempt shall be made to clean the test specimen. In addition, care shall be taken to prevent salt residue from being removed from the test specimen during handling.

3.3.2 The test specimen shall be transferred to an oxygen humidity chamber within one hour after salt spray test. The test specimen shall be installed in the same manner as noted in paragraph 3.3.

3.3.2.1 Prior to evacuation, perform a functional test as specified in paragraph 2.5.

3.3.2.2 The chamber shall be evacuated to a pressure of 20 mm Hg at ambient temperature conditions and back filled with commercial oxygen 95 ±5 percent until the chamber pressure increases to 5.0 ±0.2 psia. Chamber temperature shall be increased to 125 ±5 F. Then proceed with the following steps:

1. Maintain these conditions for 12 hours.

2. Perform a functional test as specified in paragraph 2.5.

3.3.2.3 Maintain the oxygen environment at 5.0 ±0.2 psia and introduce sufficient moisture to obtain a relative humidity 95 ±5 percent with distilled water having a Ph factor of 6.5 to 7.5. Chamber temperature shall be reduced to and maintained at 74 ±10 F.

After the conditions of 3.3.2.3 have been verified, the chamber temperature, pressure, and humidity shall be varied as follows:

1. Increase the temperature to 125 +5F, -15F in 2 hours ±15 minutes. During this period, the pressure shall be 5.0 ±0.5 psia, the relative humidity shall be 95 +5, -15%, and the O_2 shall be 95 +5, -15%.

2. Maintain the temperature of 125 +5F, -15F for 6 hours ±15 minutes. During this period, the pressure shall be 5 ±0.2 psia, the relative humidity shall be 95 ±5%, and the O_2 shall be 95 ±5%.

3. Decrease the temperature to 60 ±10F in 10 hours ±15 minutes. During this period, the pressure shall be 5.0 ±0.5 psia, the relative humidity shall be 95 +5, -15%, and the O_2 shall be 95 +5, -15%.

3.3.2.3 (continued)

4. Maintain the temperature of 60 ±10 F for 6 hours ±15 minutes. During this period, the pressure shall be 5.0 ±0.2 psia, the relative humidity shall be 95 ±5%, and the O_2 shall be 95 ±5%.

5. Steps 1 through 4 constitute one 24-hour cycle and shall be repeated continuously for a total of four cycles.

6. After the fourth cycle the chamber shall remain constant at 60 ±10 F until the total test time of 120 hours minimum are accumulated. During this period, the pressure shall be 5.0 ±0.2 psia, the relative humidity shall be 95 ±5%, and the O_2 shall be 95 ±5%.

7. Perform a functional test as specified in paragraph 2.5 at the following intervals: 6, 22, 30, 46, 54, 70, 78, 94, 102, and 118 ±1 hours.

3.3.2.4 After the oxygen humidity chamber has returned to room ambient condition (temperature and pressure) and while the test specimen is still in the chamber perform a functional test as specified in paragraph 2.5. (The chamber door may be open during this functional test.)

3.3.2.5 Visual examination shall be performed on the external surfaces of the test specimen after the unit is removed from the chamber. All deterioration or corrosion shall be recorded.

3.4 High/Low Temperature - Life

3.4.1 The test specimen shall be mounted in a High/Low temperature chamber; and no attempt shall be made to clean the test specimen. The position of the test specimen and test setup installation shall be as noted in paragraph 3.3.1.

3.4.2 Prior to lowering the temperature, perform a functional test as specified in paragraph 2.5 and a dielectric strength test as specified in paragraph 2.6 except the applied voltage shall be 280 ±5 vdc.

3.4.3 Perform High/Low Temperature Test as follows: (14 days)

1. Chamber temperature shall be decreased at a rate not greater than 5 F/minute from room ambient to 40 ±5 F. The chamber shall be reduced to and maintained at 40 ±5 F for 96 ± 1 hours.

3.4.3 -1. (continued)

Perform a functional test approximately every 24 hours, and during the last functional test perform a dielectric strength test as specified in paragraph 3.4.2.

2. Chamber temperature shall be increased at a rate no greater than 5 F/minute from +40 to 125 ±5 F. The chamber shall be maintained at 125 ±5 F for 240 ±1 hours. During this period, perform a functional test approximately every 24 hours; and during the last functional test perform a dielectric strength test as specified in paragraph 3.4.2.

3. Chamber temperature shall be increased at a rate no greater than 5 F/minute from 125 to 200 ±5 F. The chamber shall be maintained at 200 ±5 F for 30(+30, -5) minutes.

After stabilization for 15 minutes at 200 F perform a functional and dielectric strength test as specified in paragraph 3.4.2.

4. Chamber temperature shall be decreased at a rate no greater than 5 F/minute from 200°F to room ambient. Allow test specimen 2 hours minimum to stabilize at room ambient temperature and perform a functional and dielectric strength test as specified in paragraph 3.4.2.

5. Chamber temperature shall be decreased at a rate not greater than 5 F/minute from room ambient to -20 ±5 F. The chamber shall be maintained at -20 ±5F for 24 ±1 hours. No functional testing is to be conducted during this period.

6. Chamber temperature shall be increased at a rate not greater than 5 F/minute from -20 F to room ambient. Allow test specimen 2 hours minimum to stabilize at room ambient temperature and perform a functional and dielectric strength test as specified in paragraph 3.4.2. (The chamber door may be open during this functional test.)

3.5 Vacuum (4.4)

3.5.1 The test specimen shall be mounted in a vacuum chamber; perform a functional test as specified in paragraph 2.5 while the chamber is at room ambient condition.

3.5.2 Perform the vacuum test at a vacuum of at least 1×10^{-4} mm Hg and with the test specimen temperature at 40 ± 5°F for 50 $^{+5}_{-0}$ hours. Temperature shall be decreased at a rate not greater than 5 F/minute from room ambient to 40 ± 5F. (Thermocouple shall be located approximately as shown in Figure I).

After the test specimen has been stabilized at the required vacuum and temperature perform a functional test as specified in paragraph 2.5. Repeat the functional test approximately at the following times: 24 and 50 hours.

ϕ_1 3.5.3 The test specimen temperature shall be increased at a rate not greater than 5 F/minute from 40 to 135 ± 10 F. The test specimen temperature shall be maintained at 135 ± 10 for 50^{+5}_{-0} hours.

After the test specimen has been stabilized at the required vacuum and temperature, perform a functional test as specified in paragraph 2.5. Repeat the functional test again approximately at the following times: 24 and 50 hours.

ϕ_1 3.5.4 The test specimen temperature shall be decreased at a rate no greater than 5 F/minute from 135 F to room ambient.

After the test specimen has been stabilized at the required vacuum and temperature for 1 hour, perform a functional test as specified in paragraph 2.5.

3.5.5 After chamber temperature and pressure has returned to room ambient condition, perform a functional and dielectric strength test as specified in paragraph 3.4.2.

3.5.6 During the vacuum test, at temperatures of 40 and 135 F, all electrical circuits shall be energized by applying to each of the positive (+) test points 26 ± 0.26 V (rms), 800 cycles and connecting a suitable load resistor to the minus (-) test points. An AC current of 110 ± 10 milliamps shall flow through each circuit (See Table II for connecting points). These circuits shall be monitored throughout the test, the reading shall be recorded approximately every 24 hours and at the end of the test.

TABLE II

From (+)	To (-)
J2-P	J1-P
R	R
K	K
L	L
G	G
H	H
S	S
M	M
X	X
N	N
V	V
W	W

3.6 Acceleration (4.10)

3.6.1 The assembly shall be subjected to an acceleration test by applying 20 ± 1 g's in each direction of three mutually perpendicular axes as indicated by Figure I. The acceleration shall be applied for 5 +1, -0 minutes in each direction of each axis.

3.6.2 Monitor for discontinuity during the acceleration test as specified in paragraph 3.2.4.

3.6.3 Prior to acceleration test, after the assembly has been mounted on the fixture, perform a functional test as specified in paragraph 2.5; and subsequent to the completion of the acceleration exposure, perform the functional and dielectric strength test as specified in paragraph 3.4.2.

3.7 Shock (4.9)

3.7.1 The Assembly shall be subjected to a terminal peak sawtooth pulse in both directions in each of the orthogonal axes (six shocks total). Magnitudes and directions shall be outlined in Table III and Figure I. The total pulse duration shall be 10 to 15 milliseconds including a decay time no greater than 10 percent of the total duration.

3.7.2 Monitor for discontinuity during shock test as specified in paragraph 3.2.4.

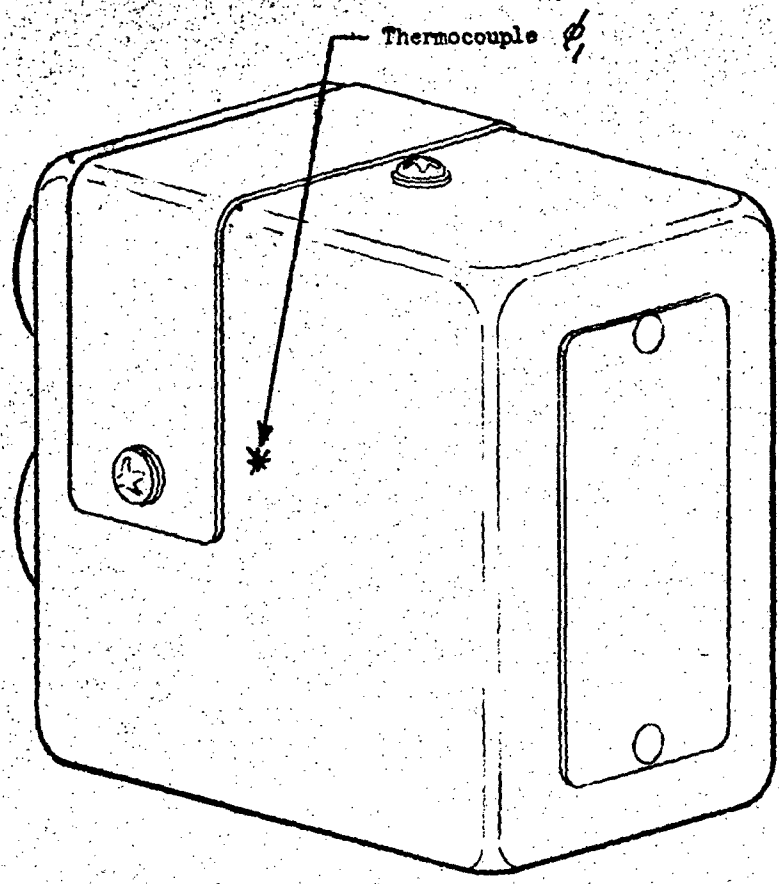
3.7.3 Prior to and subsequent to the complete shock exposure, perform the functional and during the last functional test perform a dielectric strength test as specified in paragraph 3.4.2. These functional tests are for engineering reference only.

4.0 Visual Examination

The external and internal surfaces of the test specimen shall be visually inspected and there shall be no evidence of structural damage resulting from the foregoing test. All damage shall be recorded.

Table III
(Shock Test)

Magnitude	Axis
20 g	-X
35 g	±Y
78 g	+X, +Z, -Z



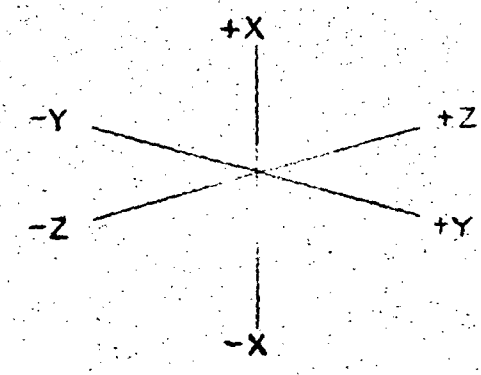


Figure I

APPENDIX B

QUALIFICATION TEST PROCEDURE (QTP)

APOLLO CSM 101
LR 6227
ATR 492117B

IL-6227-801 A
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29 June 1968
ø Revised 8-13-68

LABORATORIES AND TEST
QUALIFICATION TEST PROCEDURE
FOR GUIDANCE AND NAVIGATION
FILTER BOX ASSEMBLY
V36-442330

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1.0 INTRODUCTION

The Guidance and Navigation Filter Box Assembly, V36-442330, which is located in the Command Module, Right Hand Lower Equipment Bay, is used to filter switching transients in the Guidance and Navigation System.

2.0 SCOPE

One test specimen shall be subjected to the Qualification Tests described below, and in the order listed.

2.1 Functional Test

2.2 Dielectric Strength Test

2.3 Vibration:

2.3.1 Sinusoidal

2.3.2 Random

2.4 CCOH:

2.4.1 Salt Spray

2.4.2 Oxygen - Humidity

2.5 High/Low Temperature - Life

ø 2.6 Vacuum

ø 2.7 Acceleration

2.8 Shock

3.0 APPLICABLE DOCUMENTS

ø 3.1 ATR 492117B	Apollo Test Request - Qualification Test, Guidance and Navigation Filter Box Assembly
3.2 V36-442330NC	Box Assembly - G&N Filter (EO M672744)
3.3 V36-945106NC	Schematic Diagram - Guidance and Navigation Filter Box (No EO's)
3.4 MA0203-0622NC	Guidance and Navigation Filter Assembly, Functional and Vibration Acceptance Test Procedure For - EO M672833
3.5 MC999-0050C	General Test Requirements For Apollo Sub-contractors and Suppliers (EO M615051)

3.6 T&QA M2.4.1 Laboratories & Test Quality Assurance Responsibilities

4.0 GENERAL REQUIREMENTS

The test specimen shall be subjected to the tests described herein without degradation of performance or structural integrity. Failure to meet specified tolerance levels shall constitute a failure and shall be reported in accordance with NR/SD Policies and Procedures N-403.

Unless otherwise specified, all environmental tests shall be performed at room ambient temperature and conditions.

Any special test fixtures required shall be in accordance with Specification MC999-0050C.

4.1 Safety:

Normal safety precautions shall be observed at all times. Precaution shall also be taken to ensure that the test item incurs no damage as a result of handling.

4.2 Quality Assurance Provisions:

4.2.1 All testing shall be performed per T&QA M2.4.1.

4.2.2 Equipment used shall have a valid calibration decal effective for the estimated test phase period.

4.2.3 All tests shall be witnessed and certified by NR/SD and NASA Inspection personnel.

4.2.4 Cognizant engineering personnel shall be notified prior to the start of tests.

4.3 Data and Reports:

4.3.1 All data recorded or noted visually shall be tabulated in an Engineering/Laboratory Notebook and verified for accuracy by NR/SD Inspection personnel. All test setups shall be described, with complete electrical schematics maintained of the circuitry. Circuits and/or schematics contained herein need not be repeated in the Engineering Laboratory Notebook.

4.3.2 A Space Division, Category I Test Report shall be issued after completion of testing.

5.0 DETAIL REQUIREMENTS

5.1 Visual Examination:

5.1.1 The test specimen shall be visually examined for conformance to production drawings and for evidence that the unit has passed assembly and acceptance inspection. Apollo Engineering shall determine whether the unit is acceptable for Qualification Testing and shall so state in the Engineering/Laboratory Notebook.

5.1.2 Following the test efforts described herein, the specimen shall again be examined under the direction of Apollo Engineering and/or Reliability for structural or electrical damage.

5.2 Functional Tests:

5.2.1 Insulation Resistance

Using a megohm bridge, apply a test potential of 200±10 VDC and measure the resistance from each pin on Connector J1 to the chassis, individually. Allow the meter to stabilize for a minimum of 30 seconds before recording each measurement.

Any resistance reading less than 90 megohms shall be considered a test failure, except when otherwise noted.

5.2.2 Continuity

5.2.2.1 Using an ohmmeter, verify that continuity exists between the following pins:

From	To	From	To
J1-C	J2-C	J1-H	J2-H
J1-F	J2-F	J1-J	J2-J
J1-G	J2-G	J1-K	J2-K
J1-L	J2-L	J1-J	J2-J
J1-M	J2-M	J1-K	J2-K
J1-N	J2-N	J1-M	J2-M
J1-P	J2-P	J1-N	J2-N
J1-R	J2-R	J1-P	J2-P
J1-S	J2-S	J1-R	J2-R
J1-T	J2-T	J1-S	J2-S
J1-U	J2-U	J1-T	J2-T
J1-V	J2-V	J1-U	J2-U
J1-X	J2-X	J1-V	J2-V
J1-Y	J2-Y	J1-W	J2-W
J1-Z	J2-Z	J1-X	J2-X
J1-A	J2-A	J1-Y	J2-Y
J1-B	J2-B	J1-Z	J2-Z
J1-C	J2-C	J1-AA	J2-AA

5.2.2.1 (Cont'd.)

From	To	From	To
J1-D	J2-D	J1-BB	J2-BB
J1-E	J2-E	J1-CC	J2-CC
J1-F2	J2-F	J1-DD	J2-DD
J1-G	J2-G	J1-EE	J2-EE
J1-H	J2-H	J1-FF	F2-FF
J1-I	J2-I	J1-GG	J2-GG
		J1-HH	J2-HH

5.2.2.2 During the initial and final continuity test, record the measured resistance for each of the pins listed above. All other continuity tests shall be compared with the initial check, but need not be recorded, except when dissimilarity is observed.

Ø 5.2.3 Capacitance Test

Using an impedance bridge, measure the capacitance between each of the following connector pins and chassis. Any reading less than 5,500 picofarads at room ambient temperature (70-78F) and less than 3,500 picofarads at all other test temperatures shall be considered a test failure. The test voltage applied by the bridge shall be verified as being greater than 0.5 volts rms and less than 7.0 volts rms at 1,000 cps.

Pin (To Chassis)	Pin (To Chassis)
J1-K	J2-K
J1-L	J2-L
J1-N	J2-N
J1-P	J2-P
J1-R	J2-R
J1-S	J2-S
J1-G	J2-G
J1-H	J2-H
J1-M	J2-M
J1-V	J2-V
J1-W	J2-W
J1-X	J2-X

5.3 Dielectric Strength:

Using a megohm bridge, apply a test potential of 375±10 VDC for a period of 5.0(+0.0, -0.5) seconds, between all pins of J1 tied together and to chassis ground. Rate of voltage application shall not exceed 100 volts per second. Current leakage shall be less than 2 milliamperes (in accordance with MIL-STD-202, Method 301).

5.4 Vibration:

5.4.1 Sinusoidal Resonance Search

5.4.1.1 Prior to the start of the resonance search and after the specimen has been mounted to the vibration fixture, an initial Functional and Dielectric Strength Test shall be conducted as specified in Paragraphs 5.2 and 5.3.

5.4.1.2 A resonance search shall be conducted in each of the three orthogonal axes (Ref. Figure 3) in accordance with the requirements of MC999-0050C, Paragraph 4.8.2.1, except for the following:

Frequency Range: 10 cps to 2000 cps, 2(+0,-1) g
Sweep Rate: 10(+1,-0) minutes per axis

5.4.1.3 Response accelerometers shall be used. The location and number shall be determined prior to the test by Apollo CSM Dynamics, Department 099-220.

5.4.1.4 All response accelerometers and the control accelerometer shall be FM tape recorded and plotted on Form 2974 log paper and properly identified.

5.4.1.5 A functional test shall be conducted as specified in Paragraph 5.2, following completion of the resonance search.

5.4.2 Random Vibration

5.4.2.1 Two levels of random vibration spectrum levels shall be applied to the specimen in each of the three orthogonal axes. (See Figure 3)

Level A - Duration is 2.5(+0.25, -0) minutes
20 to 80 cps - 3 db/octave linear increase to 0.067 g^2/cps

80 to 2000 cps - Constant at 0.067 g^2/cps

Level B - Duration is 12.5(+1.0, -0) minutes
20 to 80 cps - 3 db/octave linear increase to 0.003 g^2/cps

80 to 2000 cps - Constant at 0.003 g^2/cps

NOTE: The durations shown do not include equalization time which shall be conducted prior to the start of the "X" axis and one of the two remaining axes.

5.4.2.2 During the above vibration tests, the circuits listed in Figure 2A shall be energized and monitored for discontinuities greater than 70 microseconds. If discontinuity occurs an oscilloscope shall be connected in the circuit and discontinuity duration shall be noted and recorded.

5.4.2.3 A functional test shall be conducted as specified in Paragraph 5.2, following final random vibration exposure in each level. However, the final functional test may be performed after the test specimen is mounted in the salt spray chamber.

5.5 Corrosive Contaminants, Oxygen-Humidity:

5.5.1 Salt Spray

5.5.1.1 The test specimen shall be placed into a salt spray cabinet in a position which simulates spacecraft installation. (See Figure 3)

5.5.1.2 Prior to the salt spray application, and after installation into the chamber, the specimen shall be subjected to the functional tests specified in Paragraph 5.2.

5.5.1.3 The salt spray application shall be in accordance with Method 509, Procedure I, of MIL-STD-810, with the following exceptions:

(a) The salt solution shall be 1 percent by weight.

(b) The test duration shall be 1 hour.

(c) Cabinet conditions shall be ambient.

5.5.1.4 Subsequent to the salt spray exposure, while the specimen is still installed in the chamber, conduct the functional test as specified in Paragraph 5.2.

5.5.1.5 Visual examination shall be performed on the external surfaces of the specimen after the unit has been removed from the salt spray cabinet. All deterioration or corrosion shall be recorded.

5.5.1.6 No attempt shall be made to clean the test specimen and care shall be exercised to prevent salt residue from being removed from the specimen during handling.

5.5.2 Oxygen - Humidity

5.5.2.1 The test specimen shall be transferred from the salt spray cabinet to an oxygen - humidity chamber within one hour after completion of the Salt Spray test. The specimen shall be installed in the manner described in Paragraph 5.3.1.1.

5.5.2.2 Prior to pressure evacuation, the functional test of Paragraph 5.2 shall be performed.

5.5.2.3 The test chamber shall be evacuated to a pressure of 20 mm Hg at ambient temperature conditions and back filled with commercial oxygen(95±5 percent) until the chamber pressure increases to 5.0±0.2 psia.

Chamber temperature shall be 125±5F.

These conditions shall be maintained for a period of 12 hours.

5.5.2.4 Following the 12-hour exposure, perform the functional test as specified in Paragraph 5.2.

5.5.2.5 Maintain the oxygen environment at 5.0±0.2 psia and introduce sufficient moisture to obtain a relative humidity of 95±5 percent, with distilled water having a pH factor of 6.5 to 7.5. Chamber temperature shall be maintained at 74±10F.

5.5.2.6 After the conditions of the above have been verified, the chamber temperature, pressure, and humidity shall be varied as follows:

(a)	Temperature	- Increase to 125(+5, -15)F in 2 hours ±15 minutes
	Pressure	- 5.0±0.5 psia
	Relative Humidity	- 95(+5, -15 percent)
	Oxygen	- 95(+5, -15 percent)
(b)	Temperature	- Maintained at 125(+5, -15F) for 6 hours ±15 minutes
	Pressure	- 5±0.2 psia
	Relative Humidity	- 95±5 percent
	Oxygen	- 95±5 percent

5.5.2.6 (Cont'd.)

(c) Temperature - Decrease to 60±10F in 10 hours ±15 minutes

Pressure - 5.0±0.5 psia

Relative Humidity - 95(+5, -15 percent)

Oxygen - 95(+5, -15 percent)

(d) Temperature - Maintained at 60±10F for 6 hours ±15 minutes

Pressure - 5.0±0.2 psia

Relative Humidity - 95±5 percent

Oxygen - 95±5 percent

5.5.2.7 Steps (a) through (d) above, constitute one 24-hour cycle, and shall be repeated continuously for a total of four cycles.

5.5.2.8 After the fourth cycle, the chamber temperature shall remain at 60±10F until the total test time of 120 hours minimum is accumulated. During this period, the pressure shall be 5.0±0.2 psia, the relative humidity 95±5 percent, and the oxygen at 95±5 percent.

5.5.2.9 The functional tests of Paragraph 5.2 shall be conducted throughout the 120-hour exposure at the following intervals: 6, 22, 30, 46, 54, 70, 78, 94, 102, and 118±1 hours.

5.5.2.10 Following the oxygen - humidity test, after the chamber has returned to room ambient condition (temperature and pressure), and while the specimen is still in the chamber, perform the functional test of Paragraph 5.2. (The chamber door may be open during this functional test.)

5.5.2.11 Visual examination shall be performed on the external surfaces of the test specimen after the unit has been removed from the chamber. All deterioration or corrosion shall be recorded.

5.6 High/Low Temperature - Life:

5.6.1 The test specimen shall be mounted in a high/low temperature chamber, and no attempt shall be made to clean the test specimen. The position of the specimen shall be as noted in Paragraph 5.3.1.1. (See Figure 3)

5.6.2 Prior to lowering the temperature, perform the functional test of Paragraph 5.2 and the Dielectric Strength test of Paragraph 5.3, except the applied voltage shall be 280±5 VDC.

5.6.3 Perform the High/Low Temperature Test for fourteen days, as follows:

	Temperature	Duration/Delta Change	Functional
1.	Ambient to 40±5F	5F/minute maximum	
2.	40±5F	96±1 hour	Every 24 hours per Paragraph 5.2*
3.	40±5F to 125±5F	5F/minute maximum	
4.	125±5F	240±1 hour	Every 24 hours per Paragraph 5.2*
5.	125±5F to 200±5F	5F/minute maximum	
6.	200±5F	30 +30 -5 minutes	Functional and Dielectric Strength when stabilized per Paragraph 5.6.2
7.	200±5F to Ambient	5F/minute maximum	
8.	Ambient	2 hours	Functional and Dielectric Strength after 2 hours per Paragraph 5.6.2.
9.	Ambient to -20±5F	5F/minute maximum	
10.	-20±5F	24±1 hour	No Functional
11.	-20±5F to Ambient	5F/minute maximum	
12.	Ambient	2 hours	Functional and Dielectric Strength after 2 hours per Paragraph 5.6.2.

* During the last functional, perform a dielectric strength test as described in Paragraph 5.6.2.

ø 5.7 Vacuum:

5.7.1 The test specimen shall be mounted in a vacuum chamber; perform a functional test as specified in Paragraph 5.2 while the chamber is at room ambient condition. (Install T/C as shown in Figure 3)

5.7.2 Perform the vacuum test at a pressure of 1×10^{-4}mm Hg maximum with a specimen case temperature as follows:

	Temperature	Duration/Delta Change	Functional
1.	Ambient to 40±5F	5F/minute maximum	
2.	40±5F	50^{+5}_{-0} hours	After stabilizing, perform functional at 2, 24, and 40 hours
3.	40±5F to 135±10F	5F/minute maximum	
4.	135±10F	50^{+5}_{-0} hours	After stabilizing, perform functional at 2, 24, and 40
5.	135±10F to Ambient	5F/minute maximum	
6.	Ambient	1 hour	Stabilize and perform a functional test.

5.7.3 All filter circuits shall be continuously energized with an AC current of 110±10 milliamperes at 26±0.26 VRMS, 800 cycles connected through a suitable load resistor. Current through each circuit shall be measured before and after each of the above functional tests. (See Figure 5)

ø 5.8 Acceleration:

5.8.1 The assembly shall be subjected to an acceleration test by applying 20±1 g's for 5^{+1}_{-0} minutes in each direction of three mutually perpendicular axes, as indicated by Figure 3.

5.8.2 Monitor for discontinuity during the acceleration test per Paragraph 5.4.2.2.

5.8.3 Prior to acceleration test, after the assembly has been mounted on the fixture, perform a functional test per Paragraph 5.2, and subsequent to the completion of the acceleration exposure, perform the functional and dielectric strength tests per Paragraph 5.6.2.

5.9 Mechanical Shock:

5.9.1 The test specimen shall be subjected to a terminal peak sawtooth pulse in both directions of the three orthogonal axes (see Figure 3) for a total of six shocks. The total pulse duration shall be 10 to 15 milliseconds, including a decay time no greater than 10 percent of the total duration.

5.9.2 Magnitudes and directions of shock shall be as follows:

Magnitude	Axis
20g	-X
35g	+Y, -Y
78G	+X, +Z, -Z

5.9.3 During the above shock test, the circuits listed in Figure 2A shall be energized and monitored for discontinuities greater than 70 microseconds.

6.0 STEP-BY-STEP PROCEDURE

6.1 Pre-Test Functions:

6.1.1 Specimen Acceptance (5.1) (_____hrs. _____1968)

6.1.2 Functional Test (5.2) (_____hrs. _____1968)

6.1.2.1 The specimen shall be mounted to the vibration test fixture.

6.1.2.2 Connect the specimen to the test equipment using Figure 4.1 (Functional Tests). (P5 and P6 to J3 and J4)

6.1.2.3 Insulation Resistance (Paragraph 5.2.1, Ref. Figure 1A).

6.1.2.3.1 Connect positive lead of megohm bridge to TP1 and negative lead to chassis ground.

6.1.2.3.2 Adjust megohm bridge for 200±10 VDC.

6.1.2.3.3 Conduct the Insulation Resistance Test of Paragraph 6.1.1 by moving Switch S30 from Position 1 through 23, allowing 30 seconds minimum stabilization for each step.

6.1.2.3.4 Connect positive lead of megohmmeter to TP3 and repeat Paragraph 6.1.2.3.3.

6.1.2.3.5 Connect positive lead of megohmmeter to TP5 and move Switch S31 from Position 1 through 3, allowing 30 seconds minimum stabilization for each step.

6.1.2.3.6 Disconnect megohmmeter.

6.1.2.4 Continuity:(5.2.2)

6.1.2.4.1 Connect an ohmmeter across TP1 and TP2.

6.1.2.4.2 Conduct the continuity test by moving Switch S30 from Positions 1 through 23, allowing sufficient time between switch movement for meter stabilization.

6.1.2.4.3 Connect the ohmmeter across TP3 and TP4 and repeat Paragraph 6.1.2.4.2.

6.1.2.4.4 Connect the ohmmeter across TP5 and TP6 and move Switch S31 from Position 1 through 3.

6.1.2.4.5 Disconnect ohmmeter.

6.1.2.5 Capacitance Test: (5.2.3)

6.1.2.5.1 Connect the negative lead of an impedance bridge to the chassis ground and the positive lead to TP1.

6.1.2.5.2 Measure capacitance by placing Switch S30 to the following positions: 4, 6, 7, 8, 9, 22, and 23.

6.1.2.5.3 Connect the positive lead of the impedance bridge to TP2 and placing S30 to the following positions: 4, 6, 7, 8, 9, 22, 23.

6.1.2.5.4 Connect the positive lead of the impedance bridge to TP3 and measure capacitance by placing Switch S30 to the following positions: 3, 6, 13, 14, and 15.

6.1.2.5.5 Connect the positive lead to TP4 and measure capacitance by placing Switch S30 to the following positions: 3, 6, 13, 14, and 15.

6.1.2.5.6 Disconnect the impedance bridge.

6.1.3 Dielectric Strength (5.3) (_____hrs. _____1968)

6.1.3.1 Connect the specimen to the test equipment using Figure 4.2 (Dielectric Strength Test) harness (P5 and P6 to J5 and J6).

6.1.3.2 Attach positive lead of megohm bridge to TP7 and the negative lead to chassis ground.

6.1.3.3 Adjust for a test potential of 375±10 VDC and record meter reading.

6.2 Vibration: (5.2)

6.2.1 Resonance Search axis (_____hrs. _____1968).

Conduct per Paragraph 5.4.1.

6.2.2 Resonance Search axis (_____hrs. _____1968).

Conduct per Paragraph 5.4.1.

6.2.3 Resonance Search axis (_____hrs. _____1968).

Conduct per Paragraph 5.4.1.

6.2.4 Post-Test Functional (_____hrs. _____1968).

Repeat Paragraph 6.1.2, except IR voltage is 100±10 VDC.

6.2.5 Remove test harness (Figure 4.2).

6.2.6 Connect the test specimen to the chatter detection equipment (Reference Figure 4.3) utilizing the test harness P1 and P2.

6.2.7 Random Vibration, Levels A & B,axis (_____ hrs._____1968).

6.2.7.1 Turn on power supply and set at 28.5±1.5 VDC.

6.2.7.2 Turn on S1 through S20 (Figures 2(A) and 2(B) ref.)

NOTE: Load currents are set at 100 ma and can be verified by rotating S21 from Position 1 through 6 and opening the proper switch, as described below:

6.2.7.2 (Cont'd.)

Switch	Position	Open Switch	Read Current
S21	1	S15	100 ma
S21	2	S16	
S21	3	S17	
S21	4	S18	
S21	5	S19	
S21	6	S20	100 ma

Upon completion of load current verification, verify S15 through S20 are in the ON position and S21 is OFF. (See Figure 2).

6.2.7.3 Hook up DCN chatter checkers. (See Figure 2).

Verify chatter checkers are operational and set at 70±7 microseconds. Operation of the chatter checkers can be verified by opening Switches S15 through S20.

6.2.7.4 Verify S15 through S20 ON - Reset chatter checkers.

6.2.7.5 Start Random Vibration.

6.2.8 Random Vibration, Levels A & B, axis (____hrs. _____1968).

Repeat Paragraphs 6.2.7.1 through 6.2.7.5.

6.2.9 Random Vibration, Levels A & B, axis (____hrs. _____1968).

6.2.9.1 Repeat Paragraphs 6.2.7.1 through 6.2.75.

6.2.9.2 Remove chatter checker hookup and test harness.

6.2.10 Post-Test Functional (_____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 90 megohms minimum).

6.3 CCOH (5.5):

6.3.1 Pre-Test Functional (_____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 90 megohms minimum) after installation of specimen in the salt spray cabinet.

6.3.2 Salt Spray (5.5.1) (_____hrs. _____1968).

6.3.3 Post-Test Functional (_____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum) with specimen still in the salt spray cabinet.

6.3.4 Visual Examination (____hrs. _____1968).

Visually examine the specimen following removal from the salt spray cabinet. Note condition in Laboratory Notebook.

6.3.5 Pre-Oxygen-Humidity Functional (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum) after installation of specimen in the oxygen-humidity chamber (within 1 hour after 6.3.4).

6.3.6 Twelve-Hour Dry Oxygen (5.5.2)

6.3.6.1 Start (_____hrs. _____1968).

6.3.6.2 Stop (_____hrs. _____1968).

6.3.7 Post-Oxygen Functional (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8 Oxygen-Humidity (24 Hours)

6.3.8.1 Time zero (____hrs. _____1968).

Temperature increased to 125F in two hours.

6.3.8.2 Time plus 6 hours (_____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8.3 Time plus 22 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8.4 Time plus 30 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8.5 Time plus 46 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8.6 Time plus 54 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8.7 Time plus 70 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8.8 Time plus 78 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum.

6.3.8.9 Time plus 94 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8.10 Time plus 102 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.8.11 Time plus 118 hours (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 10 megohms minimum).

6.3.9 Post Oxygen-Humidity Functional

After chamber has returned to room ambient temperature, repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance reading shall be 10 megohms minimum).

6.3.10 Visual Examination (____hrs. _____1968).

Visually examine the test specimen following removal from the chamber. Note condition in Laboratory Notebook.

6.4 High/Low Temperature - Life (5.6):

6.4.1 Pre-Test Functional (____hrs. _____1968).

Repeat Paragraph 6.1.2 (except IR voltage is 100±10 VDC and resistance shall be 90 megohms minimum) after installation of the specimen in the chamber.

6.4.2 Dielectric Strength (____hrs. _____1968).

Repeat paragraph 6.1.3 except the applied voltage shall be 280±5 VDC.

6.4.3 Fourteen Day High/Low Temperature as follows:

6.4.3.1 40°F for 96 hours.

6.4.3.1.1 T + 24 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.1.2 T + 48 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.1.3 T + 72 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.1.4 T + 96 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

Dielectric Strength per paragraph 6.1.3 except applied voltage shall be 280±5 VDC.

6.4.3.2 125°F for 240 hours.

6.4.3.2.1 T + 24 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.2.2 T + 48 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.2.3 T + 72 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.2.4 T + 96 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.2.5 T + 120 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.2.6 T + 144 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.2.7 T + 168 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.2.8 T + 192 hours - Functional per paragraph 6.1.2 (____hrs. _____1968).

6.4.3.2.9 T + 216 hours - Functional per paragraph 6.1.2 (___hrs. _____1968).

6.4.3.2.10 T + 240 hours - Functional per paragraph 6.1.2 (___hrs. _____1968).

Dielectric Strength per paragraph 6.1.3 except the applied voltage shall be 280±5 VDC.

6.4.3.3 125F to 200F, 30 minutes (___hrs. _____1968).

6.4.3.3.1 After 15 minute stabilization - Functional test per paragraph 6.1.2.

6.4.3.3.2 Perform a Dielectric Strength test per paragraph 6.1.3, except the applied voltage shall be 280±5 VDC.

6.4.3.4 200F to ambient (___hrs. _____1968).

6.4.3.4.1 After 2 hours minimum stabilization, at room ambient, Functional test per paragraph 6.1.2.

6.4.3.4.2 Perform a Dielectric Strength test per paragraph 6.1.3, except the applied voltage shall be 280±5 VDC.

ø 6.4.3.5 Ambient to -20°F (___hrs. _____1968). Soak for 24 hours. No Functional.

ø 6.4.3.6 -20F to ambient (___hrs. _____1968).

6.4.3.6.1 After 2 hours minimum stabilization at room ambient, Functional test per paragraph 6.1.2.

6.4.3.6.2 Perform a Dielectric Strength test per paragraph 6.1.3, except the applied voltage shall be 280±5 VDC.

ø 6.5 VACUUM (5.7)

6.5.1 Pretest Functional (___hrs. _____1968).

6.5.2 40F -- Vacuum test (50 hours)

Connect specimen to electrical setup as shown in Figure 5. Apply 26±0.26 V(rms) and monitor for 110±10 milliamps throughout the 50-hour test phase. (Figure 5)

6.5.2.1 Start Vacuum test, time zero (_____hrs. _____1968).

6.5.2.2 T + 2 hours - Functional test per paragraph 6.1.2 (____hrs. _____1968).

6.5.2.3 T + 24 hours - Functional test per paragraph 6.1.2 (____hrs. _____1968) and record ampere reading.

6.5.2.4 T + 48 hours - Functional test per paragraph 6.1.2 (____hrs. _____1968) and record ampere reading.

6.5.3 135F - Vacuum test (50 hours)

Specimen to be monitored for 110±10 milliamps throughout the 50-hour test phase, as shown in Figure 5.

6.5.3.1 Start 135F - Vacuum test, time zero (____hrs. _____1968).

6.5.3.2 T + 2 hours - Functional test per paragraph 6.1.2 (____hrs. _____1968).

6.5.3.3 T + 24 hours - Functional test per paragraph 6.1.2 (____hrs. _____1968) and record ampere reading.

6.5.3.4 T + 48 hours - Functional test per paragraph 6.1.2 (____hrs. _____1968) and record ampere reading.

6.5.4 135F to ambient (5F/minute) (____hrs. _____1968).

6.5.4.1 After a one-hour ambient stabilization Functional test per paragraph 6.1.2.

6.5.4.2 Perform Functional test per paragraph 6.1.2 and Dielectric Strength test per paragraph 6.1.3.

Ø 6.6 ACCELERATION (5.8)

6.6.1 Pre test operation (_____hrs. _____1968).

6.6.1.1 Install the test specimen on the fixture and connect specimen to electrical setup as shown in Figure 4.1 utilizing the Functional test harness.

6.6.1.2 Perform the Functional test of paragraph 6.1.2.

6.6.1.3 Disconnect the functional test harness from the test specimen and connect the specimen to the chatter detector panel (Figure 4.3) utilizing the test harness connector P1 and P2.

6.6.1.4 Repeat paragraphs 6.2.7.1 through 6.2.7.4.

6.6.2.1 20g acceleration + x axis (____hrs. _____1968).

6.6.2.2 20g acceleration - x axis (____hrs. _____1968).

6.6.2.3 20g acceleration + y axis (____hrs. _____1968).

6.6.2.4 20g acceleration - y axis (____hrs. _____1968).

6.6.2.5 20g acceleration + z axis (____hrs. _____1968).

6.6.2.6 20g acceleration - z axis (____hrs. _____1968).

6.6.3 Disconnect chatter monitor harness and connect the specimen per Figure 4.1.

6.6.3.1 Perform the Functional test of paragraph 6.1.2.

6.6.3.2 Repeat Dielectric Strength test of paragraph 6.1.3 except the applied voltage shall be 280±5 VDC.

6.7 SHOCK (5.9)

6.7.1 Pre Test Operation (____hrs. _____1968).

6.7.1.1 After installation of the test specimen to the test fixture perform the Functional test of paragraph 6.1.2.

6.7.1.2 Remove Test Harness (Figure 4.1).

6.7.1.3 Connect the test specimen to the chatter detector panel (Figure 4.3) utilizing the test harness connectors P1 and P2.

6.7.1.4 Repeat paragraphs 6.2.7.1 through 6.2.7.4.

6.7.2 20g Shock Test "-X" Axis (____hrs. _____1968).

6.7.3 35g Shock Test "+Y" Axis (____hrs. _____1968).

6.7.4 35g Shock Test "-Y" Axis (____hrs. _____1968).

6.7.5 78g Shock Test "+X" Axis (____hrs. _____1968).

6.7.6 78g Shock Test "+Z" Axis (____hrs. _____1968).

6.7.7 78g Shock Test "-Z" Axis (____hrs. _____1968).

6.7.7.1 Repeat Functional test of paragraph 6.1.2.

6.7.7.2 Repeat Dielectric Strength test of paragraph 6.1.2.

6.7.7.3 These tests for engineering information only.

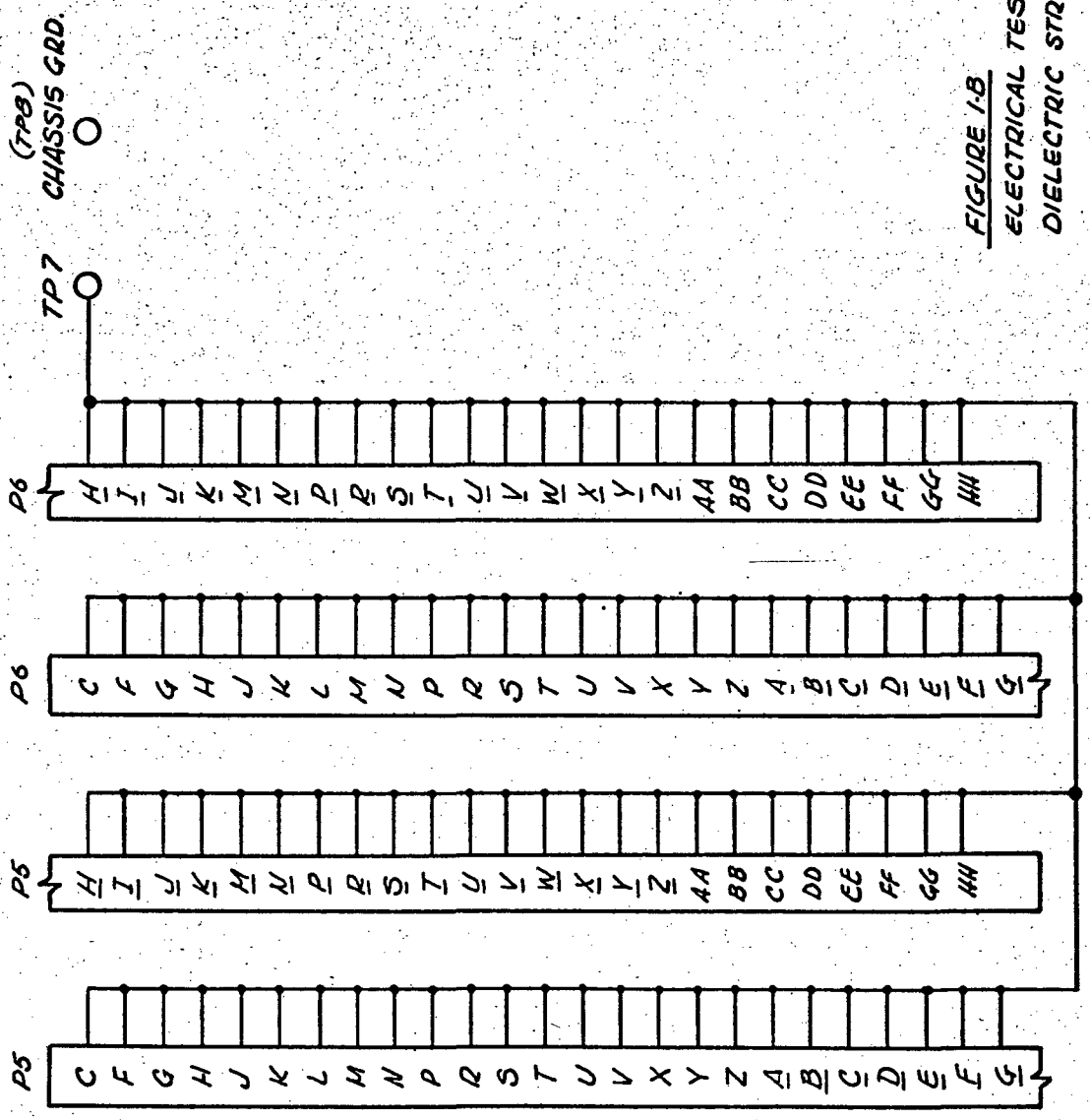
6.8 POST QUALIFICATION TEST EXAMINATION (____hrs. _____1968).

Ø 6.8.1 Visually examine the test specimen and note condition as compared with initial pre-test examination (internal and external).

6.8.2 End of test is accomplished by review of data with Apollo Engineering, who shall so state in the Engineering/Laboratory Notebook.

FIGURE 1-A
ELECTRICAL TEST SETUP
CONTINUITY & INSULATION RESIS.

FIGURE 1-8
ELECTRICAL TEST SETUP
DIELECTRIC STRENGTH



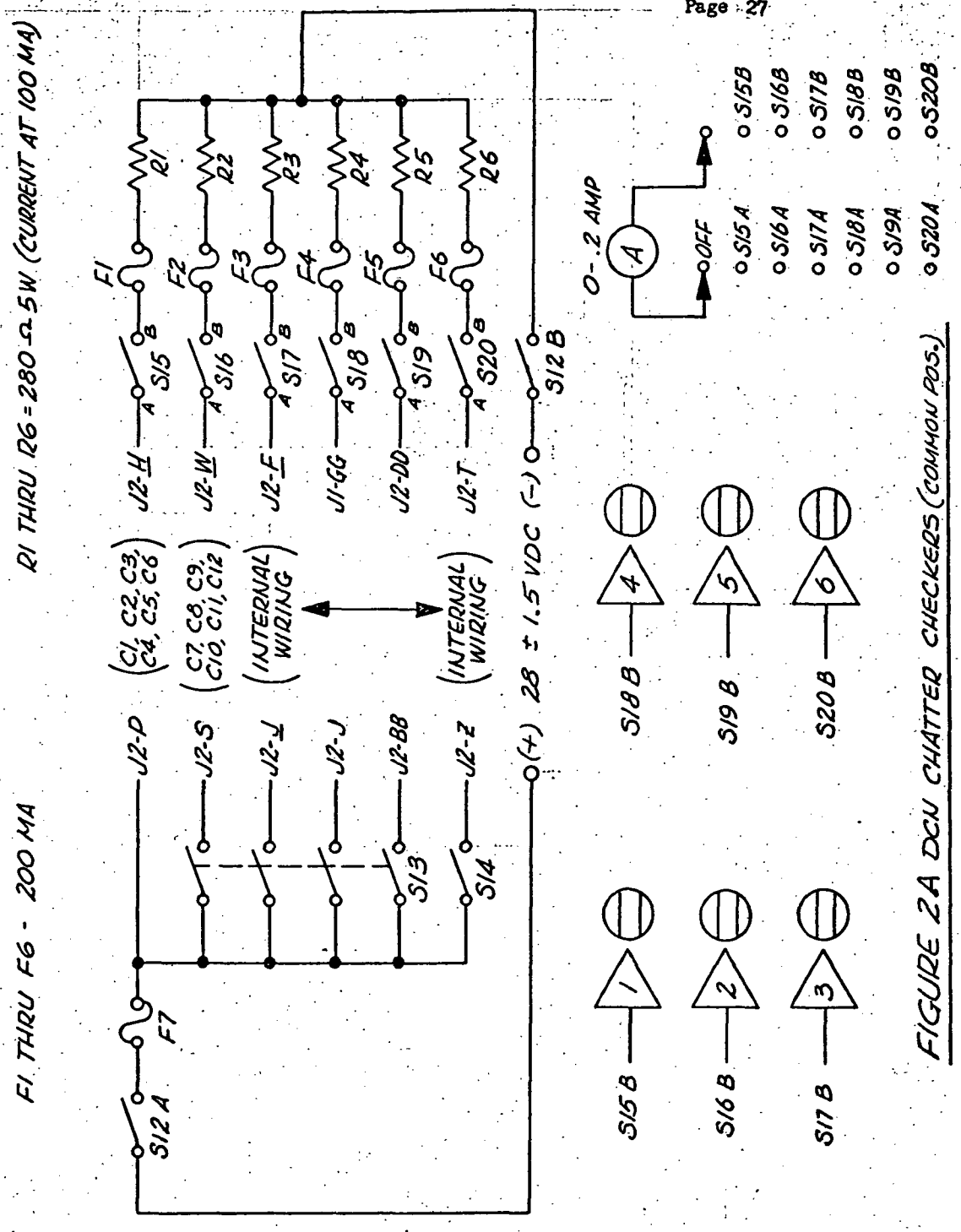


FIGURE 2A DCU CHATTER CHECKERS (COMMON POS.)

FIGURE 2 B CIRCUIT JUMPERS

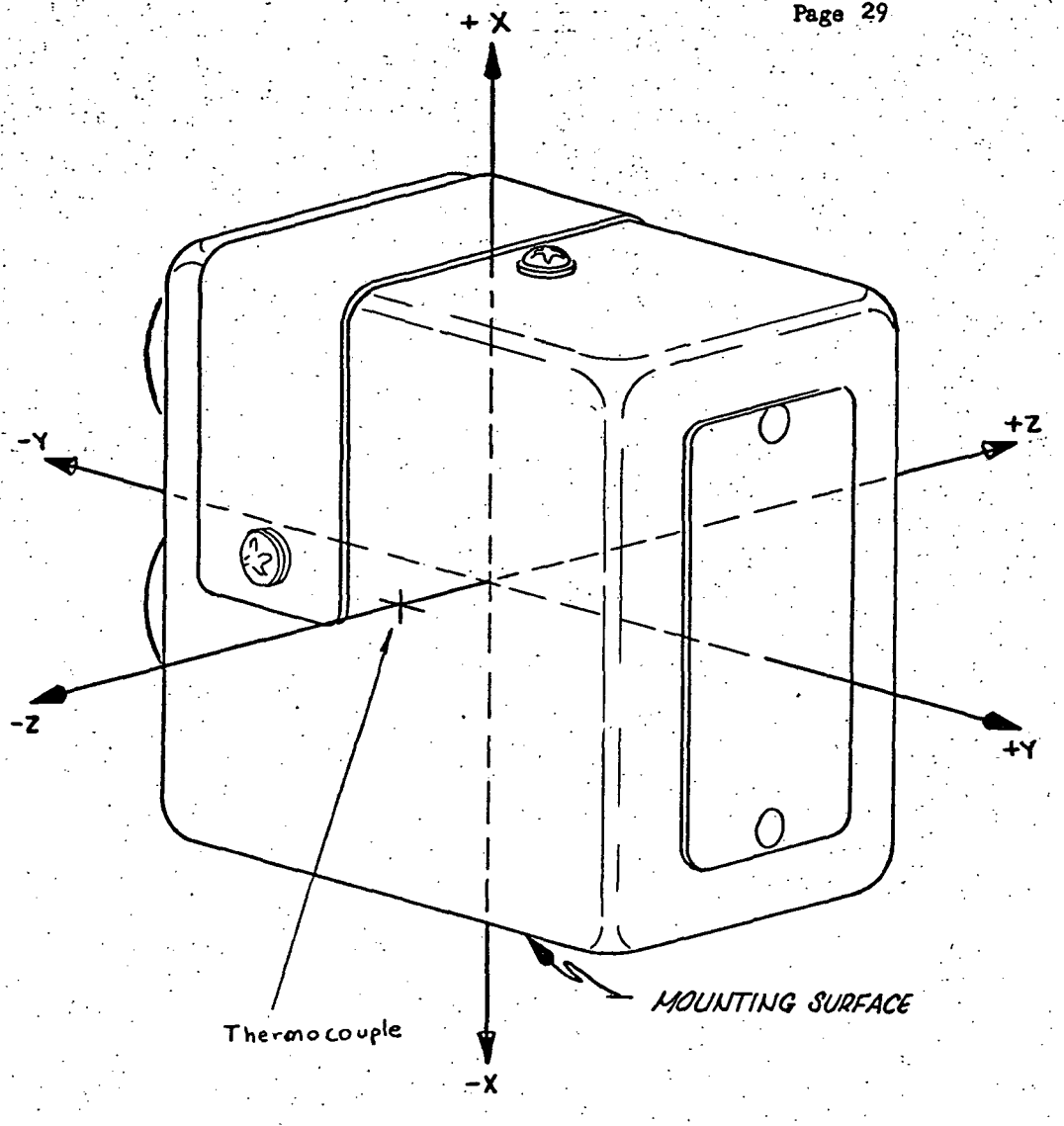


FIGURE 3. AXIS DEFINITION
(SPACECRAFT ORIENTED)

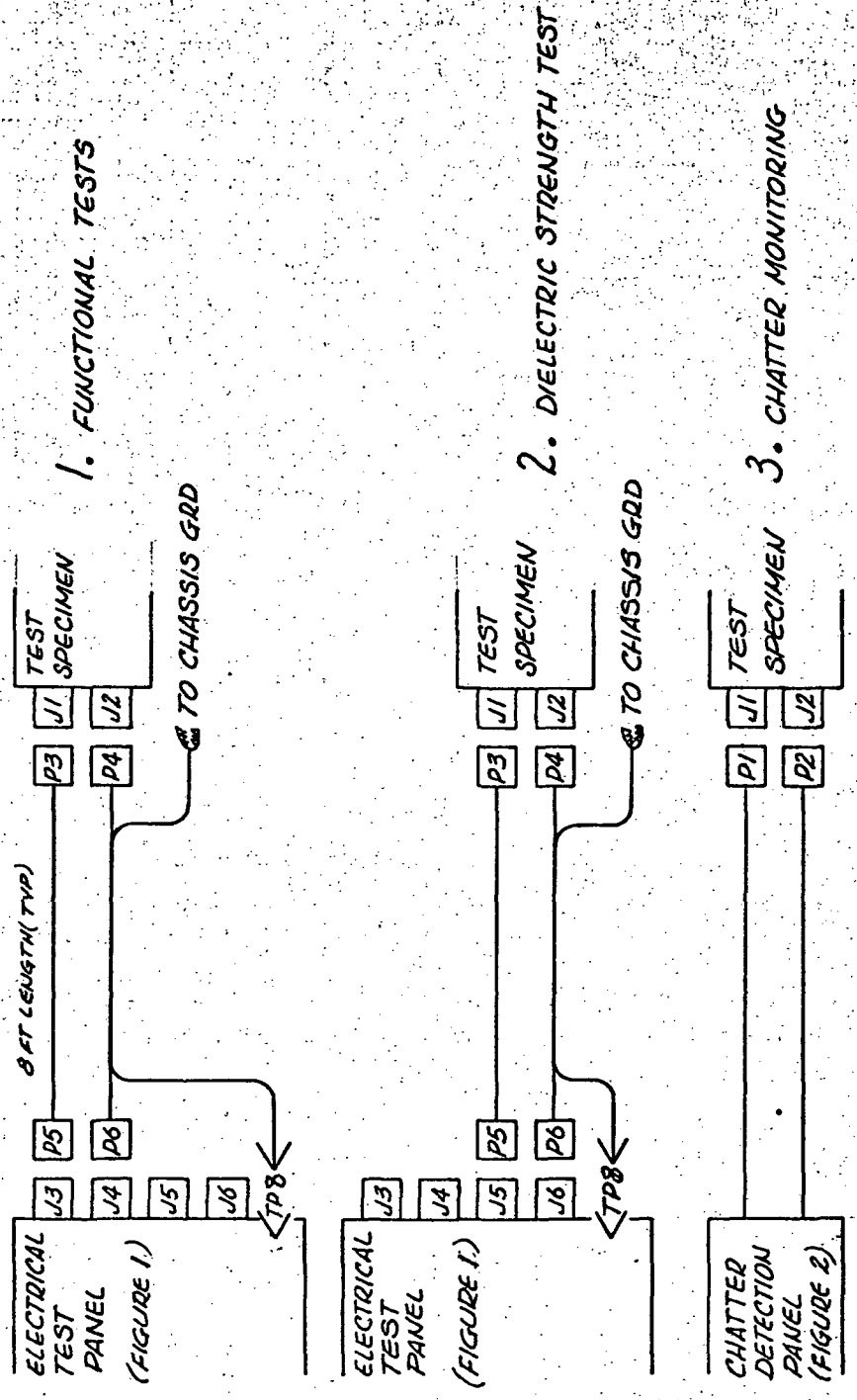


FIGURE 4. TEST HARNESSES & CONNECTOR HOOK-UP

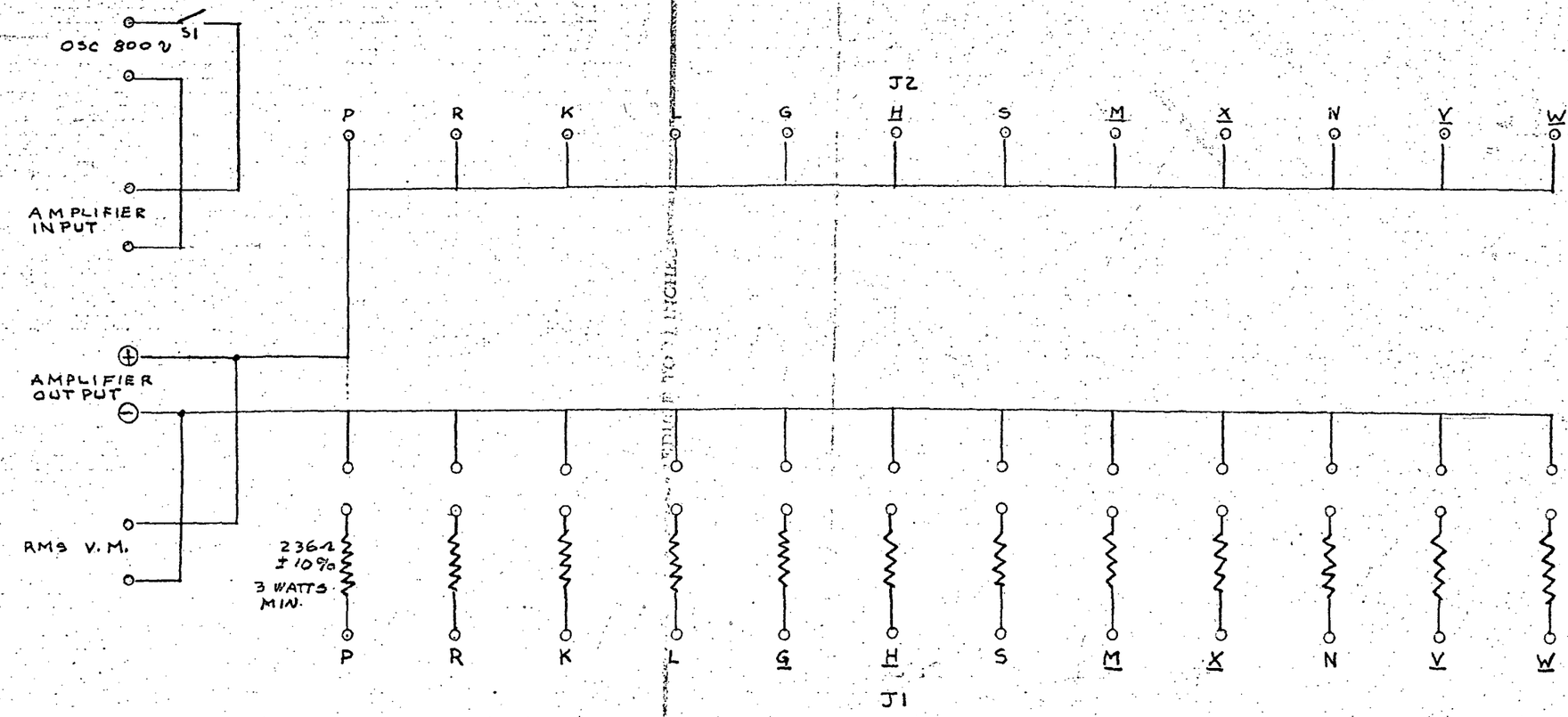
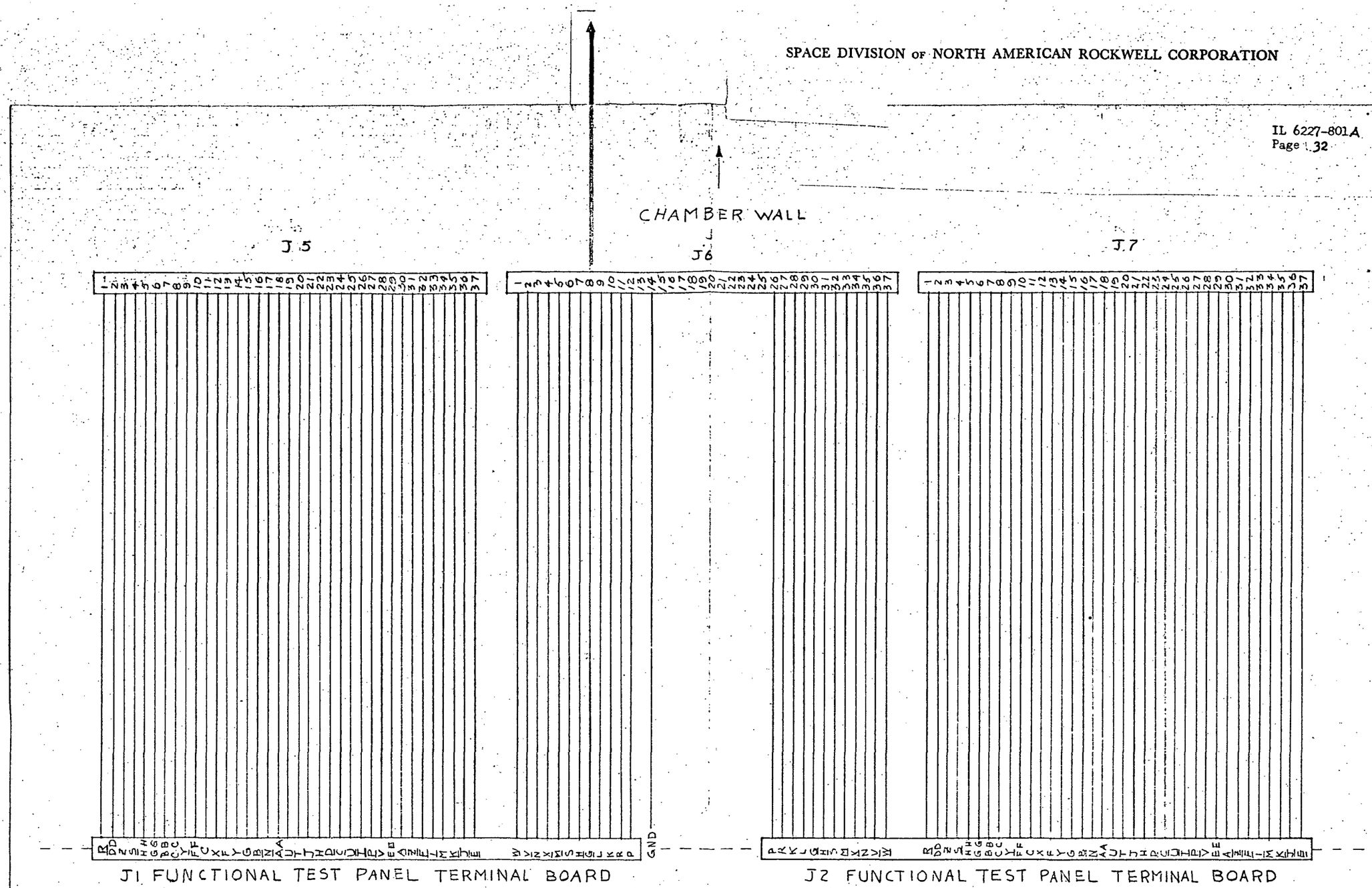


FIGURE 5

G & N FILTER BOX VACUUM TEST
AC LOAD PANEL
LR 6227
ATR 492117A

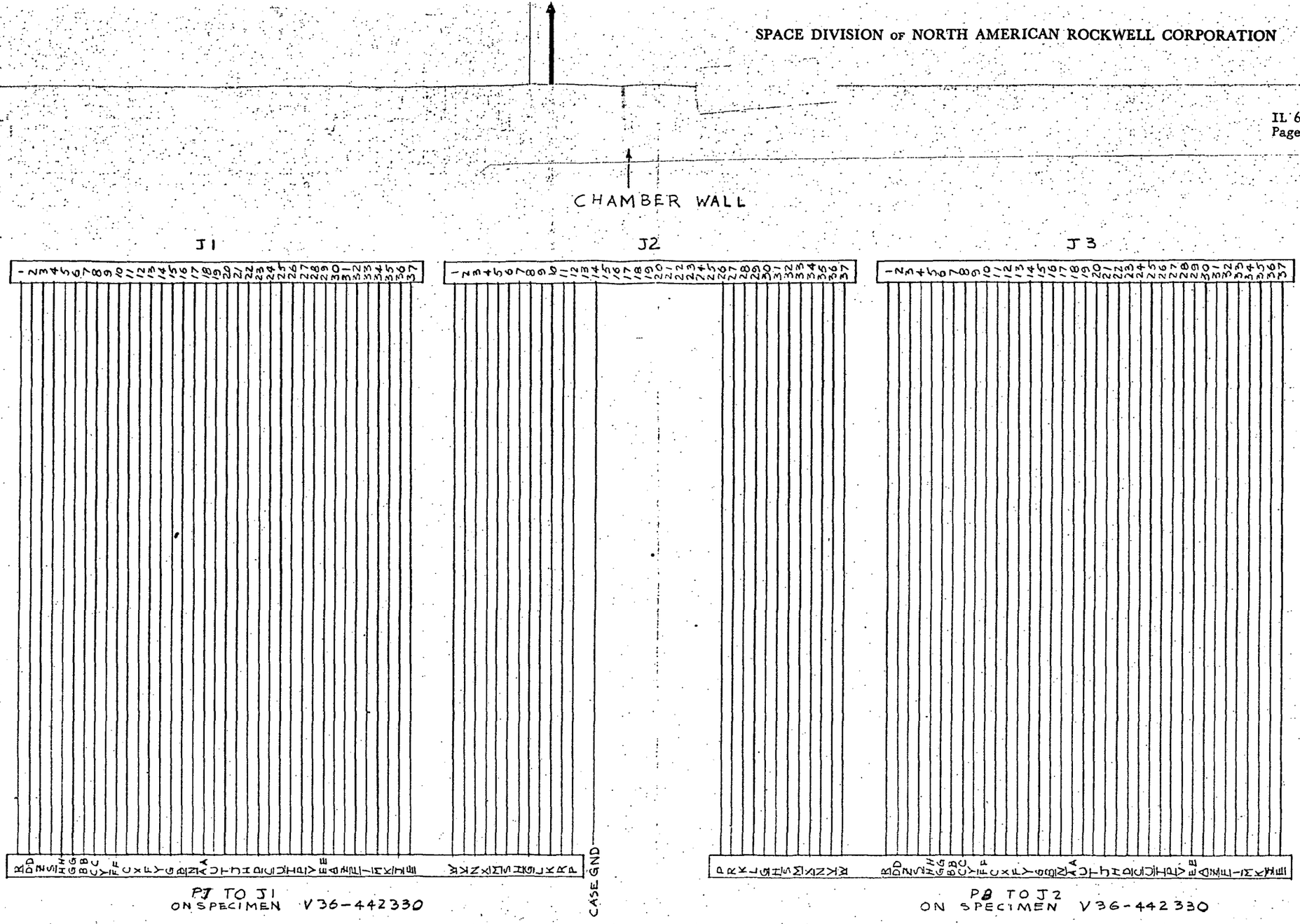


G & N FILTER BOX VACUUM TEST HARNESS (OUTSIDE)

FIGURE 6
LR 6227
ATR 492/17A

J5-J7 DEUTCH DSO7-375-059

B-33, B-34



J1-J3 DEUTCH 13084-375-5020
PJ ME414-0135-0021
PB ME414-0082-4355

G & N FILTER BOX VACUUM TEST HARNESS (INSIDE)

FIGURE 7
LR6227
ATR 492117A

APPENDIX C

FUNCTIONAL

North American Aviation, Inc. N 1997- 1

DIVISION		
SPACE DIVISION - DOWNEY, CALIFORNIA		
PROJECT NO: LR 6227	CONTRACT NO. ATR 492117	DATE 10 JULY 1968

QUALIFICATION TEST

GUIDANCE AND NAVIGATION FILTER BOX ASSEMBLY

V36-442330

SERIAL No. 0636 2AAH3858

APPLICABLE DOCUMENTS

ATR 492117	APOLLO TEST REQUEST - QUAL TEST FOR G&N FILTER BOX ASSEMBLY
IL-6227-801	L&T TEST PROCEDURE
MA0203-0622	FUNCTIONAL TEST PROCEDURES FOR G&N FILTER BOX ASSY.

DNE V36-444011 - ELECTRICAL SYSTEMS INSTALLATION L/E BAY
V34-945072 - SCHEMATIC DIAGRAM
V36-442330 - BOX ASSEMBLY
EO M672744 DNE (AMA 793)

C-1

(CONT ON N 1997-3)

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM 403-G REV. 7-66

SIGNATURE: R.G. Ekroos 7-10 19 68

WITNESSED AND UNDERSTOOD: R. Nyles 7-10 19 68

North American Aviation, Inc. N 1997- 3

DIVISION		
SPACE (41)		
PROJECT NO: LR6227	CONTRACT NO. ATR 492117	DATE 10 JULY 1968

GEN FILTER BOX ASSY. PN V36-442330, SN 06362AAH3858

(CONT. FROM PAGE N1997-1)

(PAGE N1997-2 INDEX PAGE VOIDED) PWE/mm

TEST SPECIMEN DELIVERY

LABORATORIES AND TEST, D/098-212, HAS RECEIVED A GUIDANCE AND NAVIGATION FILTER BOX ASSEMBLY FOR USE IN THE QUALIFICATION TEST PROGRAM OF ATR 492115. 2nd ANM (193) ATTACHED TO THE SPECIMEN WERE THE FOLLOWING:

902-W-1 TAG # MA 084304

PN V36-442330
SN 06362AAH3858
ACCT NO. 3001 REL 00103
CONTR. 7494 DEPT. 668

PHYS. 7-10-68 (STAMPED NAR & NASA)
FUNCT. 7-4-68 (STAMPED NAR & NASA)

EO'S WORKED MG70744 (7-7-8).

C-2

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: A G Schaaf 7-10 19 68

WITNESSED AND UNDERSTOOD: [illegible] 7-10 19 68

19 ___

FORM A93-G REV. 7-66

North American Aviation, Inc. N 1997- 4

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LK6227	CONTRACT NO. ATR 492117	DATE 7-10-68

G&N FILTER BOX ASSEMBLY V36-442330, SN 0636ZAAH3858

VISUAL EXAMINATION

THE TEST SPECIMEN APPEARS PHYSICALLY SOUND AND ACCEPTABLE FOR THE QUALIFICATION TEST OF ATR 492117.

OK TO START TEST

THE TEST SPECIMEN IS EQUAL TO THAT DEFINED IN THE APPROVED TEST REQUEST (ATR 492117) AND THE TEST SET UP IS ADEQUATE TO MEET THE REQUIREMENTS SPECIFIED.

SIGNED R G Schrag 7-10-68
L&T RESPONSIBLE TEST ENGINEER

CONCURRENCE F S Luera 695-412 10 July 1968
APOLLO ENGINEERING

CONCURRENCE R. Lyke 7-10-68
QAR/SD INSPECTION

CONCURRENCE J R Johnson 7-10-68
NASA INSPECTION

(CONTINUED ON PAGE N1997-9)

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.G. Schrag 7-10 1968

WITNESSED AND UNDERSTOOD: R. Lyke 7-10 1968

FORM A93-G REV. 7-66

North American Aviation, Inc. N 1997- 9

DIVISION		
SPACE (41)		
PROJECT NO: LR 6227	CONTRACT NO. ~~NAS~~ ATR ~~4912~~ 492117	DATE 10 JULY 1968

G & N FILTER BOX ASSEMBLY V36-442330 S/N 06362AAH3858

PWE/mrb [CONT. FROM N 1997-4. – PGS. N1997-5 thru 8 Voided to permit recopying F.T. Data (on those pages) into a more clearer tabular format – see below]

ALL PARAGRAPH NUMBERS REFERENCED ON SUBSEQUENT NOTEBOOK PAGES CORRESPOND TO THOSE IN THE STEP-BY-STEP PROCEDURES OF IL 6227-801 (PARA. 6.0)

6.1.2 FUNCTIONAL TESTS

6.1.2.3 INSULATION RESISTANCE

(TP1)	SW. - POS.	CONTACT	MEGOHM		SW. - POS.	CONTACT	MEGOHM
	30 - 1	J1-C	∞		30 - 20	J1-E	∞
	2	F			21	F	
	3	G			22	G	
	4	L			23	H	
	5	M		(TP3)	30 - 1	H	
	6	N			2	J	
	7	P			3	K	
	8	R			4	J	
	9	S			5	K	
	10	T			6	M	
	11	U			7	N	
	12	V			8	P	
	13	X			9	R	
	14	Y			10	S	
	15	Z			11	T	
	16	A			12	U	
	17	B			13	V	
	18	C			14	W	
	19	D	∞		15	X	∞

mrb

FORM A93-G REV. 7-65

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.G. Schrag 7-10 1968

WITNESSED AND UNDERSTOOD: J. Ingram 7-11 1968

North American Aviation, Inc. N 1997-10

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. ATR 492 117	DATE 10 JULY 1968

G & N FILTER BOX ASSY

6.1.2.3 INSULATION RESISTANCE (CONTINUED)

SW - POS	CONTACT	MEGOHMS
(TP3) 30 - 16	J1-Y	∞
17	Z	
18	AA	
19	BB	
20	CC	
21	DD	∞

SW. POS	CONTACT	MEGOHMS
(TP3) 30-22	J1-EE	∞
23	FF	
(TP5) 31-1	HH	
2	I	
3	GG	∞

6.1.2.4 CONTINUITY

SW. - POS.	FROM - TO		OHMS
(TP1-2) 30 - 1	J1-C, J2-E		.3
2	F	F	.3
3	G	G	.3
4	L	L	.3
5	M	M	.3
6	N	N	.3
7	P	P	.3
8	R	R	.3
9	S	S	.3
10	T	T	.3
11	U	U	.4
12	V	V	.4
13	X	X	.4
14	Y	Y	.3
15	Z	Z	.4

SW - POS.	FROM - TO		OHMS
30 - 16	J1-A, J2-A		.4
17	B	B	.4
18	C	C	.4
19	D	D	.4
20	E	E	.4
21	F	F	.4
22	G	G	.4
23	H	H	.4
(TP3-4) 30- 1	J1-H, J2-H		.38
2	J	J	.38
3	K	K	.38
4	L	L	.38
5	K	K	.4
6	M	M	.4
7	N	N	.4

nd

FORM A93-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. G. Schrieg 7-11 1968

WITNESSED AND UNDERSTOOD: _____ 19___

J. Ingram (G) 7-11 1968

North American Aviation, Inc. N 1997-11

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. NAS 9-2117	DATE 10 JULY 1968

MNR GEN FILTER BOX ASSY

6.1.8.4 CONTINUITY (CONTINUED)

SW-POS	FROM	TO	OHMS	SW-POS	FROM	TO	OHMS
30-8	J1-P,	J2-P	.4	30-18	J1-AA	J2-AA	.4
9	R	R	.4	19	BB	BB	.4
10	S	S	.4	20	CC	CC	.4
11	T	T	.4	21	DD	DD	.4
12	U	U	.4	22	EE	EE	.4
13	V	V	.4	23	FF	FF	.4
14	W	W	.4	(TP5-6) 31-1	HH	HH	.4
15	X	X	.4	2	J	J	.4
16	Y	Y	.4	3	GG	GG	.4
17	Z	Z	.4				

6.1.2.5 CAPACITANCE TEST

	SW.-POS	CONTACT	PICOFARADS		SW.-POS.	CONTACT	PICOFARADS
(TP1)	30-4	J1-L	9500		30-22	J2-G	8000
	6	N	8600		23	H	8300
	7	P	8800	(TP3)	3	J1-K	8100
	8	R	7600		6	M	8600
	9	S	8800		13	V	8800
	22	G	8100		14	W	7900
	23	H	8400		15	X	8600
(TP2)	30-4	J2-L	9400	(TP4)	3	J2-K	8000
	6	N	8500		6	M	8600
	7	P	8700		13	V	8700
	8	R	7500		14	W	7800
	9	S	8700		15	X	8500

MNR C-6

FORM 493-0 REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.G. Schrag 7-11 1968

WITNESSED AND UNDERSTOOD: _____ 19__

J. Ingram 7-11 1968

North American Aviation, Inc. N 1997-12

DIVISION		
SPACE (41)		
PROJECT NO: LR 6227	CONTRACT NO. AF 42117	DATE 10 JULY 1968

GEN' FILTER BOX ASSY

PARA. 6.1.3 DIELECTRIC STRENGTH

APPLIED 355 ± 10 VRMS. CURRENT LEAKAGE LESS THAN .01 MILLIAMPERS.

11 JULY 1968

6.2.1 RESONANT SEARCH X AXIS (0040 HRS) RUN #1

6.2.2 RESONANT SEARCH Y AXIS (0110 HRS) RUN #2

6.2.3 RESONANT SEARCH Z AXIS (0137 HRS) RUN #3

6.2.4 POST-TEST FUNCTIONAL

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY NR INSPECTION. *

6.2.7 RANDOM VIBRATION, LEVEL I, Z AXIS (0435 HRS)
RUN #4 (EQUALIZATION) 6 SEC.
RUN #5 (EQUALIZATION) 5 SEC. (0503)
RUN #6 (EQUALIZATION) 5 SEC. (0530)
RUN #7 (RANDOM VIBR.) 2.5 MIN. (0623 HRS)
NO CONTACT DISCONTINUITIES OBSERVED

[* PG N6097-7 VOIDED (NO DATA IN PAGE) & OMITTED]

* PREVIOUSLY RECORDED FUNCTIONAL TEST DATA (LAB NOTE-BOOK N 1997 PAGES 9 THRU 11) INSULATION RESISTANCE, CONTINUITY, AND CAPACITANCE AND ALL SUBSEQUENT FUNCTIONAL DATA WILL BE RECORDED IN LAB NOTEBOOK N 6097 PAGES 1 TO 24. *

FORM A93-G REV. 7-66

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.G. Schrock 7-11 1968

WITNESSED AND UNDERSTOOD: _____ 19__
J. Ingram 7-11 1968

North American Aviation, Inc. N 1997-13

DIVISION		
SPACE (41)		
PROJECT NO: LR 6227	CONTRACT NO. ATR 492117	DATE 11 JULY 1968

GEN FILTER BOX ASSY

6.2.~~7~~ 8 BE RANDOM VIBRATION, LEVEL I, Y AXIS
RUN #8 (EQUALIZATION) 5 SEC (0643)
RUN #9 (EQUALIZATION) 5 SEC (0713)
RUN #10 (RANDOM VIBR.) 2.5 MIN (0758)
NO DISCONTINUITIES OBSERVED

6.2.9 RANDOM VIBRATION, LEVEL I, X AXIS
RUN #11 (EQUALIZATION) 7 SEC (0848)
RUN #12 (EQUALIZATION) 6 SEC (1007)
RUN #13 (RANDOM VIBRATION) 2.5 MIN (1050)
NO DISCONTINUITIES OBSERVED

6.2.10 POST-LEVEL 1 VIBRATION FUNCTIONAL TEST (1300)

INSULATION ~~RESTA~~ RESISTANCE, CONTINUITY AND CAPACITANCE TEST CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN THE SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY NR INSPECTION.

6.2.~~11~~ 9 BE RANDOM VIBRATION, LEVEL 2 - X AXIS
RUN #14 (EQUALIZATION) 6 SEC 1320
RUN #15 (EQUALIZATION) 6 SEC 1430
RUN #16 (EQUALIZATION) 5 SEC 1503
RUN #17 (RANDOM VIBR) 13.5 MIN (1550)
NO DISCONTINUITIES OBSERVED

FORM A93-G REV. 7-66

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. Wyatt 7-11 1968
WITNESSED AND UNDERSTOOD: J. A. Pittey 7-11 1968
______ ______ 19__

North American Aviation, Inc. N 1997-14

DIVISION		
SPACE (41)		
PROJECT NO: LR 6227	CONTRACT NO. ATR ~~6227~~ 492117	DATE 11 JULY 1968

GEN FILTER BOX ASSY

6.2.12 (8 PVE) RANDOM VIBRATION, LEVEL 2, Y AXIS
RUN #18 (EQUALIZATION) 6 SEC. (1500) (7 PVE)
RUN # 19 (RANDOM VIBR.) 12.5 MIN. (1750) PE
NO DISCONTINUITIES OBSERVED.

6.2.13 (7 PVE) RANDOM VIBRATION, LEVEL 2, Z AXIS
RUN # 20 (EQUALIZATION) 8 SEC (1714) (9 PE)
RUN # 21 (EQUALIZATION) 10 SEC (1950)
RUN # 22 (RANDOM VIBR.) 12.5 MIN. (2127)
NO DISCONTINUITIES OBSERVED

THE ABOVE VIBRATIONS TESTS HAVE BEEN CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS PRESCRIBED BY IL 6227-801 AND ATR 492117, FOR CONCURRING VIBRATION NOTES REFER TO THE DYNAMIC NOTEBOOK, PAGES N5778-16 THROUGH N5778-23 (3 PE)

END OF VIBRATION TEST

SIGNED: R G Schroff
LET RESPONSIBLE TEST ENGINEER

CONCURRENCE: J H Pettey 7-11-68
NR/SD INSPECTION

C-1

FORM A93-G REV. 7-66

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R G Schroff 7-11 19 68
WITNESSED AND UNDERSTOOD: J H Pettey 7-11 19 68
_____ 19 ___

North American Aviation, Inc. **N 1997-15**

DIVISION: SPACE (41)

PROJECT NO:	CONTRACT NO.	DATE
LR6227	ATR 492117	11 JULY 1968

G&N FILTER BOX ASSY

ELECTRICAL EQUIPMENT USED DURING VIBRATION EFFORT

INSULATION RESISTANCE

MEGOHM BRIDGE, GENERAL RADIO - MOD. 1644-A, N 770971, CAL DUE 9-27-8

CONTINUITY

VOM, SIMPSON - MOD 269AF, PN F322706, CAL. DUE 8-23-68

CAPACITANCE TEST

IMPEDENCE BRIDGE, GENL. RADIO - MOD. 1650-A, S009-492, CAL. DUE 10-10-8

CHATTER DETECTION

CHATTER DETECTOR, NR/SD - MOD DCN-6, SN 4, CALIB. DUE 10-8-68

POWER SUPPLY, KEPCO ABC40-025M, S007978, CAL. DUE 8-13-68

FORM A93-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. G. Schroy 7-11 1968

WITNESSED AND UNDERSTOOD: R. Junso 7-11 1968

_____ _____ 19__

North American Aviation, Inc. N 1997-16

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. NAS 492 117	DATE 11 JULY 1968

G & N FILTER BOX ASSY

6.3.1 PRE TEST FUNCTIONAL (SALT SPRAY)

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY NR INSPECTION. (ANM 571) 7-11-8

6.3.2 SALT SPRAY EXPOSURE STARTED, 2315 HRS

THE SALT SPRAY PORTION OF THE TEST PER PARA. 5.5.1.

CONDUCTED IN ACCORDANCE WITH METHOD 509, PROCEDURE I, OF MIL-STD-810. HAD A P.H. READING OF 6.6 AND A SPECIFIC GRAVITY READING OF 1.0053. TEC (ANM 571) 7-11-8

6.3.3 POST TEST FUNCTIONAL (0015 HRS, 7-11)

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS, VALUES HAVE BEEN RECORDED AND VERIFIED BY NR INSPECTION (ANM 571) 7-12-8

6.3.4 VISUAL EXAMINATION

NO VISUAL DAMAGE OR SALT DEPOSIT COLLECTIONS. UNIT DOES NOT EXHIBIT ANY GREAT MOISTURE CONDENSATION (ANM 571) 7-12-8

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM A93-G REV. 7-66

SIGNATURE: R G Schrock 7-12 1968

WITNESSED AND UNDERSTOOD: E. Trombetta 7-12 1968

North American Aviation, Inc. N 1997-17

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	**CONTRACT NO.** AT.R 492 117	**DATE** 12 July 1968

GEN' FILTER BOX ASSEMBLY

TEST SPECIMEN TRANSFERED TO OXYGEN/ HUMIDITY AT 0045 HOURS. 7-12-8

6.3.5 PRETEST FUNCTIONAL (12-HR DRY OXYGEN)

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHING SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED AND VERIFIED BY NR INSPECTION. 7-12-8

6.3.6 12 HOUR DRY OXYGEN

START EVACTUATION 0200 HRS 7-12-8

OXYGEN SENSOR ON CHAMBER ISOLATED AND REPAIRED.

0700 START 12 HOUR DRY OXYGEN ENVIRONMENT.

6.3.7 POST-TEST FUNCTIONAL

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED AND VERIFIED BY NR/INSPECTION. C.B. Rich 7-12-68

FORM A93-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.A. Schmitt 7-12 19 68

WITNESSED AND UNDERSTOOD: C.B. Rich 7-12 19 68

North American Aviation, Inc. N 1997-18

DIVISION		
SPACE (41)		
PROJECT NO: LR 6227	CONTRACT NO. ATR 492117	DATE 13 JULY 1968

G&N FILTER BOX ASSY

6.3.8.2 FUNCTIONAL TEST FOLLOWING 6 HOURS OF OXYGEN - HUMIDITY EXPOSURE

INSULATION RESISTANCE, CONTINUITY, AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY NR INSPECTION. 7-13-68

6.3.8.3 FUNCTIONAL TEST FOLLOWING 22 HOURS OF OXYGEN - HUMIDITY EXPOSURE.

INSULATION RESISTANCE, CONTINUITY, AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY NR INSPECTION. 7-13-68

6.3.8.4 FUNCTIONAL TEST FOLLOWING 30 HOURS OF OXYGEN - HUMIDITY EXPOSURE. INSULATION RESISTANCE AT 100 VDC, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY N. R. INSPECTION. 7-14-68

C-1

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 7-14 1968

WITNESSED AND UNDERSTOOD: [signature] 7-14 1968

_____ 19__

FORM A93-G REV. 7-66

North American Aviation, Inc. **N 1997-19**

DIVISION		
SPACE (041)		
PROJECT NO: LR 6227	**CONTRACT NO.** ATR 492117	**DATE** 14 July 1968

G&N FILTER BOX ASSY.

6.3.8.5 FUNCTIONAL TEST FOLLOWING 46 HOURS OF OXYGEN - HUMIDITY EXPOSURE.

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY NR INSPECTION.

7-14-68

6.3.8.6 FUNCTIONAL TEST FOLLOWING 54 HOURS OF OXYGEN - HUMIDITY EXPOSURE

INSULATION RESISTANCE AT 100 VDC, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED TOLERANCE. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY N.R. INSPECTION 7-15-68 0300 TIME

6.3.8.7 FUNCTIONAL TEST. FOLLOWING 70 HOURS OF OXYGEN - HUMIDITY EXPOSURE

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY NR INSPECTION.

7-15-68

C-14

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM A93-G REV. 7-66

SIGNATURE: R. G. Schuff 7-15 1968

WITNESSED AND UNDERSTOOD: E. Semechek 7-15 1968

19

North American Aviation, Inc. N 1997-20

DIVISION		
SPACE (41)		
PROJECT NO: LR 6227	CONTRACT NO. ATR 992117	DATE 16 JULY 1968

G&N FILTER BOX ASSY.

6.3.8.8. FUNCTIONAL TEST FOLLOWING 78 HOURS OF OXYGEN-HUMIDITY EXPOSURE.

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY N.R. INSPECTION.

7-16-68

6.3.8.9 FUNCTIONAL TEST FOLLOWING 94 HOURS OF OXYGEN-HUMIDITY EXPOSURE.

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY N.R. INSPECTION

7-16-68

6.3.8.10 FUNCTIONAL TEST FOLLOWING 102 HOURS OF OXYGEN - HUMIDITY EXPOSURE

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY NR INSPECTION

7-17-68

C-1

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM A93-G REV. 7-66

SIGNATURE: R. G. Schuff 7-17 19 68

WITNESSED AND UNDERSTOOD: _____ 19 ____

J. Ingram 7-17 19 68

North American Aviation, Inc. **N 1997-21**

DIVISION SPACE (041)

PROJECT NO:	CONTRACT NO.	DATE
APOLLO LR 6227	ATR 492117	17 JULY 1968

GE'N FILTER BOX ASSEMBLY

A DISPOSITION RECORD (DRA110403) HAS BEEN INITIATED BY NR INSPECTION FOLLOWING OVER-EXPOSURE DURING THE OXYGEN-HUMIDITY TEST. THE ATR REQUIREMENTS (TR 492117) AND THE IL TEST PLAN (IL6227-801) STIPULATE THAT THE OXYGEN-HUMIDITY TEST SHALL CONSIST OF 4 CYCLES, EACH HAVING A DURATION OF 24 HOURS. AT THE COMPLETION OF THE REQUIRED TIME (96 HOURS) THE SPECIMEN WAS INADVERTENTLY ALLOWED TO CONTINUE WITH AN ADDITIONAL CYCLE INSTEAD OF MAINTAINING CONDITIONS WITH THE TEMPERATURE AT 60 ± 10°F

THE OVER-TEST HAS BEEN REVIEWED BY APOLLO ENGINEERING AND BY RELIABILITY PERSONNEL. THE CONDITIONS STATED ABOVE HAVE BEEN ACCEPTED AND THE DISPOSITION TO "CONTINUE WITH TEST" HAS BEEN MADE AS NO ANOMOLIES HAVE OCCURRED.

6.3.8.11 FUNCTIONAL TEST FOLLOWING 118 HOURS OF OXYGEN-HUMIDITY EXPOSURE

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED, ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY NR INSPECTION

(stamp) 7-17-68

C-16

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. C. [signature] 7-17 1968

WITNESSED AND UNDERSTOOD: E. [signature] 7-17 19 68

FORM AD3-G REV. 7-66

North American Aviation, Inc. N 1997-22

DIVISION		
SPACE (041)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. ATR 492117	DATE 17 JULY 1968

G&N FILTER BOX ASSEMBLY

6.3.9 POST-OXYGEN-HUMIDITY TEST (AMBIENT CONDITIONS) FUNCTIONAL TEST

INSULATION RESISTANCE, CONTINUITY, AND CAPACITANCE TEST HAS BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY NR INSPECTION.

THE PRECEDING CCOH TESTS HAVE BEEN CONDUCTED IN ACCORDANCE WITH ATR492117 AND LC6337-801 EXCEPT FOR THOSE CONDITIONS NOTED ON PAGE N1997-21. FOR CONCURRING NOTES DEPICTING CLIMATIC CONDITIONS REFER TO LAB NOTEBOOK PAGES N4694-29 THRU N4694-36

6.3.10 VISUAL EXAMINATION

NO SIGN OF CORROSION OR DETERIORATION. THERE IS SLIGHT EVIDENCE OF RUST FORMING ON THE MOUNTING PLATE. SOME SALT PARTICLES ARE IN EVIDENCE AROUND AND WITHIN THE TWO CONNECTORS.

THIS COMPLETES THE CCOH REQUIREMENTS AND THE UNIT IS NOW ACCEPTABLE FOR HIGH/LOW TEMP.-LIFE

SIGNED: R.G. Schroff   7-17-68 E. Temechek CONCURRENCE NR INSPECTION

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.G. Schroff 7-17 1968

WITNESSED AND UNDERSTOOD: E. Temechek 7-17 1968

FORM A93-G REV. 7-66

North American Aviation, Inc. **N 1997-23**

DIVISION SPACE (041)

PROJECT NO.	CONTRACT NO.	DATE
APOLLO LK 0227	ATK 492117	17 JULY 1968

GEN FILTER BOX ASSEMBLY

6.4.1 PRE-TEST FUNCTIONAL – HIGH/LOW TEMP. - LIFE (2300)

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEETS AND VERIFIED BY NR INSPECTION. 7-17-68

6.4.2 DIELECTRIC STRENGTH (2230)

APPLIED 180 ± 5 VDC. CURRENT LEAKAGE LESS THAN 2 MILLIAMP 7-17-68

6.4.3 14-DAY HIGH/LOW TEMP - LIFE

TEST START: 2305 HRS 7-17-68

6.4.3.1.1 FUNCTIONAL TEST FOLLOWING ELEVEN HOURS OF 40 DEGREE F

INSULATION RESISTANCE, CONTINUITY TESTS CONDUCTED AS SPECIFIED AND ALL READINGS WERE WITHIN LIMITS. THE CAPACITANCE TEST READINGS INDICATED 14 OF THE 24 MEASUREMENTS WERE OUT OF TOLERANCE. VALUES HAVE BEEN RECORDED FOR EACH MEASUREMENT AND VERIFIED BY NR INSPECTION.

CONTINUED ON PAGE N1997-24

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R G Schroy 7-18 1968

WITNESSED AND UNDERSTOOD: R Sykes 7-18 1968

FORM A93-G REV. 7-66

North American Aviation, Inc. N 1997-24

DIVISION		
SPACE 41		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. NAS 9-3117	DATE 18 JULY 1968

GEN FILTER BOX ASSEMBLY

AT 1352 THE TEMPERATURE CHAMBER BEGAN A 5°F PER MINUTE RETURN TO AMBIENT CONDITIONS. THE TEMPERATURE TEST HAS BEEN STOPPED DUE TO THE OUT-OF-TOLERANCE CAPACITANCE READINGS NOTED ON PAGE N1997-23.

DRA96675 HAS BEEN INITIATED AND APOLLO ENGINEERING AND RELIABICITY NOTIFIED.

THE TEST SETUP, MATING CONNECTORS HAVE BEEN REMOVED AND CLEANED AS DIRECTED BY DR A96675 AND SEALING PLUGS HAVE BEEN INSTALLED.

THE CAPACITANCE TEST WAS REREN AS DIRECTED AND ALL READINGS WERE WITHIN THE SPECIFIED TOLERANCE. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY NR INSPECTION.

THE OUT-OF-TOLERANCE CAPACITANCE MEASUREMENTS WERE ATTRIBUTED TO MOISTURE CONDENSATION WITHIN THE TEST EQUIPMENT CONNECTORS. A MORE POSITIVE GROUND STRAP HAS BEEN PROVIDED BY REPLACING THE ALIGATOR CLIP WITH A TERMINAL LUG AND SECURING TO THE BOTTOM MOUNTING PLATE OF THE SPECIMEN.

C-1

FORM A93-0 REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R G Schrag 7-18 1968

WITNESSED AND UNDERSTOOD: R. Ryan 7-18 1968

North American Aviation, Inc. N 1997-25

DIVISION SPACE (41)		
PROJECT NO. APOLLO LR 6227	CONTRACT NO. ATR 492117	DATE 18 JULY 1968

GEN FILTER BOX ASSEMBLY

OK TO CONTINUE WITH HIGH/LOW TEMP. TEST DR REQUIREMENTS HAVE BEEN SATISFIED.

SIGNED: R. G. Schroff
L&T RTE

CONCURRENCE R. M. Lykes 7-18-8
NR INSPECTION

CONCURRENCE W F Klein 7/18/8
NASA

HIGH/LOW TEMP. TEST CONTINUED AT 1525 HOURS. (7-19-68)

6.4.3.1.1 (1500 HRS) FUNCTIONAL TEST RERUN, FOLLOWING APPROX. 24 HOURS OF CONTINUOUS EXPOSURE.

INSULATION TEST AND CONTINUITY WERE TESTED AS REQUIRED AND THE READING WHICH WERE OBTAINED ARE WITHIN SPECIFIED LIMITS.
THE CAPACITANCE TEST WAS CONDUCTED AS REQUIRED BUT 6 MEASUREMENT WERE BELOW THE SPECIFIED LEVEL OF 5500 PICOFARADS.

MEASUREMENTS HAVE BEEN RECORDED ON A DATA SHEET AND IDENTIFIED AS 6.4.3.1.1

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. G. Schroff 7-19 1968

WITNESSED AND UNDERSTOOD R. Lykes 7-19 1968

FORM A03-G REV. 7-66

North American Aviation, Inc. N 1997-26

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. NAS 9-2117	DATE 19 JULY 1968

G&N FILTER BOX ASSEMBLY

DISPOSITION RECORD A 110406 HAS BEEN PREPARED BY NR INSPECTION TO RECORD THE OUT-OF-TOLERANCE CAPACITANCE READINGS NOTED ON PAGE N1997-25. APOLLO ENGINEERING, RELIABILITY AND NASA HAVE BEEN NOTIFIED.

ALTHOUGH THE OUT-OF-TOLERANCE READINGS CONSTITUTE A FAILURE, THE QUALIFICATION TEST REQUIREMENTS SHALL BE CONTINUED AS REQUIRED BY THE DR DISPOSITION

"CONTINUE TESTING - ANALYSIS TO BE CARRIED OUT AT COMPLETION OF TESTS AND RECORDING OF DATA"

SIGNED S.V. MCKEEVER, 695-412
W. JOHNSON, 695-115

OK TO CONTINUE TESTING

SIGNED R.G. Schrey 7-19-68
LET RESPONSIBLE TEST ENGR.

CONCURRENCE R. Ryker 7-19-68
NR INSPECTION

C-21

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS. IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.G. Schrey 7-19 68
WITNESSED AND UNDERSTOOD } R. Ryker 7-19 19 68

FORM A93-G REV. 7-66

North American Aviation, Inc. N 1997-27

DIVISION
SPACE (91)

PROJECT NO:	CONTRACT NO.	DATE
APOLLO LR 6227	ATR 492117	20 JULY 1968

G&N FILTER BOX ASSEMBLY

6.4.3.1.2 FUNCTIONAL TEST FOLLOWING 48 HOURS OF TEMPERATURE EXPOSURE

THE INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TEST HAS BEEN CONDUCTED IN ACCORDANCE WITH THE TEST REQUIREMENTS. ALL MEASUREMENT READINGS HAVE BEEN RECORDED ON A DATA SHEET. ALL READINGS, EXCEPT FOR SEVEN CAPACITANCE TEST MEASUREMENTS, WERE WITHIN SPECIFIED LIMITS.

6.4.3.1.3 FUNCTIONAL TEST FOLLOWING ~~8~~ 72 HOURS OF TEMPERATURE EXPOSURE

THE CAPACITANCE, INSULATION RESISTANCE AND CONTINUITY TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL MEASUREMENTS HAVE BEEN RECORDED ON A DATA SHEET. ALL READINGS EXCEPT FOR SEVEN CAPACITANCE TEST MEASUREMENTS, WERE WITHIN SPECIFIED LIMITS

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.G. Schropf 7-21 1968

WITNESSED AND UNDERSTOOD: ______ 19__
Hamelin 7/21 1968

FORM A93-G REV. 7-66

North American Aviation, Inc.

N 1997-28

DIVISION		
SPACE		
PROJECT NO. CR 6227	CONTRACT NO. AT(49)2117	DATE 22 JULY 1968

G&N FILTER BOX ASSEMBLY

6.4.3.1.4 FUNCTIONAL TEST FOLLOWING 96 HOURS OF TEMPERATURE (40°F)

THE INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL MEASUREMENTS HAVE BEEN RECORDED ON A DATA SHEET. ALL READINGS, EXCEPT FOR TWO CAPACITANCE TEST MEASUREMENTS, WERE WITHIN SPECIFIED LIMITS.

A DIELECTRIC STRENGTH TEST WAS CONDUCTED BY APPLYING 280 ± 5 VDC. NO DIELECTRIC BREAKDOWN, ARCHING OR CURRENT LEAKAGE IN EXCESS OF 2 MILLIAMP. 7-2268

6.4.3.2.1 FUNCTIONAL TEST FOLLOWING 24 HOURS OF 125°F

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED AND VERIFIED BY NR/INSPECTION.

CONT N-1997-29

FORM A93-0 REV. 2-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.G. Schrieve 7/23 19 68

WITNESSED AND UNDERSTOOD: [illegible] 7/23 19 68

North American Aviation, Inc. N 1997-29

DIVISION		
SPACE (41)		
PROJECT NO: LR 6227	CONTRACT NO. ATR 492117	DATE 24 JULY 1968

G & N FILTER BOX ASSEMBLY

6.4.3.2.2 FUNCTIONAL TEST FOLLOWING 48 HOURS OF 125°F

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS SPECIFIED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY NR INSPECTION 7-24-68

25 JULY 1968

6.4.3.2.3 FUNCTIONAL TEST FOLLOWING 72 HOURS OF 125°F

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY INSPECTION.

7-25-68

26 JULY 1968
6.4.3.2.4 FUNCTIONAL TEST FOLLOWING 96 HOURS OF 125°F

INSULATION RESISTANCE, CONTINTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL THE READINGS WERE WITHIN SPECIFIED LIMETS. VALUES HAVE BEEU RECORDED ON A DATA SHEET AND VERIFIED BY INSPECTION

CONT N-1997-30

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. G. Schm... 7-26 1968

WITNESSED AND UNDERSTOOD: 7-26 1968; R. ... 7-26 1968

FORM A93-G REV. 7-60

North American Aviation, Inc. N 1997-30

DIVISION		
SPACE		
PROJECT NO: LR 6227	CONTRACT NO. ATR 492117	DATE 7-27-68

6.4.3.2.5 FUNCTIONAL TEST FOLLOWING 120 HOURS OF 125°F
INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS REQUIRED ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY INSPECTION. (AVA 193) 7-27-68

6.4.3.2.6 FUNCTIONAL TEST FOLLOWING 144 HOURS OF 125°F

INSULATION RESISTANCE, CONTINUITY, AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY INSPECTION. (AVA 193) 7-28-68

6.4.3.2.7 FUNCTIONAL TEST FOLLOWING 168 HOURS OF 125°F

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY INSPECTION. (AVA 193) 7-30-68

CONT N-1997-31

FORM 493-G REV. 7-66

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.M. Wyatt 7-29 19 68

WITNESSED AND UNDERSTOOD: (AVA 225) R. Ryba 7-29 19 68

North American Aviation, Inc. N 1997-31

DIVISION		
SPACE (41)		
PROJECT NO: LR 6227	CONTRACT NO. ATE 492117	DATE 30 JULY 1968

G & N FILTER BOX ASSY

6.4.3.2.8 FUNCTIONAL TEST FOLLOWING 192 HOURS OF 125°F

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE HAVE BEEN CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY INSPECTION.

(ANM 515) 7-30-68

6.4.3.2.9 FUNCTIONAL TEST FOLLOWING 216 HOURS OF 125°F

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY INSPECTION.

7-31-68

6.4.3.2.10 FUNCTIONAL TEST FOLLOWING 240 HOURS OF 125°F.

INSULATION RESISTANCE, CONTINUITY AND CAPACITANCE TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON A DATA SHEET AND VERIFIED BY INSPECTION.

~~1435~~ 1535 8-1-68 PNE

CONT N-1997-32

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: D. W. Elwood 8/1 1968

WITNESSED AND UNDERSTOOD: ______ 19__

[signature] (ANM 515) 8/1 1968

FORM A03-G REV. 7-66

North American Aviation, Inc. N 1997-32

DIVISION		
SPACE (41)		
PROJECT NO: LR 62271	CONTRACT NO. NAS 9-2117A	DATE 8-1-68

G+N FILTER BOX ASSY.

6.4.3.2.10 (CONT.) CONDUCTED DIELECTRIC STRENGTH TEST AT 280 VDC. CURRENT WAS LESS THAN 0.2 MA. 1535 8-1 DE

H H Parmelee 8/1/68 (ANM 815)

6.~~4~~ DE 3.3 CHAMBER TEMPERATURE AT 200°F AT 1600 HRS.

FUNCTIONAL TEST FOLLOWING 15 MINUTE STABILIZATION AT 200°F.

INSULATION RESISTANCE (AT 100 VDC), CONTINUITY ~~AND~~ CAPACITANCE AND DIELECTRIC STRENGTH TESTS AS REQUIRED× HAVE BEEN CONDUCTED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#36.~~ DE AND VERIFIED BY INSPECTION 1700 (ANM 193) 8-1 DE.

DIELECTRIC STRENGTH TEST CURRENT WAS LESS THAN 0.2 MA. (ANM 82) 8-1-68

~~6.4.3.4~~ 6.4.3.4 DE (ANM 193) CHAMBER TEMPERATURE STABILIZED AT AMBIENT ROOM TEMPERATURE AT 1755.

INSULATION RESISTANTCE (AT 100 VDC) CONTINUITY, CAPACITANCE AND DIELECTRIC STRENGTH TESTS (CURRENT WAS LESS THAN 0.2 MA were conducted AS REQUIRED.

CONT N 1997-33 C-7

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM A03-G REV. 7-66

SIGNATURE: Paul S Elwood 8-1 1968

WITNESSED AND UNDERSTOOD: C B Rich (ANM 574) 8-1 1968

North American Aviation, Inc. N 1997-33

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. ATR 492117A	DATE 8-1-68

CONT FROM N1997-32

CONT ~~HAVE BE~~ ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#37~~ AND VERIFIED BY INSPECTION. (571) 8-1-68

24-HOUR TEMPERATURE SOAK AT -20°F WAS COMPLETED AT 2100 HOURS 8-2-68. THE CHAMBER TEMPERATURE WAS RAISED TO ROOM AMBIENT AT 2145. ROOM AMBIENT TEMPERATURE WAS MAINTAINED UNTIL 0155 HOURS WHILE THE VACUUM TEST CIRCUIT WAS BEING INSTALLED.

0155 FUNCTIONAL TEST FOLLOWING HIGH/LOW TEMPERATURE-LIFE TEST

INSULATION RESISTANCE, CONTINUITY, CAPACITANCE, AND DIELECTRIC STRENGTH TESTS HAVE BEEN CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#38~~ AND VERIFIED BY INSPECTION.
RE 8-3-68
8-3-68

VACUUM TEST

ALL VACUUM/SPACE/THERMAL TEST DATA

CONT N-1997-34

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-3 1968

WITNESSED AND UNDERSTOOD: [signature] 8-3 1968

FORM A93-G REV. 7-66

North American Aviation, Inc. N 1997-34

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. NAS 9-2117A	DATE 8-3-68

CONT FROM N 1997-33

SHALL BE RECORDED IN LABORATORY NOTE-BOOK N 2907 STARTING WITH PAGE 1-(thru 10).

6.5.1 INSULATION RESISTANCE, CONTINUITY, CAPACITANCE TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITH IN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~# 39~~ DNE AND VERIFIED BY INSPECTION. DNE 8-3-68 (ANM 197) (ANM 197)

6.5.2.1
PARA. ~~3.5.2~~ VACCUM 1×10^{-4} mm Hg @ 40 ± 5°F for 50 ± 5 HOURS.

START 50 hrs 0800 8-3-68

PARA 6.5.2.2 1300 HOURS INSULATION RESISTANCE, CONTINUITY, CAPACITANCE TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITH IN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~# 40~~ DNE AND VERIFIED BY INSPECTION. JPW 8-3-68 (ANM 197) (ANM 215) 8/3/68

ALL ELECTRICAL CIRCUITS WERE ENERGISED AFTER ABOVE FUNCTION, 26 VRMS, 800 ~, 110 ± 10 milliamps.

J2	PIN	VOLTS	AMPS	PIN	VOLTS	AMPS
	P	26	114 ma.	S	26	116 ma.
	R		114	M		114
	K		114	X		117
	L		112	N		115
	G		115	V		117
J2	H		117	W		114

C-2-1

FORM 493-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: J P Whitted 8-3- 1968

WITNESSED AND UNDERSTOOD: F Knowles (ANM 8-5) 8/3 1968

North American Aviation, Inc. N 1997-35

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR6227	CONTRACT NO. ATR 492 117A	DATE 8-3-68

1000 8-4-68 PRIOR TO FUNCTIONAL TEST THE FOLLOWING CURRENT READINGS WERE NOTED

	PIN	VOLTS	AMPS		PIN	VOLTS	AMPS
J2	P	26	113.5 MA	J2	S	26	118 MA
	R	|	113		M	|	113
	K	|	113		X	|	116
	L	|	112		N	|	114
	G	|	115		V	|	116
J2	H	26	116 MA	J2	W	26	112.5 MA

1130 8-4-68 24-HOUR FUNCTIONAL COMPLETE PARA 6.5.2.B

INSULATION RESISTANCE, CONTINUITY, & CAPACITANCE TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~# PAE 41~~ AND VERIFIED BY INSPECTION. PAE 8-4-68

THE AC LOAD CIRCUIT WAS ENERGIZED AND THE ~~FOLLOWING~~ CURRENTS RECORDED.

	PIN	VOLTS	AMPS		PIN	VOLTS	AMPS
J2	P	26	114 MA	J2	S	26	117.5 MA
	R	|	113		M	|	113.5
	K	|	113		X	|	116
	L	|	111.5		N	|	114
	G	|	114.5		V	|	116
J2	H	/	116.5 MA	J2	W	/	112.5 MA

CONT N 1997-36

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM 493-G REV. 7-66

SIGNATURE: Paul W. Edwards 8-4 1968

WITNESSED AND UNDERSTOOD: 8-4 1968

North American Aviation, Inc. N 1997-36

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. NAS 9-7117 A	DATE 8-5-68

CONT FROM N 1997-35

0810 8-5-68 PRIOR TO FUNCTIONAL THE FOLLOWING CURRENT READINGS WERE NOTED.

J2	PIN	VOLTS	AMPS		PIN	VOLTS	AMPS	
	P	26	113.2	MA	J2 S	26	116.7	MA
	R		113.0		M		113.5	
	K		112.8		X		116	
	L		111.3		N		114	
	G		114.6		V		115.6	
J2	H	26	116.3	MA	J2 W	26	112.5	MA

0900 8-5-68 48-HOUR FUNCTIONAL COMPLETE PARA 6.5.2.4.

INSULATION RESISTANCE, CONTINUITY, CAPACITANCE TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET 42 DNE AND VERIFIED BY INSPECTION. DNE 8-5-68

THE AC LOAD CURRENT WAS RESTORED AND THE FOLLOWING CURRENTS RECORDED.

J2	PIN	VOLTS	AMPS		PIN	VOLTS	AMPS	
	P	26	113	MA	J2 S	26	116.5	MA
	R	26	113		M		113	
	K		112.5		X		116	
	L		111		N		114	
	G		114		V		116	
J2	H	26	116	MA	J2 W	26	112	MA

CONTINUED ON N 1997-37

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: Paul A. Edwards 8-5 19 68

WITNESSED AND UNDERSTOOD: [illegible] 8/5 19 68

FORM A03-G REV. 7-66

North American Aviation, Inc. N 1997-37

DIVISION: SPACE (41)

PROJECT NO:	CONTRACT NO.	DATE
APOLLO LR 6227	ATR 492117A	8-5-68

G + N FILTER BOX

1530 8-5-68 CHAMBER REACHED 135°F AT
6.5.3.2 1330 HOURS.

PRIOR TO T+2 HR. FUNCTIONAL THE FOLLOWING CURRENTS WERE NOTED

J2 PIN	VOLTS	AMPS	PIN	VOLTS	AMPS
P	26	115 MA	J2 S	26	116 MA
R		115	M		115
K		114.5	X		118
L		113	N		116
G		116.5	V		118
J2 H	26	118 MA	J2 W	26	115 MA

1535 8-5-68 ~~3~~ 2 HOUR FUNCTIONAL COMPLETE.
PARA 6.5.3.2

INSULATION RESISTANCE, CONTINUITY, CAPACITANCE TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#~~ 4 ~~3~~ AND VERIFIED BY INSPECTION. PWE 8-5-68

THE AC LOAD CURRENT WAS RESTORED AND THE FOLLOWING CURRENTS WERE RECORDED.

PIN	VOLTS	AMPS	PIN	VOLTS	AMPS	PIN	VOLTS	AMPS
J2 P	26	115 MA	J2 G	26	116.5 MA	J2 X	26	118 MA
R		115 MA	H		118	N		116
K		114.5	S		116	V		118
J2 L	26	118 MA	J2 M	26	115 MA	J2 W	26	115 MA

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: Paul W. Edwards 8-5 1968

WITNESSED AND UNDERSTOOD: ______ 19__; L. Harmelee 8/5 1968

FORM A03-G REV. 7-66

North American Aviation, Inc. N 1997-38

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. NAS9-117A	DATE 8-6-68

G YN FILTER BOX

1410 8-6-68 PRIOR TO T+24 HOUR FUNCTIONAL THE 6.5.3.3 FOLLOWING CURRENT READINGS WERE NOTED.

	PIN	VOLTS	AMPS		PIN	VOLTS	AMPS
J2	P	26	115 MA	J2	S	26	119 MA
	R		114		M		115
	K		114		X		117
	L		113		N		115
	G		116		V		117
J2	H	26	118 MA	J2	W	26	114 MA.

1445 8-6-68 T+24 HOUR FUNCTIONAL COMPLETE 6.5.3.3 INSULATION RESISTANCE, CONTINUITY, CAPACITANCE TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE ~~CONDUCTED~~ WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#44~~ PE AND VERIFIED BY INSPECTION. AH 193 PE 8-6-68.

THE AC LOAD CURRENT WAS RESTORED AND THE FOLLOWING CURRENTS WERE RECORDED.

	PIN	VOLTS	AMPS		PIN	VOLTS	AMPS
J2	P	26	115 MA	J2	S	26	119 MA
	R		114		M		115
	K		114		X		117
	L		112		N		115
	G		116		V		116
J2	H	26	118 MA	J2	W	26	114 MA

CONT N 1997-39

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM 493-G REV. 7-66

SIGNATURE: P.W. Edwards 8-6 1968

WITNESSED AND UNDERSTOOD: E.H. Farmelee 8/6 1968

North American Aviation, Inc. N 1997-39

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. ATR 492117A	DATE 8-7-68

G+N FILTER BOX ASSEMBLY

1450 8-7-68 PRIOR TO 48 HOUR FUNCTIONAL THE FOLLOWING CURRENT READINGS WERE RECORDED.

PIN	VOLTS	CURRENT	PIN	VOLTS	CURRENTS
J2 P	26	114 MA	J2 S	J2 26	119 MA
R		114	M		114
K		113	X		117
L		112	N		115
G		115	V		117
J2 H	26	117 MA	J2 W	26	113 MA

1530 8-7-68 48 HR FUNCTIONAL COMPLETE.

6.5.3.4 INSULATION RESISTANCE, CONTINUITY, CAPACITANCE TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#45~~ AND VERIFIED BY INSPECTION. PE 8-7-68

THE AC LOAD CURRENT WAS RESTORED AND THE FOLLOWING CURRENTS RECORDED.

PIN	VOLTS	CURRENTS	PIN	VOLTS	CURRENTS
J2 P	26	114 MA	J2 S	26	118 MA
R		114	M		114
K		113	X		117
L		112	N		115
G		115	V		116
J2 H	26	117 MA	J2 W	26	112 MA

CONT N 1997-42

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-7 1968

WITNESSED AND UNDERSTOOD [signature] 8/7 1968

FORM A93-G REV. 7-66

North American Aviation, Inc. N · 1997-42

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. NAS9-2117A	DATE 8-7-68

G+N FILTER BOX ASSEMBLY : VACUUM TEST
CONT FROM N 1997-39
1855 8-7-68 PRIOR TO & AMBIENT STABILIZATION
6.5.4.1 FUNCTIONAL TEST THE FOLLOWING CURRENTS WERE READ

PIN	VOLTS	CURRENT	PIN	VOLTS	CURRENT
J2 P	26	114 MA	J2 S	26	118 MA
R		113	M		114
K		113	X		116
L		112	N		114
G		115	V		116
J2 H	26 RE	117 MA	J2 W	26 RE	113 MA

1930 8-7-68 VACUUM TEST AMBIENT/10^{-4} FUNCTIONAL COMPLETE. 8-7-68 (AHM 571)
6.5.4.1

INSULATION RESISTANCE, CONTINUITY, CAPACITANCE TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#46~~ RE AND VERIFIED BY INSPECTION. RE 8-7-68 (AHM 571)

2055 8-7-68 VACUUM TEST FINAL FUNCTIONAL
6.5.4.2

INSULATION RESISTANCE, CONTINUITY, CAPACITANCE AND DIELECTRIC STRENGTH TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#47~~ RE AND VERIFIED BY INSPECTION. RE 8-7-68 (AHM 193)
CONT N 1997-43

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P. G. Elwood 8-7 19 68

WITNESSED AND UNDERSTOOD: C. B. Rich 8-7 19 68

FORM A93-0 REV. 7-66

North American Aviation, Inc.

N 1997-43

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR6227	CONTRACT NO. ATR 492 117A	DATE 8-8-68

VACUUM AND HIGH/LOW TEMPERATURE TEST EQUIPMENT LIST

1. GENERAL RADIO IMPEDANCE BRIDGE
   TYPE 1650-A S/N 5912 S009492 CAL-DUE 10-10-68
2. SENSITIVE RESEARCH MILLIAMMETER MODEL D
   S/N 602969 F310151 CAL-DUE 2-13-69
3. GENERAL RADIO MEGOHM BRIDGE
   TYPE 1644-A S/N 290 N770971 CAL-DUE 9-27-68
4. INVERTRON AC P/S MODEL 161A
   S011309 CAL-DUE 1-4-69
5. PERKINS DC P/S MODEL TUR040-5
   S011313 CAL-DUE 11-6-68
6. SENSITIVE RESEARCH VOLTMETER
   MODEL-A S/N 602279 CAL-DUE F306214-11-26-68
7. SIMPSON OHMMETER MODEL 269 F302850 CAL-DUE 9-5-68
8. ARIZONA INSULATION TESTER N735197 CAL-DUE -12-12-68

FORM A93-G REV. 7-68

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: Paul W. Edwards 8-8 19 68

WITNESSED AND UNDERSTOOD: [illegible] 8-8 19 68

North American Aviation, Inc. N 1997-44

DIVISION		DATE
SPACE (41)		
PROJECT NO: APOLLO LR6227	CONTRACT NO. ATR 492117A	8-8-68

G+N FILTER BOX

1020 8-8-68 PRE ACCELERATION FUNCTIONAL TEST PARA 6.6.1

INSULATION RESISTANCE, CONTINUITY, CAPACITANCE AND ~~DIELECTRIC STRENGTH~~ TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#48~~ AND VERIFIED BY INSPECTION. RE 8-8-68

1550 ~~1650~~ 8-8-68 ACCELERATION TEST PER PARAGRAPH 6.6.2 ~~AND~~ COMPLETED. NO EVIDENCE OF DISCONTINUITY IN EXCESS OF 70 μS WAS NOTED.

1630 8-8-68 POST-ACCELERATION FUNCTIONAL TEST COMPLETE. PARA 6.6.3

INSULATION RESISTANCE, CONTINUITY, CAPACITANCE, AND DIELECTRIC STRENGTH ~~TESTS~~ (LESS THAN 0.2 MA.) TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#47~~ AND VERIFIED BY INSPECTION. RE 8-8-8

1930 8-8-68 PRE SHOCK FUNCTIONAL TEST 6.7.1.1 INSULATION RESISTANCE, CONTINUITY, CAPACITANCE AND DIELECTRIC STRENGTH TESTS WERE CONDUCTED AS REQUIRED.

CONT N 1997-45

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. W. Edwards 8-8 19 68

WITNESSED AND UNDERSTOOD: R. Lyker 8-8 19 8

FORM A93-G REV. 7-66

North American Aviation, Inc. N 1997-45

DIVISION		
SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. ATR 492 117 A	DATE 8-9-68

CONT FROM N 1997-44

1930 8-8-68 CONT
ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET ~~#50~~ #PE 50 AND VERIFIED BY INSPECTION. PE 8-8-68. (NM 1997)

0000 8-9-68 POST-SHOCK FUNCTIONAL COMPLETE. PARA 6.7.7
INSULATION RESISTANCE, CONTINUITY, CAPACITANCE AND DIELECTRIC STRENGTH TESTS WERE CONDUCTED AS REQUIRED. ALL READINGS WERE WITHIN SPECIFIED LIMITS. VALUES HAVE BEEN RECORDED ON DATA SHEET# ~~#51~~ #PE 51 AND VERIFIED BY INSPECTION. PE 8-9-68. (NM 1997) 8-9-68

1035 8-9-68 DYNAMICS LABORATORY TEST SUPPORT DATA ~~is~~ IS REFERENCED AS FOLLOWS.

ACCELERATION LAB NOTEBOOK N5118 PAGES ~~27~~ 28,29 THRU 30
SHOCK LAB NOTEBOOK N5118 PAGES 31 - #PE 33
FUNCTIONAL TEST DATA-LAB NOTE BOOK N6097 PAGES 1-6, 8-24 (NM 1997)

1040 8-9-68 POST-QUALIFICATION TEST EXAMINATION.
NO VISIBLE EVIDENCE OF DAMAGE. THE ASSEMBLY HOUSING AND CONNECTORS ARE FREE OF CRACKS, UNUSUAL SCRATCHES OR SURFACE CONTAMINATION, INTERNA OR EXTERNAL
CONT N 1997-46

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM 493-G REV. 7-66

SIGNATURE: P. G. Edwards 8-9 1968

WITNESSED AND UNDERSTOOD: R. Lyles 8-9 1968

North American Aviation, Inc. N 1997-46

DIVISION SPACE (41)		
PROJECT NO: APOLLO LR 6227	CONTRACT NO. ATR 492117A	DATE 8-9-68

G+N FILTER BOX COUT FROM N-1997-45

1050 8-9-68 ALL AXES OF THE SHOCK EXPOSURE ~~WAS~~ WERE MONITORED FOR DISCONTINUITY ON THE SPECIFIED CIRCUITS ~~B~~ GREATER THAN 70 µs (microsec). NO DISCONTINUITY WAS NOTED. PE. 8-9-68

CLOSING STATEMENT:

THE PRECEDING TEST HAS BEEN CONDUCTED IN ACCORDANCE WITH THE APPROVED TEST REQUEST (ATR 492117A) AND SUPPORTING DOCUMENTS. DATA SUPPORTING THIS TEST ARE NOTED OR REFERENCED HEREIN. SPECIMEN SUBMITTED TO "BONDED STORAGE" ON (PRR # 509143) 918K No. S000502. PWE/AN (ANM 193)

SIGNED Paul W. Elwood 8-9-68
L+T RESPONSIBLE TEST ENGR.

SIGNED P. V. McKeever 8/14/68
APOLLO DESIGN ENGR.

VERIFIED R. M. Lykes 8-15-68
N.R. INSPECTION

VERIFIED J. C. Johnson 8-15-68
NASA INSPECTION

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P. W. Elwood 8-15 1968

WITNESSED AND UNDERSTOOD R. Lykes 8-15-1968

FORM A93-G REV. 7-66

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097- 1

DIVISION		ATR 492117 A
SPACE (41)		
PROJECT NO: APOLLO LR 6227	**CONTRACT NO:** G+N FILTER BOX QUAL FUNCTIONAL TEST DATA	**DATE** 8-15-68

THE DATA ON PAGES N 6097-2 THRU 6 AND 8 THRU 24 IS ALL OF THE TEST (FUNCTIONAL) DATA ; IE INSULATION RESISTANCE, CONTINUITY, CAPACITANCE. THIS DATA WAS COLLECTED DURING THE QUALIFICATION TESTING OF THE G+N FILTER BOX V36-442330 S/N 0636ZAAH3858

TEST	PARAGRAPHS	TIME DATES	N6097 PAGES
INSULATION RESISTANCE	6.1.2 THRU 6.3.8.6	1505 7-10-8 / 1300 7-15-8	2 AND 3
	6.3.8.7 THRU 6.4.3.1.3	1900 7-15-8 / 1500 7-21-8	4 AND 5
	6.4.3.1.4 THRU 6.4.3.3	1510 7-22-8 / 1655 8-1-8	6 AND 7*
	6.4.3.4.1 THRU 6.6.1	2000 8-1-8 / 1030 8-9-8	9 AND 10
	6.6.3 THRU 6.7.7	1405 8-8-8 / 0000 8-9-8	11 AND 12
CONTINUITY	6.1.2 THRU 6.3.8.6	1505 7-10-8 / 2000 7-15-8	13 AND 14
	6.3.8.7 THRU 6.4.3.1.3	1900 7-15-8 / 1500 7-21-8	15 AND 16
	~~6.4.3.1.4 THRU 6.4.3.3~~	~~1500 7-22-8 / 2000 8-1-8~~	~~17 AND 18~~ 2nd
	~~6.4.3.4.1 THRU 6.6.1~~	~~2000 8-1-8 / 1030 8-9-8~~	~~19 AND 20~~ 2nd
	6.6.3 THRU 6.4.3.1.4 THRU 6.4.3.4.1	1500 7-22-8 / 2000 8-1-8	17 AND 18
	6.4.3.6.7 THRU 6.6.7	0155 8-8-8 / 0000 8-9-8	19 AND 20
CAPACITANCE	6.1.2 THRU 6.3.8.7	1505 7-10-8 / 1900 7-15-8	21
	6.3.8.8 THRU 6.4.3.2.1	0300 7-16-8 / 1500 7-23-8	22
	6.4.3.2.2 THRU 6.5.1	1435 7-24-8 / 0530 8-3-8	23
	6.5.2.2 THRU 6.7.7	1300 8-3-8 / 0000 8-9-8	24

G Ω = Giga ohms = 10^9 Ω

T Ω = Tetra ohms = 10^{12} Ω

* PAGE 7 VOID - NO DATA

C-3

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM 93-G REV. 6-68

SIGNATURE: David M. Elwood 8-15 1968

WITNESSED AND UNDERSTOOD: [illegible] 8/15 19 68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097- 2

DIVISION: SPACE (HI) ATR 492117

PROJECT NO: Apollo LR 6227 CONTRACT NO. G + N FILTER BOX QUAL TEST DATE

(GR) INSULATION RESISTANCE TEST

TIME		1505	0317	1100	2215	0015	0150	1920	0300	1900	0300	1900	0300
DATE		7-10-8	7-11-8	7-11-8	7-11-8	7-12-8	7-12-8	7-12-8	7-13-8	7-13-8	7-14-8	7-14-8	7-15-8
PARA.		6.1.2	6.2.A	6.2.10	6.3.1	6.3.3	6.3.5	6.3.7	6.3.8.2	6.3.8.3	6.3.8.4	6.3.8.5	6.3.8.6
30-1/1-GRD/J1-C/GRD		∞	∞	4.2G	5.2	14.4	∞	100T	∞	∞	∞	∞	3KG
2	F	↕	↕	4.3	15	14.4	↕	100T	↕	↕	↕	↕	∞
3	G	↕	↕	4.0	12	13.2	↕	100T	↕	↕	↕	↕	∞
4	L	↕	↕	4.1	13	11.	↕	100T	↕	↕	↕	↕	5KG
5	M	↕	↕	3.8	5.7	11.5	↕	60T	↕	↕	↕	∞	∞
6	N	↕	↕	3.8	5.6	12.	↕	60T	↕	↕	↕	↕	1KG
7	P	↕	↕	3.9	5.8	13.2	↕	60T	↕	↕	↕	↕	2KG
8	R	↕	↕	3.8	6.1	12.6	↕	70T	↕	↕	↕	↕	400
9	S	↕	↕	4.05	6.5	19.5	↕	70T	↕	↕	↕	↕	5KG
10	T	↕	↕	4.1	6.9	21	↕	70T	↕	↕	↕	↕	20KG
11	U	↕	↕	4.4	6.9	21	↕	100T	↕	↕	↕	↕	∞
12	V	↕	↕	4.4	7.0	21	↕	100T	↕	↕	↕	↕	↕
13	X	↕	↕	4.3	6.8	23	↕	100T	↕	↕	↕	↕	↕
14	Y	↕	↕	4.3	6.8	23	↕	100T	↕	↕	↕	↕	↕
15	Z	↕	↕	4.3	~~6.6~~	25	↕	100T	↕	↕	↕	↕	↕
16	a	↕	↕	4.4	7.5	30	↕	100T	↕	↕	↕	↕	↕
17	b	↕	↕	4.4	7.5	30	↕	200T	↕	↕	↕	↕	↕
18	c	↕	↕	4.4	7.5	30	↕	1000T	↕	↕	↕	↕	↕
19	d	↕	↕	4.4	7.5	30	↕	1000T	↕	↕	↕	↕	↕
20	e	↕	↕	4.3	7.3	30	↕	1000T	↕	↕	↕	↕	↕
21	f	↕	↕	4.1	6.9	28	↕	1000T	↕	↕	↕	↕	∞
22	g	↕	↕	4.1	6.8	25	↕	1000T	↕	↕	↕	↕	850
23	h	∞	∞	4.1	7.2	25	∞	1000T	∞	∞	∞	∞	∞
30-1/3-GRD/J1-H/GRD		∞	∞	3.1	6.0	8.7	∞	1000T	∞	∞	∞	∞	∞
2	J	↕	↕	3.1	6.0	10	↕	1000T	↕	↕	↕	↕	∞
3	K	↕	↕	3.2	6.0	11.2	↕	1000T	↕	↕	↕	↕	7KG

FORM 93-G REV. 6-68

INSTRUCTIONS CONT

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

N 6097-3

SIGNATURE: [signature] 8-14 1968

WITNESSED AND UNDERSTOOD: [signature] 8-14 1968

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-3

DIVISION: SPACE (HI)

ATR 1192117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE

(GR) INSULATION RESISTANCE

TIME		1505	0317	1100	2215	0815	0150	1920	0300	1900	0300	1900	0300
DATE		7.10.8	7.11.8	7.11.8	7.11.8	7.12.8	7.12.8	7.12.8	7.13.8	7.13.8	7.14.8	7.14.8	7.15.8
PARA.		6.1.2	6.2.4	6.2.10	6.3.1	6.3.3	6.3.5	6.3.7	6.3.8.2	6.3.8.3	6.3.8.4	6.3.8.5	6.3.8.6
4	J	∞	∞	3.0G	6.2G	12.2G	∞	1000T	∞	∞	∞	∞	∞
5	K	↕	↕	3.1	6.2	12.8	↕	1000T	↕	↕	↕	↕	∞
6	M	↕	↕	3.1	6.2	13.6	↕	1000T	↕	↕	↕	↕	3506
7	N	↕	↕	3.1	6.2	13.6	↕	1000T	↕	↕	↕	↕	∞
8	P	↕	↕	3.2	6.2	17.	↕	1000T	↕	↕	↕	↕	↕
9	R	↕	↕	3.3	6.3	18.	↕	1000T	↕	↕	↕	↕	↕
10	S	↕	↕	3.3	6.2	20.	↕	1000T	↕	↕	↕	↕	↕
11	T	↕	↕	3.0	6.4	20.	↕	1000T	↕	↕	↕	↕	↕
12	U	↕	↕	3.0	6.7	20.	↕	1000T	↕	↕	↕	↕	∞
13	V	↕	↕	3.0	6.3	20.	↕	1000T	↕	↕	↕	↕	3 KG
14	W	↕	↕	4.1	6.7	20.	↕	1000T	↕	↕	↕	↕	∞
15	X	↕	↕	3.7	6.5	24.	↕	1000T	↕	↕	↕	↕	700G
16	Y	↕	↕	3.5	6.6	25.	↕	1000T	↕	↕	↕	↕	∞
17	Z	↕	↕	3.4	6.7	25.	↕	1000T	↕	↕	↕	↕	∞
18	AA	↕	↕	2.7	5.6	20.	↕	1000T	↕	↕	↕	↕	∞
19	BB	↕	↕	3.2	6.4	22.	↕	1000T	↕	↕	↕	↕	∞
30-20/3-GRD/JJ CC/GRD		↕	↕	3.2	6.6	23	↕	1000T	↕	↕	↕	↕	↕
21	DD	↕	↕	3.2	6.8	23	↕	1000T	↕	↕	↕	↕	↕
22	EE	↕	↕	3.2	6.9	23	↕	1000T	↕	↕	↕	↕	↕
23	FF	↕	↕	3.2	6.9	23	↕	1000T	↕	↕	↕	↕	↕
31-1/5-GRD/JJ HH/GRD		↕	↕	7.4	13.8	9.7	↕	1000T	↕	↕	↕	↕	↕
2	L	↕	↕	6.5	13.8	9.1	↕	1000T	↕	↕	↕	↕	↕
3	GG	∞	∞	6.0	13.[illegible]	8.8	∞	1000T	∞	∞	∞	∞	∞
		PRETEST FUNCTIONAL	POST RESONANCE SEARCH	LEVEL A RANDOM-POST TEST	PRETEST-SALT SPRAY	POST TEST-SALT SPRAY	PRE OXYGEN-HUMIDTY	POST OXYGEN-HUMIDITY	OXYGEN-HUMIDITY T+6 HRS	OXYGEN-HUMIDITY T+22 HRS	OXYGEN HUMIDITY T+30 HRS	OXYGEN-HUMIDITY T+46 HRS	OXYGEN-HUMIDITY T+54 HRS

INSTRUCTIONS CONT

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

N 6097-4

SIGNATURE: J. W. Edwards 8-14 1968

WITNESSED AND UNDERSTOOD: R. Lykes 8-14 1968

FORM 93-G REV. 6-66

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-4

ATR 497117

DIVISION: SPACE (HI)

PROJECT NO: Apollo LR 6227

CONTRACT NO. G&N FILTER BOX QUAL TEST

DATE

(GR) INSULATION RESISTANCE

TIME		1900	0300	1900	0300	1900	2110	2200	1000	1435	1500	1500	1500
DATE		7-15-8	7-16-8	7-16-8	7-17-8	7-17-8	7-17-8	7-17-8	7-18-8	7-18-8	7-19-8	7-20-8	7-21-8
PARA.		6.3.8.7	6.3.8.8	6.3.8.9	6.3.8.10	6.3.8.11	6.3.9	6.4.1	6.4.3.1.1	6.1.2 6.4.3.1.1	RETEST 6.4.3.1.1	6.4.3.1.2	6.4.3.1.3
30-1/1-GRD/J1-C/GRD.		∞	∞	∞	∞	∞	∞	4.36	∞	SPECIAL TEST CHAMBER DOORS OPENED (AMBIENT)	56	3.56	2.36
2	F							4.1			4.0	3.5	2.2
3	G							3.6			3.5	3.1	17.0
4	L							3.4			3.3	3.4	18.0
5	M							3.5			3.3	3.6	18.0
6	N							2.1			3.0	3.5	25.0
7	P							2.8			3.4	4.1	25.0
8	R							1.6			4.4	4.3	44.
9	S							3.5			5.3	5.0	190.
10	T							4.1			8.32	5.4	300
11	U							4.2			8.5	5.5	3.5
12	V							4.3			9.2	5.5	3.5
13	X							3.9			8.2	4.8	3.5
14	Y							4.0			7.5	5.0	7.0
15	Z							4.0			8.8	5.0	10.5
16	A							4.2			10.2	5.5	18.0
17	B							4.2			10.2	5.4	40.
18	C							4.2			4.3	5.5	20.
19	D							4.2			4.2	5.5	22.
20	E							4.1			4.1	5.4	3.7
21	F							3.7			4.0	5.4	3.7
22	G							2.4			4.2	5.8	3.8
23	H							4.0			4.2	5.87	4.5
30-1/3-GRD/J1-H/GRD.								2.6			2.6	5.8	4.3
2	J							2.8			2.7	5.5	3.4
3	K	∞	∞	∞	∞	∞	∞	2.8	∞	X	2.7	6.1	3.5

INSTRUCTIONS CONT N6097-5

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-19 1966

WITNESSED AND UNDERSTOOD: [signature] 8-14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-5

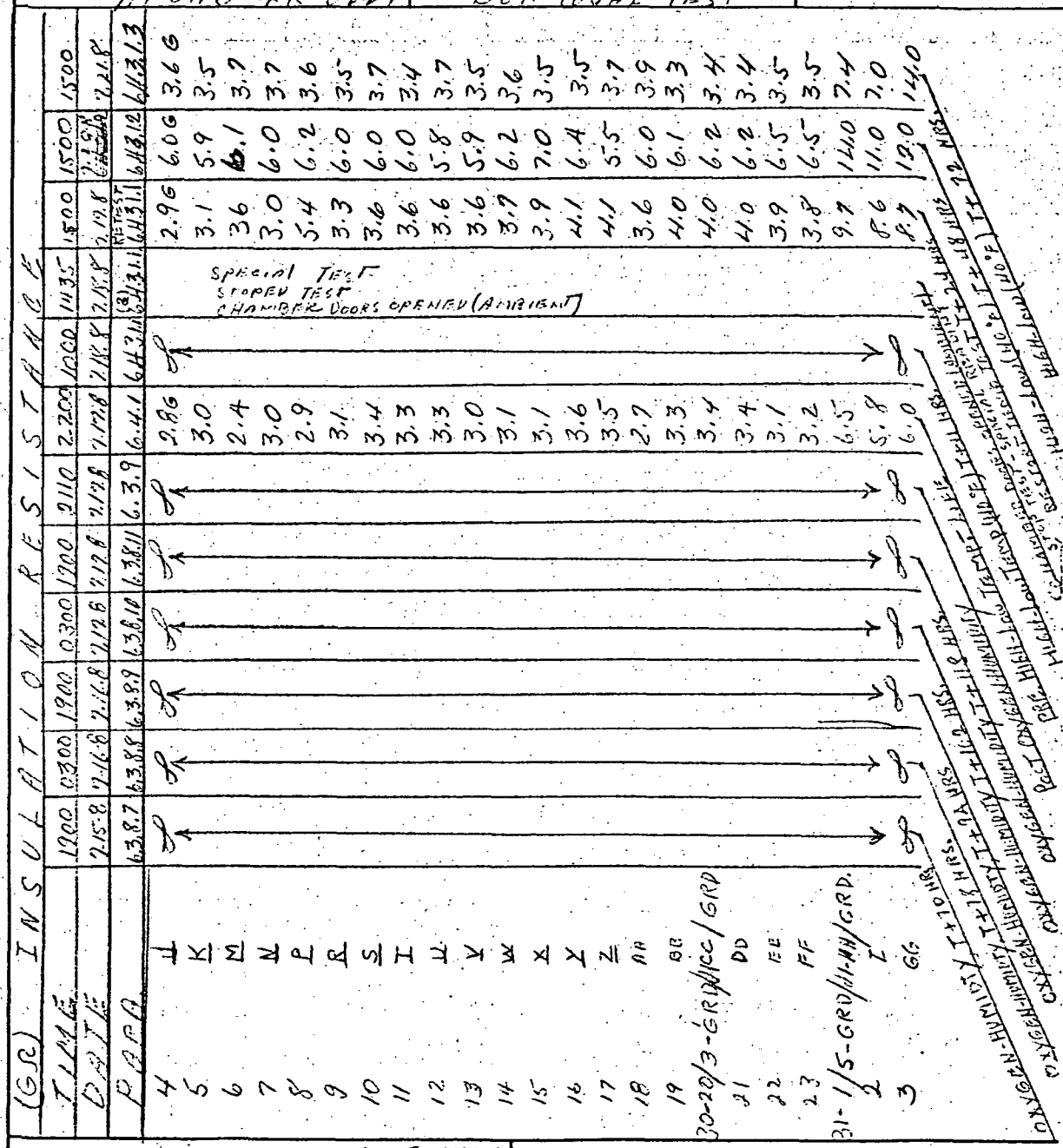
DIVISION: SPACE (H1)

ATR 492119

PROJECT NO: APOLLO LR 6447

CONTRACT NO. C&N FILTER BOX QUAL TEST

DATE



INSTRUCTIONS CONTN 6097-6

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-14 19 68

WITNESSED AND UNDERSTOOD: [signature] 8-14 19 68

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097- 6

DIVISION: SPACE (A1)

ATR 492117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE —

(GR) INSULATION RESISTANCE

TIME	1500	1500	1435	1500	1500	1500	1500	1300	1500	1500	1450	1655
DATE	7-22-8	7-23-8	7-24-8	7.25.8	7.25.8	7.27.8	7.28.8	7.29.8	7.30.8	7.31.8	8.1.8	8-1-8
PARA.	6H.311	6.4.321	6.4.322	6H.323	6.4.324	6.4.325	6.4.326	6.4.327	6.4.328	6.4.329	6.4.32[illegible]	6.4.33
30 1/1-GRD J1-C/GRD	2.36	2.66	4.06	3.46	2.7G	2.76	1.9G	2.06	2.36	2.56	10.6	2.1G
2 F	2.3	2.6	3.7	3.3	2.7	2.6	1.7	2.0	2.3	2.6	10.	2.3
3 G	2.2	2.7	6.8	3.3	2.6	2.5	1.7	1.94	2.2	2.6	10.5	2.1
4 L	2.2	2.6	3.4	3.1	2.7	2.6	1.8	2.0	2.4	2.6	8.5	2.7
5 M	5.0	2.7	3.4	3.1	2.8	2.7	1.9	1.86	2.5	2.6	10.	2.1
6 N	5.0	2.7	3.4	3.2	2.8	2.7	1.8	2.0	2.4	2.6	9.	2.7
7 P	6.3	2.6	3.5	3.0	3.0	2.9	2.0	1.97	2.6	2.7	10.	3.1
8 R	6.9	2.7	3.6	3.0	3.1	3.0	2.0	1.93	2.5	2.7	12.	3.1
9 S	9.8	2.7	3.8	3.0	3.3	3.3	2.0	2.1	2.8	3.0	11.	3.5
10 T	3.2	2.7	3.3	3.1	3.4	3.4	2.1	2.12	2.7	3.1	15.	3.3
11 U	8.0	2.8	3.3	3.1	3.5	3.4	2.3	2.3	2.6	3.2	15.	3.2
12 V	11.6	2.8	3.3	3.2	3.5	3.5	2.2	2.3	2.7	3.0	15.	3.3
13 X	2.9	2.8	3.3	3.2	3.4	3.4	2.1	2.4	2.6	3.0	12.	3.2
14 Y	2.9	2.8	3.3	3.2	3.4	3.4	2.2	2.4	5.0	3.0	13.	3.0
15 Z	2.9	2.8	3.3	3.2	3.4	3.4	2.1	2.4	6.0	3.0	14.	3.0
16 A	3.0	2.8	3.3	3.2	3.5	3.5	2.3	2.6	10.0	3.0	16.	3.0
17 B	3.1	2.8	3.3	3.2	3.5	3.5	2.3	2.7	8.5	3.1	16.	2.7
18 C	3.1	2.7	3.3	3.2	3.5	3.5	2.2	2.7	8.5	3.1	15.	2.8
19 D	3.1	2.9	3.3	3.1	3.5	3.5	2.1	2.7	8.5	3.0	12.	2.8
20 E	3.0	2.8	3.2	3.0	3.4	3.4	2.2	2.6	13.0	2.9	17.	3.0
21 F	2.9	2.8	3.1	3.0	3.4	3.3	2.2	2.7	3.0	2.9	16.	3.1
22 G	2.9	2.9	3.1	3.0	3.4	3.3	2.1	2.6	3.0	2.9	13.	4.0
23 H	3.2	2.9	3.3	3.0	3.5	3.5	2.4	2.6	3.0	3.0	15.	10.0
30-1/3-GRD/H/GRD	3.0	3.3	3.1	2.1	2.5	3.1	2.3	1.8	2.8	2.2	8.	700.
2 J	2.9	3.3	3.0	2.2	2.6	3.1	2.1	1.9	2.8	2.7	8.5	800.
3 K	2.9	3.2	3.0	2.3	2.8	3.1	2.2	2.0	2.7	2.7	8.5	1.0T

INSTRUCTIONS CONT. N 6097-8

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-19 1968

WITNESSED AND UNDERSTOOD [signature] 8-14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097- 8

ATR 492 117

DIVISION: SPACE (41)

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE: —

FORM 93-G REV. 6-66

(G2) INSULATION RESISTANCE

TIME		1500	1500	1435	1500	1500	1500	1500	1300	1500	1500	1450	1655
DATE		7.22.8	7.23.8	7.24.8	7.25.8	7.26.8	7.27.8	7.28.8	7.29.8	7.30.8	7.31.8	8-1-8	8-1-8
PARA.		6.4.3.14	6.4.3.21	6.4.3.22	6.4.3.23	6.4.3.24	6.4.3.25	6.4.3.26	6.4.3.27	6.4.3.28	6.4.3.29	6.4.3.210	6.4.3.3
4	J	3.16	3.36	3.16	2.46	2.96	3.36	2.16	2.16	2.6	2.96	9.06	1.1 T
5	K	3.0	3.3	3.1	2.4	2.9	3.2	2.1	2.2	2.8	2.7	9.5	1.5 T
6	M	3.0	3.3	3.0	2.5	2.9	3.2	2.2	2.2	2.8	2.8	8.5	1.6 T
7	N	3.1	3.3	3.0	2.6	3.1	3.2	2.1	2.3	3.0	2.9	9.0	2.5 T
8	P	3.1	3.3	3.0	2.6	3.1	3.2	2.2	2.3	3.0	2.9	9.0	3.0 T
9	R	3.1	3.3	3.0	2.6	3.1	3.2	2.2	2.4	3.0	2.9	9.5	3.5 T
10	S	3.0	3.3	2.9	2.6	3.1	3.2	2.0	2.4	2.9	2.8	9.5	4.0 T
11	T	3.0	3.3	2.9	2.6	3.1	3.2	2.1	2.4	2.9	2.8	9.5	6.0 T
12	U	3.0	3.4	2.9	2.6	3.1	3.2	2.2	2.4	2.9	2.7	10.0	5.0 T
13	V	3.0	3.4	2.8	2.5	3.1	3.1	2.2	2.4	2.9	2.7	9.5	8.0 T
14	W	3.0	3.4	2.9	2.6	3.2	3.3	2.2	2.6	3.0	2.7	12.0	9.0 T
15	X	3.0	3.4	2.9	2.7	3.3	3.3	2.0	2.5	3.0	2.8	12.0	20. T
16	Y	3.2	3.4	3.0	2.8	3.4	3.3	2.2	2.5	2.5	2.9	13.0	50 T
17	Z	3.1	3.4	3.0	2.7	3.4	3.3	2.0	2.6	2.6	2.8	13.0	25 T
18	AA	2.6	3.0	2.6	2.4	2.9	2.8	1.8	2.2	2.2	2.5	10.0	30. T
19	BB	3.0	3.1	2.9	2.7	3.2	3.1	2.0	2.5	2.5	2.7	12.0	40 T
30-20/3-GRDJ1-CC/GRD		3.0	3.4	2.9	2.7	3.3	3.1	2.0	2.5	2.5	2.7	13.0	50 T
21	DD	3.0	3.4	2.9	2.7	3.3	3.1	2.0	2.5	2.6	2.8	12.0	100 T
22	EE	3.1	3.4	2.9	2.7	3.4	3.2	2.1	2.5	2.5	2.8	13.0	200 T
23	FF	3.1	4.8	3.0	2.7	3.3	3.2	2.0	2.6	2.7	2.9	14.0	200 T
31-1/5GRD.J1-HH/GRD		5.8	9.5	5.6	6.0	6.9	5.7	3.6	5.0	15.	5.8	40.	40 T
2	I	5.6	8.4	5.3	5.5	6.6	5.5	3.6	4.5	5.5	5.3	22.	50 T
3	GG	5.6	8.4	5.3	5.2	6.6	5.5	3.5	4.3	5.3	6.0	25.	100 T
		HIGH-LOW-LOW TEMP. (110°F) T+96 HRS.	HIGH-LOW TEMP. (125°F) T+24 HRS.	HIGH-LOW TEMP (125°F) T+48 HRS.	HIGH LOW TEMP. (125°F) T+72 HRS.	HIGH LOW TEMP (125°F) T+96 HRS.	HIGH LOW TEMP. (125°F) T+120 HRS.	HIGH LOW TEMP. (125°F) T+144 HRS	HIGH LOW TEMP (125°F) T+168	HIGH LOW TEMP (125°F) T+192 HRS.	HIGH LOW TEMP (125°F) T+216 HRS.	HIGH LOW TEMP. LIFE	HIGH LOW TEMP LIFE

Notes written in column 7.30.8: row 13 "3.9 / 3.0"; row 15 "3.0"; row 16 "2.5 / 2.6"; row 18 "2.2 / 2.5".

INSTRUCTIONS (SHEET N6097-9)

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-14 1968

WITNESSED AND UNDERSTOOD: [signature] 8-14 1968

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097- 9

DIVISION: SPACE (AI) — ATR 492117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE —

(GR) INSULATION RESISTANCE

TIME	2000	0155	0530	1300	1015	0835	1530	1420	1505	1855	2055	1030
DATE	8-1-8	8.3.8	8.3.8	8.3.8	8.4.8	8.5.8	8.5.8	8.6.8	8.7.8	8.7.8	8.7.8	8.8.8
PARA.	6.4.3.4.1	6.4.3.6	6.5.1	6.5.2.2	6.5.2.3	6.5.2.4	6.5.3.2	6.5.3.3	6.5.3.4	6.5.4.1	6.5.4.2	6.6.1
30-1/1-GRD/J1-C/GRD	3.0G	2.3G	13.1G	1.6G	160G	3G	2.4G	2.3G	2.4G	2.3G	3.0G	100T
2 F	3.3	2.4	14.3	1.7	61	3.0	2.4	2.3	2.4	2.3	3.1	∞
3 G	3.0	2.4	17.2	1.7	39	2.7	2.3	2.2	2.4	2.0	2.9	50T
4 L	3.1	2.3	12.3	1.6	23	2.7	2.3 (2.5)	2.1	2.4	2.1	3.0	50T
5 M	3.3	2.7	19.1	1.8	36	3.0	~~2.8~~	2.3	2.5	2.3	3.3	50T
6 N	3.1	2.1	8.3	1.8	29	2.7	2.7	2.2	2.4	2.0	3.0	50T
7 P	3.1	2.4	10.1	1.76	40	3.0	~~2.7~~	2.4	2.6	2.3	3.1	∞
8 R	3.0	2.4	6.9	1.9	63	3.0	~~3.1~~ 2.9	2.5	2.7	2.4	3.4	∞
9 S	3.4	2.2	11.0	1.7	110	3.2	3.1	2.7	2.9	2.6	3.5	↑
10 T	3.7	3.7	20.0	2.2	950	4	3.4	2.9	3.0	2.9	4.4	
11 U	3.6	3.7	18.0	2.2	1T	4.1	3.5	2.9	3.1	3.0	4.5	
12 V	3.6	3.8	17.0	2.2	1T	~~4.0~~	3.5	3.0	3.1	3.0	4.6	
13 X	3.3	3.8	16.0	2.2	1T	~~3.8~~	3.4	~~3.0~~ 2.9	3.0	2.8	4.6	
14 Y	3.2	3.7	15.7	2.2	1T	3.8	3.3	2.8	3.0	3.6	5.0	
15 Z	~~3.3~~	3.6	19.4	2.2	1T	3.8	3.4	2.8	3.0	2.8	4.3	
16 A	3.5	3.7	14.0	2.2	1T	4.0	3.6	3.0	3.2	3.0	4.5	
17 B	3.7	3.7	13.9	2.2	1T	4.0	3.6	3.0	3.2	3.0	4.5	
18 C	3.7	3.5	13.2	2.2	9T	4.0	3.5	3.0	3.2	3.0	4.2	
19 D	3.7	3.5	14.1	2.1	∞	4.0	3.5	2.9	3.1	3.0	4.4	
20 E	3.6	3.5	14.3	2.1	∞	4.2	3.5	2.9	3.1	3.0	3.7	
21 F	3.5	3.3	14.2	2.0	9.3T	3.7	3.3	2.8	3.0	2.8	3.5	
22 G	3.4	2.1	3.9	1.7	550	3.4	3.2	2.7	3.0	2.7	3.2	
23 H	3.7	3.0	8.5	2.0	460	3.8	3.5	2.9	3.1	3.0	3.6	
30-1/3-GRD/J1-H/GRD	3.2	3.0	7.5	1.7	3.3	3.4	3.1	2.8	2.9	2.9	3.3	
2 J	3.1	3.1	7.9	1.8	3.3	3.4	3.0	2.8	2.8	3.0	3.3	↓
3 K	3.1	2.7	7.6	1.6	3.1	3.2	2.9	2.7	2.8	2.7	3.1	∞

INSTRUCTIONS CONT N 6097-10

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P. W. Ellsworth 8-16 1968

WITNESSED AND UNDERSTOOD: R. Ryken 8-14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-10

DIVISION: SPACE (41)

ATR H92117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE: —

(GR) INSULATION RESISTANCE

TIME		2000	0155	0530	1300	1015	0825	1530	1420	1505	1855	2055	1030
DATE		8-1-8	8-3-8	8-3-8	8-3-8	8-4-8	8-5-8	8-5-8	8-6-8	8-7-8	8-7-8	8-7-8	8-8-8
PARA.		6.4.3.11	6.4.3.6	6.5.1	6.5.2.2	6.5.2.3	6.5.2.4	6.5.3.2	6.5.3.7	6.5.3.4	6.5.4.1	6.5.4.2	6.6.1
4	J	3.5G	3.2G	10.1G	1.8G	3.6G	3.8G	3.1G	2.8G	2.4G	2.9G	3.3G	∞ [illegible]
5	K	3.3	3.2	10.8	1.8	3.4	3.6	2.9	2.7	2.8	2.9	3.8	
6	M	3.4	2.7	8.5	1.7	3.2	3.2	3.2	2.6	2.7	2.6	3.0	[illegible]
7	N	3.7	3.2	11.9	1.9	3.5	3.7	3.2	2.8	2.9	2.8	3.3	
8	P	3.6	3.2	13.3	1.8	3.4	3.7	3.2	2.7	2.9	2.8	3.4	
9	R	3.5	3.2	13.1	1.9	3.4	3.8	3.1	2.8	2.9	2.9	3.5	
10	S	3.4	3.3	12.7	1.9	3.4	3.5	3.3	2.7	2.8	2.9	4.0	
11	T	3.6	3.3	11.0	1.9	3.4	3.5	3.3	2.7	2.8	2.9	4.2	
12	U	3.4	3.3	10.7	1.9	3.4	3.5	3.3	2.7	2.8	2.9	4.3	
13	V	3.2	2.5	5.7	1.7	3.0	2.8	3.3	2.6	2.7	2.6	3.4	
14	W	3.3	3.1	6.4	1.8	3.3	3.5	3.2	2.7	2.8	1.9	3.8	
15	X	3.5	3.3	8.1	1.9	3.4	3.5	3.2	2.7	2.8	2.6	3.8	
16	Y	3.7	3.5	10.4	2	3.6	3.8	3.4	2.8	2.9	2.8	4.0	
17	Z	3.6	3.4	9.2	2	3.5	3.7	3.3	2.8	2.8	2.8	4.0	
18	AA	3.0	2.6	6.8	1.7	3.0	3.1	3.3	2.4	2.5	2.5	3.5	
19	BB	3.5	3.0	9.2	1.9	3.4	3.5	3.2	2.7	2.8	2.7	3.9	
30-20/3-GRD	11-CC/GRD	3.5	3.1	11.9	1.9	3.4	3.6	3.2	2.7	2.8	2.7	3.9	
21	DD	3.5	3.1	12.0	1.9	3.4	3.6	3.2	2.7	2.8	2.8	3.9	
22	EE	3.7	3.1	12.3	1.9	3.4	3.7	3.3	2.8	2.8	2.9	4.0	
23	FF	3.7	3.1	12.7	1.9	3.5	5.9	3.3	2.7	2.8	3.0	4.0	
31-1/5-GRD	HH/GRD	8.5	8.8	11.3	7.5	11.7	12	10	8.5	6.4	6.0	6.3	
2	L L	7.6	7.5	11.1	6.5	11.8	10.3	9	8.3	6.0	6.1	6.1	
3	GG GG	8.0	7.5	10.8	6.0	13.0	10.3	9	8.0	5.8	6.0	6.4	∞

INSTRUCTIONS CONT N6097-11

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-14 1968

WITNESSED AND UNDERSTOOD: [signature] 8-14 19 [illegible]

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-11

DIVISION	
SPACE (41)	ATR 492117

PROJECT NO:	CONTRACT NO.	DATE
APOLLO LR 6227	G+N FILTER BOX QUAL TEST	—

(GR) INSULATION RESISTANCE

TIME	DATE	PARA	30-1/1-GRD/J1-C/GRD through 30-1/3-GRD/J1-H/GRD, 2 J, 3 K
1605	8.8.8	6.8.3	∞ ←→ ∞
1905	8.8.8	6.7.1.1	∞ ←→ ∞
0800	8.9.8	6.7.7	∞ ←→ ∞

Pins: 30-1/1-GRD/J1-C/GRD, 2 F, 3 G, 4 L, 5 M, 6 N, 7 P, 8 R, 9 S, 10 T, 11 U, 12 V, 13 X, 14 Y, 15 Z, 16 a, 17 b, 18 c, 19 d, 20 e, 21 f, 22 g, 23 h, 30-1/3-GRD/J1-H/GRD, 2 J, 3 K

INSTRUCTIONS CONT N6097-12

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-14 1968

WITNESSED AND UNDERSTOOD: [signature] 8-14 1968

FORM 93-G REV. 6-66

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-12

DIVISION		
SPACE (A1)		ATR 492117
PROJECT NO: APOLLO LR 62427	CONTRACT NO. G+N FILTER BOX QUAL TEST	DATE

(GR) INSULATION RESISTANCE

TIME	1605	1905	0000	
DATE	8.8.68	8.8.68	8.9.68	
PARA	6.6.3	6.7.11	6.7.7	
4	∞	∞	∞	
5	∞	∞	∞	
6	∞	∞	∞	
7	∞	∞	∞	
8	∞	∞	∞	
9	∞	∞	∞	
10	∞	∞	∞	
11	∞	∞	∞	
12	∞	∞	∞	
13	∞	∞	∞	
14	∞	∞	∞	
15	∞	∞	∞	
16	∞	∞	∞	
17	∞	∞	∞	
18	∞	∞	∞	
19	∞	∞	∞	
30-10/3-GRD/J1CC/GRD	∞	∞	∞	
21	∞	∞	∞	
22	∞	∞	∞	
23	∞	∞	∞	
31-1/5-GRD/J1HH/GRD	∞	∞	∞	
2	∞	∞	∞	
3	∞	∞	∞	

INSTRUCTIONS CONTN 6097-13

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS. IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-14 1968

WITNESSED AND UNDERSTOOD: [signature] 8-14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-13

DIVISION: SPACE (HI)

ATR 492117

PROJECT NO: Apollo LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE

CONTINUITY (Ω)

TIME			1505	0317	1100	2215	0015	0150	1920	0300	1900	0300	1900	0300
DATE			7-10-8	7-11-8	[illegible]	7.11.8	7.12.8	7.12.8	7.12.8	7.13.8	7.13.8	7.14.8	7.14.8	7.15.8
PARA.			6.1.2	6.2.4	6.2.10	6.3.1	6.3.3	6.3.5	6.3.7	6.3.8.2	6.3.8.3	6.3.8.4	6.3.8.5	6.3.8.6
30-1/1-2/J1-C		J2-C	.3Ω	.10Ω	.05Ω	.20Ω	.20Ω	.20Ω	.20Ω	.25Ω	.20Ω	.40Ω	.20Ω	.20Ω
2	F	F												
3	G	G												
4	L	L												
5	M	M									.20			
6	N	N									.10			
7	P	P									.20			
8	R	R												
9	S	S												
10	T	T	.3Ω											
11	U	U	.4Ω											
12	V	V												
13	X	X	0.4Ω											
14	Y	Y	[illegible]		.05									
15	Z	Z	[illegible]		.10				.20	.25				
16	a	a							.19	.20				
17	b	b							.19					
18	c	c							.20					
19	d	d									.20			
20	e	e									.40			
21	f	f												
22	g	g												
23	h	h	.4Ω		.10				.20			.40		
30-1/3-4/J1-H		J2-H	.38Ω		.15				.10		.40	.30		
2	J	J	.38Ω		.15				.10		.10	.30		
3	K	K	.38Ω	.10Ω	.15	.20Ω	.20Ω	.20Ω	.10	.20	.10	.30	.20	.20Ω

INSTRUCTIONS OUT N6097-9

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P. W. Edwards 8-19 1968

WITNESSED AND UNDERSTOOD: R. Lykes 8-14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-14

DIVISION: SPACE (A1)

ATR 492117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE

CONTINUITY

(Ω)														
TIME			1505	0317	1100	2215	0015	0150	1920	0300	1900	0300	1900	0300
DATE			7-10-8	7.11.8	7-11-8	7.11.8	7.12.8	7.12.8	7.12.8	7.13.8	7.13.8	7.14.8	7.14.8	7.15.8
PARA.			6.1.2	6.2.4	6.2.10	6.3.1	6.3.3	6.3.5	6.3.7	6.3.8.2	6.3.8.3	6.3.8.4	6.3.8.5	6.3.8.6
4	J	J	.38Ω	.10Ω	.15Ω	.20Ω	.20Ω	.20Ω	.10Ω	.20Ω	~~.10Ω~~	.20Ω	.20Ω	.20Ω
5	K	K	.40								.10			
6	M	M									.20			
7	N	N												
8	P	P												
9	R	R										.20		
10	S	S										.30		
11	I	I			.15									
20-12/3-4	JJ-U	JJ-U			.20									
13	V	V												
14	W	W												
15	X	X												
16	Y	Y									.20			
17	Z	Z									.10			
18	AA	AA		.10 .15 .15										
19	BB	BB		~~.10~~										
20	CC	CC		.15										
21	DD	DD												
22	EE	EE												
23	FF	FF			.20						.10	.30		
3+1/5-6	HH	HH		.15	.25				.10Ω		.20	.20		
2	I	I		.10	.25				.20Ω		.20	.20		
3	GG	GG	.40	.10	.25	.20	.20Ω	.20Ω	.20Ω	.20	.20	.20	.20	.20Ω

INSTRUCTIONS CONT N6097-15

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [illegible] 8-14 1968

WITNESSED AND UNDERSTOOD [illegible] 8-14 19

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-15

DIVISION: SPACE (HI) — ATR 1192117

PROJECT NO: APOLLO LR 6227 — CONTRACT NO. G+N FILTER BOX DUAL TEST — DATE —

CONTINUITY

(52)	1900	0300	1900	0300	1700	2110	2200	1000	1435	1500	1500	1500
TIME	7.15.8	7.16.8	7.16.8	7.17.8	7.17.8	7.18.8	7.18.8	7.18.8	7.18.8	7.19.8	7.20.8	7.21.8
DATE	6281	6285	6289	6310	6311	6312	6H1	6H311	6H311	6H311 RETEST	6H312	6H313
PARA.												
30-1/1-9U1-C/U1-C	.30R	.40R	.10R	.30R	.10R	.30R	.20R	.10R	SPECIAL TEST CHAMBER DOORS OPENED (AMBIENT)	.30 .40 .40 .40 .40	.40R	.20R
F							.20					
G							.10					
L							.10					
M							.20					
N							.20					
P							.20					
R												
S												
T												
U												
V												
X												
Y												
Z												
A												
B												
C												
D												
E												
F												
G												
H												
J	.50	.50	.20R	.30R	.20	.30	.20	.20R		.30 .40 .40 .40 .40	.40R	.20R
K	.30	.50	.20R	.30R	.20	.30	.20	.20R		.30 .40 .40 .40 .40	.40R	.20R
30-1/3-4/U1-H/2-H												
J												
K												
2												
3												

FORM 93-G REV. 6-68

INSTRUCTIONS CONT'N 6097-16

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: J. W. Edwards — 8-14 19 68

WITNESSED AND UNDERSTOOD — 8-14 19 68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-16

DIVISION: SPACE (41)

ATR 492117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G + N FILTER BOX QUAL TEST

DATE: —

CONTINUITY (Ω)

TIME			1900	0200	1900	0300	1900	2110	2200	1000	1435	1500	1500	1500
DATE			7.15.8	7.16.8	7.16.8	7.17.8	7.17.8	7.17.8	7.17.8	7.18.8	7.18.8	7.17.8	7.20.8	7.21.8
PARA.			6.3.8.7	6.3.8.8	6.3.8.9	6.3.8.10	6.3.8.11	6.3.9	6.4.1	6.4.3.11	6.4.3.11	RETEST 6.4.3.11	6.4.3.12	6.4.3.13
4	J	J	.30Ω	.50Ω	.20Ω	.30Ω	.20Ω	.30Ω	.20Ω	.20Ω	SPECIAL TEST CHAMBER DOORS OPENED (AMBIENT)	.20Ω	.40Ω	.20Ω
5	K	K												
6	M	M												
7	N	N												
8	P	P												
9	R	R												
10	S	S												
11	T	T												
30-12/3-4/J1	U	J2 U												
13	V	V												
14	W	W												
15	X	X												
16	Y	Y												
17	Z	Z												
18	AA	AA												
19	BB	BB												
20	CC	CC												
21	DD	DD												
22	EE	EE												
23	FF	FF							.20					
31-1/5-6/	HH	HH							.30					
2	I	I							.30					
3	GG	GG	.30Ω	.50	.20	.30	.20	.30	.30	.20		.20	.40	.20

INSTRUCTIONS CONT N6097-7

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-14 1968

WITNESSED AND UNDERSTOOD: [signature] 8-14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AESOSPACE AND SYSTEMS GROUP

N 6097-17

DIVISION	
SPACE (41)	ATR 492117

PROJECT NO:	CONTRACT NO.	DATE
APOLLO LR 6227	G&N FILTER BOX QUAL TEST	—

CONTINUITY (Ω)

TIME	DATE	PARA.	30-1/1-2 J1-C/J2-C → 30-1/3-4 J1-H/J2-H, 2 J J, 3 K K
2000	8-1-8	6.4.3.11	.20Ω ←→ .20
1655	8-1-8	6.4.3.?	.20Ω ←→ .20
1450	8-1-8	6.4.3.?	.20Ω —— .20
1500	7-31-8	6.4.3.?	.20Ω ←→ .20
1500	7-30-8	6.4.3.?	.20Ω ←→ .20
1300	7-29-8	6.4.3.?	.2Ω ←→ .2
1500	7-28-8	6.4.3.6	.20Ω ←→ .20
1500	7-27-8	6.4.3.5	.20Ω ←→ .20
1500	7-26-8	6.4.3.4	.20Ω ←→ .20
1500	7-25-8	6.4.3.3	.20Ω ←→ .20 .30 .30 .20 .20 .20 .20 (.30Ω) ~~.20~~ (.30Ω) ~~.20~~ .20
1435	7-24-8	6.4.3.2	.20Ω ←→ .20
1500	7-23-8	6.4.3.1	.20Ω ←→ .20
1500	7-22-8	6.4.3.0	.20Ω ←→ .20

Pins: 30-1/1-2 J1-C/J2-C; 2 F F; 3 G G; 4 L L; 5 M M; 6 N N; 7 P P; 8 R R; 9 S S; 10 T T; 11 U U; 12 V V; 13 X X; 14 Y Y; 15 Z Z; 16 a a; 17 b b; 18 c c; 19 d d; 20 e e; 21 f f; 22 g g; 23 h h; 30-1/3-4 J1-H/J2-H; 2 J J; 3 K K

INSTRUCTIONS CONT N6097-13

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.W. Edwards 8-14 1968

WITNESSED AND UNDERSTOOD: R. Lykes 8-14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-18

DIVISION: SPACE (41)

ATR 492117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE: —

CONTINUITY (Ω)

TIME	DATE	PARA	Reading
2000	8-1-8?	64341	.202 ← → .20 .30 .30 .30
1655	8-1-8	64333	.202 ← → .20 .20
1450	8-1-8	643310	.202 ← → .20
1500	7-31-8	64329	.202 ← → .20
1500	7-30-8	64328	.202 ← → .20
1300	7-29-8	64327	.202 ← → [illegible] .20
1500	7-28-8	64326	.202 ← → .20
1500	7-27-8	64325	.202 ← → .20
1500	7-26-8	64324	.202 ← → .20
1500	7-25-8	64323	.202 ← → .20 .30 .30 .30
1435	7-24-8	64322	.202 ← → .20
1500	7-23-8	64321	.202 ← → .20
1500	7-22-8	64314	.202 ← → .20 .30 .30 .30

Pin	J1	J2
4	J	J
5	K	K
6	M	M
7	N	N
8	P	P
9	R	R
10	S	S
11	T	T
30-12/3-4	U	U
13	V	V
14	W	W
15	X	X
16	Y	Y
17	Z	Z
18	AA	AA
19	BB	BB
20	CC	CC
21	DD	DD
22	EE	EE
23	FF	FF
31-1/5-6	HH	HH
2	L	L
3	GG	GG

INSTRUCTIONS CONT N6097-19

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [illegible] 8-14 1968

WITNESSED AND UNDERSTOOD: [illegible] 8/14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-19

DIVISION: SPACE (H1) | ATR 492 117

PROJECT NO: APOLLO LR 6227 | CONTRACT NO. G & N FILTER BOX QUAL TEST | DATE

CONTINUITY

(Ω) TIME	0155	0530	1300	1015	0825	1520	1420	1505	1855	2055	1030	1605	1905	2000
DATE	8-3-8	8.3.8	8.3.8	8.4.8	8.5.8	8.5.8	8.6.8	8.7.8	8.7.8	8.7.8	8.8.8	8.8.8	8.7.8	8.7.8
PARA.	6.4.36	6.5.1	6.5.22	6.5.23	6.5.24	6.5.32	6.5.33	6.5.34	6.5.41	6.5.42	6.6.1	6.6.3	6.7.1.1	6.7.7
30 1/1-C/C C	.20Ω	.20Ω	.40Ω	.30Ω	.30Ω	.40Ω	.20Ω	.40Ω	.40Ω	.30Ω	.40Ω	.40Ω	.40Ω	.30Ω
2 F F				.30	.30									
3 G G				.30	.30									
4 L L				.35	.40									
5 M M				.30										
6 N N				.25										
7 P P				.40										
8 R R				.40										
9 S S				.40										
10 T T				.35										
11 U U				.30										
12 V V														
13 X X														
14 Y Y														
15 Z Z														
16 A A														
17 B B														
18 C C														
19 D D														
20 E E														
21 F F				.30										
22 G G				.40										
23 H H				.40								.40		
30-1/3H/H H				.30								.30		
2 J J				.30								.20		
3 K K	.20	.20	.40	.30	.40	.40	.20	.40	.40	.30	.40	.20	.40	.30

INSTRUCTIONS GMT N6097-10

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.W. Edwards 5-16 19 68

WITNESSED AND UNDERSTOOD: [signature] 8/14 19 68

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-20

DIVISION: SPACE (A1)

BTR 492117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE

CONTINUITY (Ω)

Pins: 4 JJ JJ, 5 KK KK, 6 MM MM, 7 NN NN, 8 PP PP, 9 RR RR, 10 SS SS, 11 TT TT, 30-12/34 UU UU, 13 VV VV, 14 WW WW, 15 XX XX, 16 YY YY, 17 ZZ ZZ, 18 AA AA, 19 BB BB, 20 CC CC, 21 DD DD, 22 EE EE, 23 FF FF, 31-1/5-6 HH HH, 2 T T, 3 GG GG

TIME	DATE	PARA	4 JJ JJ	5 … 11	30-12/34 UU	13 VV	14 WW	15 … 2	3 GG GG
0000	8.7.8	6.7.7	.30Ω ←	…	…	…	…	… →	.30
1905	8.8.8	6.7.1.1	.40Ω ←	…	…	…	…	… →	.40
1605	8.8.8	6.6.3	.20Ω ←	…	…	…	…	… →	.20
1030	8.8.8	6.6.1	.40Ω ←	…	…	…	…	… →	.40
2055	8.7.8	6.5.4.2	.30Ω ←	…	…	…	…	… →	.30
1855	8.7.8	6.5.4.1	.40Ω ←	…	…	…	…	… →	.40Ω
1535	8.7.8	6.5.3.4	.40Ω ←	…	…	…	…	… →	.40
1420	8.6.8	6.5.3.3	.20Ω ←	…	…	…	…	… →	.20
1530	8.6.8	6.5.3.2	.40Ω ←	…	…	…	…	… →	.40
0825	8.5.8	6.5.2.4	.40Ω ←	…	…	…	…	… →	.40
1015	8.4.8	6.5.2.3	.30Ω ←	… →	.30	.40	.30 ←	… →	.30
1300	8.3.8	6.5.2.2	.40Ω ←	…	…	…	…	… →	.40
0530	8.3.8	6.5.1	.20Ω ←	…	…	…	…	… →	.20
0155	8.2.8	6.4.7.6	.20Ω ←	…	…	…	…	… →	.20

FORM 93-G REV. 6-68

INSTRUCTIONS (cont N6097-21)

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 8-14 1968

WITNESSED AND UNDERSTOOD: [signature] 19__ ; [signature] 8-14 1968

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-21

DIVISION: SPACE (H1)

ATR 442117

PROJECT NO: APOLLO LR 6227

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE: —

CAPACITANCE TEST

(Pf) TIME	1505	0317	1100	2215	0015	0150	1920	0300	1900	0300	1400	0300	1900
DATE	7.10.8	7.11.8	7-11-8	7-11-8	7-12-8	7.12.8	7.12.8	7.13.8	7.13.8	7.14.8	7.14.8	7.15.8	7.15.8
PARA	6.1.2	6.2.4	6.2.10	6.3.1	6.3.3	6.3.5	6.3.7	6.3.8.2	6.3.8.3	6.3.8.4	6.3.8.5	6.3.8.6	6.3.8.7
30-4/1-GRD/J1L/GRD	PF 9500	PF 9000	PF 9500	PF 9600	PF 9500	PF 9400	PF 8300	PF 8400	PF 9400	PF 8300	PF 9600	PF 8700	PF 9600
6 N	8600	7900	8600	8500	8500	8300	7800	7900	8300	7800	8300	8100	8300
7 P	8800	8700	8900	8800	8800	8400	7800	7850	8700	7700	8900	8100	8800
8 R	7600	6900	7700	5700	7600	7500	7400	7500	7400	7500	7600	7800	7500
9 S	8800	8100	8900	7800	8700	8600	8000	8000	8600	8000	8700	8300	8600
22 G	8100	7400	8100	8100	8100	7700	7600	7700	7900	7600	8100	7900	8000
23 H	8400	7800	8400	8400	8300	8200	7800	7850	8300	7800	8400	8100	8400
4/2 J2-1	9400	8900	9500	9600	9400	9400	8300	8400	9400	8300	9600	8700	9500
6 N	8500	7800	8600	8500	8400	8300	7800	7900	8300	7800	8400	8100	8400
7 P	8700	8700	8800	8700	8700	8600	7800	7850	8700	7800	8800	8100	8800
8 R	7500	6900	7700	7600	7500	7500	7400	7500	7400	7400	7600	7700	7500
9 S	8700	8050	8800	8500	8700	8600	8000	8000	8600	7700	8400	8200	8700
22 G	8000	7400	8100	8100	8000	7900	7600	7750	7900	7700	8100	7900	8000
23 H	8300	7800	8300	8300	8300	8200	7700	7850	8200	7800	8400	8100	8300
3/3 J1-K	8100	7200	8300	8200	8100	7900	8100	8150	7900	8000	8100	8400	8000
6 M	8600	7800	8800	8700	8600	8400	8200	8250	8400	8100	8600	8500	8600
13 Y	8800	8000	8800	8700	8700	8500	7800	7900	8500	7800	8700	8100	8600
14 W	7900	7200	7900	7900	7800	7700	7300	7450	7600	7300	7900	7600	7700
15 X	8600	7950	8500	8500	8600	8400	7700	7700	8400	7700	8600	8000	8500
3/4 J2-K	8000	7200	8200	8400	8000	[illegible]	8100	8100	7900	8200	8100	8100	8000
6 M	8600	7750	8700	8600	8500	8400	8200	8200	8400	8300	8700	8500	8600
13 Y	8700	8650	8800	8600	8600	8500	7800	7900	8500	7800	8700	8100	8600
14 W	7800	7200	7900	7800	7700	7600	7300	7400	7600	7500	7800	7600	7600
15 X	8500	7950	8600	8500	8400	8400	7700	7700	8400	7700	8600	8000	8500

FORM 93-G REV. 6-68

INSTRUCTIONS CONT N6097-22

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.W. [signature] 8-14 1968

WITNESSED AND UNDERSTOOD: R. [signature] 8-14 1968

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-22

DIVISION: SPACE (HI)

ATR 492117

PROJECT NO: APOLLO LR 627-7

CONTRACT NO. G+N FILTER BOX QUAL TEST

DATE —

CAPACITANCE TEST

(PF)	0300	1400	0200	1900	2100	1600	1435	1500	1500	1500	1500	1500
TIME	7.16.8	7.16.8	7.17.8	7.19.8	7.19.8	7.19.8	7.18.8	7.19.8	7.20.8	7.21.8	7.22.8	7.23.8
DATE	6.3.68	6.28.68	6.29.68	6.27.68	6.27.68	6.28.68	6.28.68	6.28.68	6.28.68	6.28.68	6.28.68	6.28.68
PARA	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
30-4/1-GRN /J1-L/GRN	8300	9600	8200	9600	9600	6100	9100	6700	6700	6700	6600	8500
6 N	7600	8400	7600	8400	8400	*5400	8000	5700	5700	6800	6000	8000
7 P	7700	8600	7700	8400	8400	5700	8500	6300	6300	6700	6400	8100
8 R	7400	7600	7300	7600	7600	*4800	2310	*5200	*5200	*5100	*5400	7600
9 S	7800	8700	7800	8800	8800	*5300	8300	6000	6000	5900	6000	8000
22 G	7500	8100	7500	8100	8100	*5300	7700	5700	5750	5700	5800	7800
23 H	7700	8400	7700	8100	8400	5600	8000	6100	6100	6000	6300	7900
4/2 J2-L	8100	9600	8100	9700	9600	6100	9100	6700	6700	6600	7100	8500
6 N	7700	8400	7700	8500	8400	*5400	8000	5800	5750	5800	6200	8000
7 P	7700	8800	7700	8900	8900	5700	8500	6200	6100	6100	6600	8000
8 R	7400	7600	7400	7700	7700	*4800	7400	*5100	*5100	*5100	5600	7600
9 S	7800	8700	7800	8900	8800	*5400	8300	5750	5750	5800	6200	8200
22 G	7500	8100	7500	8100	8100	*5200	7800	5500	5500	5600	6000	7800
23 H	7700	8400	7700	8100	8100	*4500	7600	6000	6000	5900	6400	7900
3/3 J1-K	7900	8000	8000	8100	8100	*5000	8200	*5400	*5400	*5000	*5400	7900
6 M	8000	8700	8000	8700	8700	5600	8700	5500	5500	5500	6000	8500
13 V	7700	8600	7700	8700	8700	5600	8700	6900	6150	6150	6500	8000
14 W	7200	7600	7200	7800	7800	*5000	7700	5500	5500	*5400	5700	7400
15 X	7600	8500	7600	8600	8600	5600	8100	6700	6700	6200	6600	8500
3/4 J1-K	7900	8000	8000	8100	8100	*4500	7600	*4850	*4850	*4900	5500	8000
6 M	8000	8700	8000	8700	8700	5600	8200	*5300	*5300	*5300	6100	8400
13 V	7700	8600	7700	8700	8600	5600	8200	6400	6400	6000	6600	8000
14 W	7200	7700	7200	7900	7800	*5000	7300	*5400	*5350	*5300	6000	7900
15 X	7500	8600	7600	8600	8600	5600	8100	6100	6100	6000	6700	7900

* INDICATES BEING OUTSIDE SPECIFIED LIMIT WAS REDUCED TO 3500 PF MINIMUM PER ATR 492117A

TOLERANCE ON 5500 PICOFARADS ±

FORM 93-G REV. 6-68

INSTRUCTIONS FOR N6097-23

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 5-14 19 68

WITNESSED AND UNDERSTOOD: [signature] 5-14 19 68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-23

DIVISION: SPACE (HI)

ATR 492117

PROJECT NO: APOLLO LR 6247

CONTRACT NO. G&N FILTER BOX QUAL TEST

DATE: —

(Pf) CAPACITANCE TEST

TIME		1435	1500	1500	1500	1500	1300	1500	1500	1450	1655	2000	0155	0530
DATE		7-24-8	7-25-8	7-26-8	7-27-8	7-28-8	7-29-8	7-30-8	7-31-8	8-1-8	8-1-8	8-1-8	8-3-8	8-3-8
PARA.		6.4.3.22	6.4.3.23	6.4.3.24	6.4.3.25	6.4.3.26	6.4.3.27	6.4.3.28	6.4.3.29	6.4.3.10	6.4.3.3	6.4.3.4	6.4.3.6	6.5.1
30-4/1-GRD	GRD	8400 Pf	8500 Pf	8500 Pf	8400 Pf	8400 Pf	8400 Pf	8300 Pf	8300 Pf	8300 Pf	4000 Pf	10100 Pf	9600 Pf	9700 Pf
6	N	8000	8000	7900	7900	7900	7800	7900	7900	7800	3900	8800	8300	8500
7	P	8000	8000	7900	8000	8000	7900	7900	7900	7900	3800	9500	8900	9100
8	R	7600	7600	7500	7600	7600	7500	7500	7500	7500	3700	8400	7700	7800
9	S	8700	8700	8700	8400	8400	8300	8100	8100	8100	3900	9500	8800	9000
22	G	7800	7800	7700	7800	7700	7700	7700	7700	7600	3800	8600	8000	8200
23	H	8000	8000	7900	7900	7900	7900	7800	7900	7800	3400	9000	8400	8600
4/2	J2-L	8400	8400	8400	8400	8400	8300	8300	8300	8300	4000	10000	9600	9600
6	N	7900	8000	7900	7900	7900	7900	7800	7800	7800	3900	8700	8700	8400
7	P	8000	8000	8000	7900	7900	7900	7800	7900	7900	3800	9000	8800	9000
8	R	7600	7600	7600	7600	7500	7500	7400	7500	7500	3700	8900	7600	7800
9	S	8700	8700	8700	8800	8100	8700	8000	8100	8100	3900	9200	8700	8900
22	G	7700	7700	7700	7700	7700	7700	7600	7700	7700	3800	8500	8000	8100
23	H	7900	7900	7800	7900	7800	7800	7800	7800	7800	3900	8800	8300	8600
3/3	J1-K	8200	8300	8700	8200	8700	8700	8100	8700	8100	3800	8800	7600	7900
6	M	8300	8400	8400	8400	8300	8300	8200	8300	8200	3900	9300	8000	8300
13	V	8000	8000	7900	8000	7900	7900	7900	7900	7900	3900	9200	8500	8900
14	W	7400	7400	7400	7400	7400	7400	7300	7400	7300	3600	8800	7600	7800
15	X	7800	7800	7800	7800	7800	7800	7700	7800	7700	3900	9100	8500	8600
3/4	J2-K	8200	8200	8200	8200	8200	8200	8100	8100	8100	3800	8600	7600	7900
6	M	8300	8400	8300	8300	8300	8300	8200	8300	8200	3900	9200	8000	8200
13	V	7900	8000	7900	7900	8000	7800	7900	7900	7800	3900	9000	8500	8600
14	W	7400	7400	7400	7400	7300	7400	7300	7300	7300	3600	8200	7600	7800
15	X	7800	7800	7700	7800	7700	7700	7700	7700	7700	3900	9000	8500	8600

INSTRUCTIONS CONT N6097-24

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P. W. Edwards 8-14 1968

WITNESSED AND UNDERSTOOD: R. Fyke 8-14 1968

FORM 93-G REV. 6-68

NORTH AMERICAN ROCKWELL CORPORATION
AEROSPACE AND SYSTEMS GROUP

N 6097-24

DIVISION: SPACE (41)

ATR 492117

PROJECT NO: Apollo LR 6227

CONTRACT NO. G&N FILTER BOX QUAL TEST

DATE: —

CAPACITANCE TEST (Pf)

TIME	1300	10:15	0825	1530	1420	1505	1855	2055	1030	1605	1905	0000
DATE	8-2-8	8-4-8	8-5-8	8-5-8	8-6-8	8-7-8	8-7-8	8-7-8	8-8-8	8-8-8	8-8-8	8-9-8
PARA.	6.5.2.2	6.5.2.3	6.5.2.4	6.5.2.2	6.5.3.3	6.5.3.4	6.5.4.1	6.5.4.2	6.6.1	6.6.3	6.7.1.1	6.7.7
30. 4/1-GPD/J1 L/GRD	Pf 6900	Pf 6600	Pf 1500	Pf 7400	Pf 8300	Pf 8300	Pf 10300	Pf 10,300	9800	10,000	9,900	9900
6 N	5300	5800	5600	7100	7900	7900	9200	9100	8500	8800	8700	8600
7 P	5300	6400	6900	7100	7900	8000	9600	9700	9100	9300	9300	9300
8 R	5900	5300	5100	6700	7500	7500	8600	8400	8000	8200	8200	8000
9 S	5600	6000	5900	7200	8100	8100	9600	9500	9000	9900	9100	9900
22 G	5400	5800	5600	6900	7700	7700	8800	8800	8300	8500	8400	8400
23 H	5700	6100	5700	7100	7900	8000	9100	9100	8600	8800	8700	8750
4/2 J2-L	6900	6500	6500	7400	8300 OE	8400	10300	10,200	9800	10,000	10,000	9800
6 N	5300	5700	5600	7100	7900	8000	9200	9000	8500	8800	8700	8700
7 P	5900	6200	6200	7100	7900	8000	9600	9500	9100	9300	9300	9300
8 R	4900	5200	5100	6700	7500	7500	8600	8700	8000	8250	8200	7950
9 S	5600	5900	5900	7700	8100	8100	9600	9500	9000	9200	9100	9000
22 G	5200	5700	5600	6900	7700	7700	8800	8700	8300	8500	8400	8300
23 H	5700	6000	5700	7100	7900	8000	9100	9000	8600	8800	8700	8700
3/3 J1-K	4600	5000	4900	7100	8100	8100	9000	8800	8100	8500	8300	8100
6 M	5000	5300	5200	7000	7900	7900	9200	9100	8500	8800	8700	8600
13 V	5800	6000	6000	7000	7900	7900	9400	9300	8800	9000	9000	8900
14 W	5000	5300	5200	6600	7400	7500	9100	8900	8000	8200	8400	8200
15 X	5600	6000	5900	7000	7900	7900	9300	9200	8900	9000	8900	8850
3/4 J2-K	4600	4900	4900	7100 WE	8000	8000	9000	8600	8200	8500	8300	8100
6 M	5000	5200	5900	~~7400~~ [illegible] WE	7900	7900	9200	9000	8500	8800	8700	8500
13 V	5700	6000	6000	7000	7900	7900	9300	9200	8800	9000	8900	8800
14 W	5000	5200	5700	6800 WE ~~7000~~	7400	7500	9100	8900	8000	8200	8200	8050
15 X	5600	6000	5700	7000	7900	7900	9300	9200	8700	8950	8700	8800

INSTRUCTIONS END

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P.W. Edwards 8-14 1968

WITNESSED AND UNDERSTOOD: R. [illegible] 8-14 1968

FORM 93-G REV. 6-68

APPENDIX D

VIBRATION

North American Aviation, Inc. N 5778-16

DIVISION		
SPACE - DOWNEY		
PROJECT NO: LR6227	CONTRACT NO. ATR 492 117	DATE 7-10-68

SUBJECT : QUALIFICATION TEST OF GUIDANCE AND NAVIGATIONAL FILTER BOX ASSEMBLY VIBRATION

P/N V36-442330 SN 06362 AAH 3858

L+T RESPONSIBLE TEST ENGINEER R.A. SCHROFF EX5717

L+T RESPONSIBLE VIBRATION ENGINEER P.W. SIMON EX2146

S D ENGINEERING REQUESTER L. LUERA EX1305

APPLICABLE DOCUMENTS:

ATR 492 117 GUIDANCE AND NAVIGATIONAL FILTER BOX ASSY.

IL-6227-801 LABORATORIES AND TEST QUALIFICATION TEST PROCEDURE FOR GUIDANCE AND NAVIGATION FILTER BOX ASSY. V36-442330

EQUIPMENT LIST

DESCRIPTION	MFG	MODEL	NR/SD CONTROL NO.	CAL/SCR DUE DATE
VIBRATION SYSTEM	LING	40/40-1	F306 239	8-14-68
VIBRATION SYSTEM	LING	40/40-2	F300 086	8-14-68
RANDOM SYSTEM	LING	ASDE 80	J105 897	8-6-68
VTVM	BALLANTINE	321	N777 546	8-8-68
OSCILLOSCOPE	TEKTRONIX	535A	N732 142	6-9-68
POWER SUPPLY	ENDEVCO	2628	S011 817	10-18-68
CHARGE AMPLIFIER	ENDEVCO	2713	S028 841	8-13-68
TAPE LOOP SYSTEM	AMPEX	FR1200	S016 271	9-12-68
TAPE RECORDER SYSTEM	CEC	GR2800	S006 357	9-12-68
ANALYZER SYSTEM	TPC	TP625	S011 440	11-7-68
~~VTVM~~ CHARGE AMP.	ENDEVCO	2713	S028 814	8-13-68
VTVM	BALLANTINE	320	F302 674	8-16-68

FORM A58-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P.W. Simon 7-10 1968

WITNESSED AND UNDERSTOOD: J.A. Pettey 7-10 1968

19

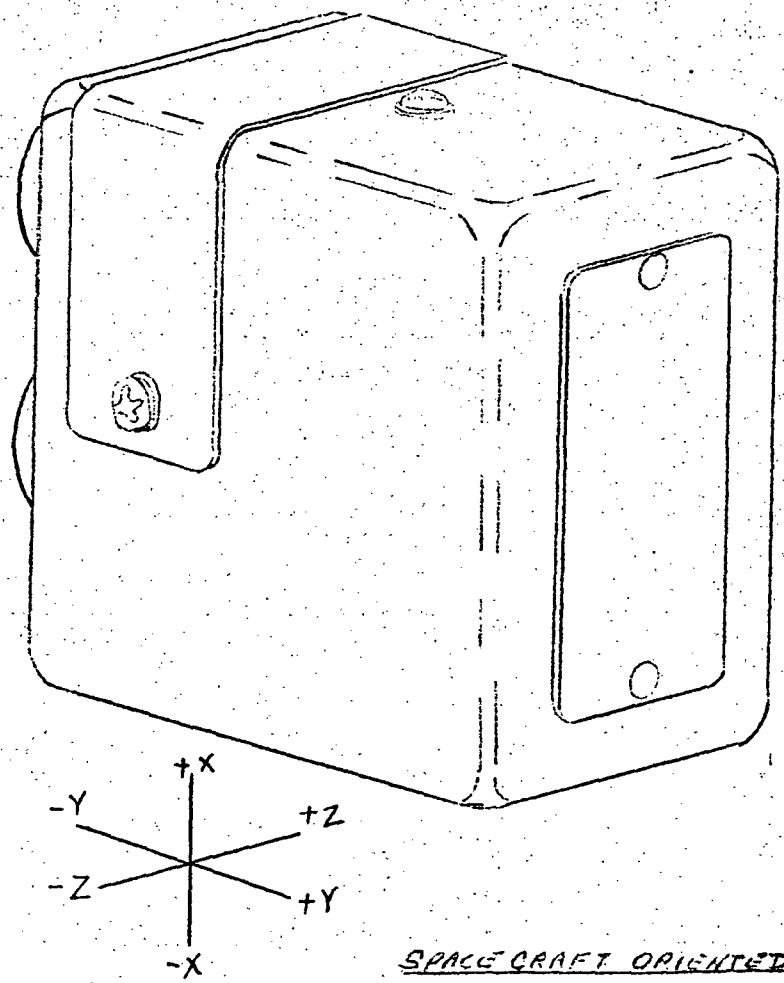
North American Aviation, Inc. N 5778-17

DIVISION		
SPACE - DOWNEY		
PROJECT NO: LR 6227	CONTRACT NO. ATR 492 117	DATE 7-10-68

EQUIPMENT LIST CONTINUED:

DESCRIPTION	MFG	MODEL	NAA EQ CONTROL NO.	CAL SER DUE DATE
RANDOM SYSTEM	LING	ASDE 80	F328602	10-8-68
VTVM	B & K	2416	F338940	7-25-68

ILLUSTRATION:



SPACECRAFT ORIENTED

FORM A93-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: D W. Simon 7-10 1968

WITNESSED AND UNDERSTOOD: J A Petty 7-10 1968

North American Aviation, Inc. N 5778-18

DIVISION		
SPACE DOWNEY		
PROJECT NO: LR6227	CONTRACT NO. ATR 492117	DATE 7-10-68

PRE TEST VALIDATION: THE TEST ITEM IS EQUAL TO THAT DEFINED IN THE APPROVED TEST REQUEST ATR492117 AND THE TEST SETUP IS ADEQUATE TO MEET THE REQUIREMENTS OF THE TEST AS DEFINED BY THE APPROVED TEST REQUEST:

L&T RESPONSIBLE TEST ENGINEER R.G. Schrag

NR/SD ENGINEERING DEPARTMENT L.S. Luera

NR/SD INSPECTION DEPARTMENT J.N. Petty 7-11-8

RESULTS AND/OR CHRONOLOGICAL EVENTS LOG

7-10-68 VIBRATION TESTS WILL BE CONDUCTED PER REQUIREMENTS OF TR 492117. FOR EACH OF THREE AXES. AND IL-6227-801. PARA 5.3 PAGES 6 & 7 ERROR-SHOULD BE PARA 5.4 RWC

PARA. 3.2.1: RESONANCE SEARCH (4.8.2.1) 10 MINUTES.
10 TO 2000 CPS @ 2.0 g's (PEAK +0, -1g)

PARA. 3.2.2.: RANDOM VIBRATION (4.8.2.2) 2.5 MINUTES.
LEVEL A 3db/OCTAVE INCREASE - 20 TO 80 CPS
0.067 g^2/CPS CONSTANT - 80 TO 2000 CPS

PARA 3.2.2: RANDOM VIBRATION (4.8.2.2) 12.5 MINUTES.
LEVEL B 3db/OCTAVE INCREASE - 20 TO 80 CPS
0.003 g^2/CPS. CONSTANT - 80 TO 2000 CPS.

NOTE: TEST WILL BE CONDUCTED TO REDLINED SPECIFICATION IL-6227-801 PAGE 7. AARA 5.4.1.3 & 5.4.1.4 - RESPONSE ACCELEROMETER NOT USED. RWC 7-10-68

FORM A03-G REV. 7-66

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: D.C. Copeland 7-10 19 68

WITNESSED AND UNDERSTOOD: J.N. Petty 7-11 19 68

North American Aviation, Inc. N 5778-19

DIVISION		
SPACE - DOWNEY		
PROJECT NO: LR 6227	CONTRACT NO. TR 492117	DATE 7-10-68

RESULTS AND/OR CHRONOLOGICAL LOG OF EVENTS.

7-10-68 ACCELEROMETER CALIBRATION FOR RANDOM TESTS.

LEVEL A. 0.067 g^2/cps: 316 MV/g - 100g SCALE. 2.23 VRMS.

LEVEL B. 0.003 g^2/cps: 100 MV/g - 10g SCALE. 707 MV.

7-10-68 TEST HARDWARE MOUNTED IN X AXIS. FIXTURE BOLTS TORQUED 35 FT. LBS. SPECIMEN BOLTS TORQUED. 28 IN. LBS.

7-11-68 RUN #1. SINUSOIDAL RESONANCE SEARCH. X AXIS
10 TO 2000 Hz @ 2.0g PEAK.
START TIME: 0030 STOP TIME: 0040. (10 MIN.)

7-11-68 TEST HARDWARE MOUNTED IN Y AXIS - FIXTURE BOLTS
0050 TORQUED TO 35 FT. LBS. SPECIMEN BOLTS TO 28 IN. LBS.

7-11-68 RUN #2. SINUSOIDAL RESONANCE SEARCH. Y AXIS
10 TO 2000 Hz @ 2.0g PEAK
START TIME: 0110 STOP TIME: 0120 (10 MIN.)

7-11-68 TEST HARDWARE MOUNTED IN Z AXIS. FIXTURE BOLTS
0130 TORQUED TO 35 FT. LBS. SPECIMEN BOLTS TORQUED TO 28 IN. LBS.

7-11-68 RUN #3. SINUSOIDAL RESONANCE SEARCH. Z AXIS
10 TO 2000 Hz @ 2.0g PEAK
START TIME: 0137 STOP TIME: 0147 (10 MIN.)

7-11-68 TEST DATA ON THIS PAGE ARE RECORDED ON TAPE REEL NO. 828

FORM AD3-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: D. C. Copeland 7-11 19 68

WITNESSED AND UNDERSTOOD: J. Ingram 7-11 19 68

North American Aviation, Inc. N 5778-20

DIVISION		
SPACE-DOWNEY		
PROJECT NO: LR 6227	CONTRACT NO. TR 492117	DATE 7-11-68

RESULTS AND/OR CHRONOLOGICAL LOG OF EVENTS.

7-11-68 0485 RUN#4 PERFORMED 6 SEC RANDOM EQUALIZATION WITH Z AXIS TEST SPECIMEN. THE EQUALIZATION IS [redacted] OUT OF TOLERANCE

7-11-68 0503 RUN#5 PERFORMED 5 SEC. RANDOM EQUALIZATION WITH Z AXIS TEST SPECIMEN. THE EQUALIZATION IS OUT OF TOLERANCE.

7-11-68 0530 RUN# 6 PERFORMED 5 SEC. RANDOM EQUALIZATION WITH Z AXIS TEST SPECIMEN. THE EQUALIZATION WAS OUT IN ONE PLACE. THE RTE GAVE AN OK TO TEST WITH ADJUSTMENT.

7-11-68 0625 RUN# 7 PERFORMED 2½ MIN OF RANDOM VIBRATION AT LEVEL A IN THE Z AXIS

7-11-68 0640 THE TEST SPECIMEN HAS BEEN ROTATED TO THE Y AXIS.

7-11-68 0643 RUN#8 PERFORMED 5 SEC RANDOM EQUALIZATION WITH TEST SPECIMEN IN THE Y AXIS LEVEL A EQUALIZATION OUT OF TOLERANCE 7-11-68

7-11-68 0716 RUN#9 PERFORMED 5 SEC RANDOM EQUALIZATION IN THE Y AXIS LEVEL A WITH TEST SPECIMEN. EQUALIZATION [redacted] IS GOOD OK TO TEST

7-11-68 0758 RUN# 10 PERFORMED 2½ MIN OF RANDOM VIBRATION AT LEVEL A IN THE Y AXIS

7-11-68 0830 COMPLETED MOVING THE TEST SPECIMEN TO THE X AXIS

D-

FORM A93-6 REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: D. W. Lemon 7-11 1968

WITNESSED AND UNDERSTOOD: J. A. Petty 7-11 1968

19___

North American Aviation, Inc. N 5778-21

DIVISION		
SPACE DOWNEY		
PROJECT NO: LR 6227	**CONTRACT NO.** ATR 492117	**DATE** 7-11-68

RESULTS AND/OR CHRONOLOGICAL LOG OF EVENTS

7-11-68 0848 RUN# 11 PERFORMED 7 SEC RANDOM EQUALIZATION IN THE X AXIS LEVEL A PLOT IS OUT OF TOLERANCE IN SEVERAL PLACES.

7-11-68 1007 RUN# 12 PERFORMED 6 SEC RANDOM EQUALIZATION IN THE X AXIS LEVEL A. THE EQUALIZATION WAS OUT OF TOLERANCE IN TWO PLACES. THE RTE GAVE AN OK TO TEST WITH ADJUSTMENTS.

7-11-68 1050 RUN# 13 PERFORMED 2½ MIN RANDOM VIBRATION IN THE X AXIS LEVEL A

7-11-68 11:15 THE RANDOM EQUALIZER (ASDE80) HAS BEEN REPROGRAMED FOR LEVEL B.

7-11-68 1320 RUN# 14 PREFORMED 6 SEC RANDOM EQUALIZATION IN THE X AXIS LEVEL B. EQUALIZATION IS OUT OF TOLERANCE

7-11-68 1430 RUN# 15 PREFORMED 6 SEC RANDOM EQUALIZATION IN THE X AXIS LEVEL B. EQUALIZATION IS OUT OF TOLERANCE

7-11-68 1503 RUN# 16 PRREFORMED 5 SEC RANDOM EQUALIZATION IN THE X AXIS LEVEL B. SEVERAL PLACES ARE SLIGHTLY OVER THE 3dB TOLERANCE LEVEL. THE RTE GAVE AN OK TO TEST WITH ADJUSTMENTS

7-11-68 1558 RUN# 17 PREFORMED 12½ MIN RANDOM VIBRATION IN THE X AXIS LEVEL B DATA SAMPLES WERE TAKEN AT 1, 6, 12 MINUTES

7-11-68 2ND SHIFT

SPECIMEN MOUNTED ON SLIP PLATE VIBRATION FIXTURE IN THE Y AXIS.

1700 RUN # 18 6 SEC EQUALIZATION PERFORMED IN THE Y AXIS AT LEVEL B EQUALIZATION WAS LOW IN ONE PLACE AT APPROX 55 CPS RTE GAVE OK TO TEST WITH ADJUSTMENTS.

FORM A93-0 REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: J P [illegible] 7-11 19 68

WITNESSED AND UNDERSTOOD: J. A Petty 7-11 19 68

[illegible] 19

North American Aviation, Inc. N 5778-22

DIVISION		
SPACE DIVISION		
PROJECT NO: LE6227	**CONTRACT NO.** ATR 492117	**DATE** 7-11-68

RESULTS AND/OR CHRONOLOGICAL EVENTS

7-11-68

17:50 RUN # 19 PERFORMED 12.5 MINUTE RANDOM VIBRATION TEST AT LEVEL B IN THE Y AXIS. SAMPLES WERE TAKEN AND PLOTTED AT 1, 6 & 12 MINUTES DURING RUN, BALLANTINE METER INDICATED THE RUN LEVEL WAS 2.3 GRMS.

18:45 PHOTOGRAPH TAKEN OF SPECIMEN MOUNTED ON VIBRATION FIXTURE IN THE Y AXIS.

Z-AXIS

SPECIMEN MOUNTED ON VIBRATION FIXTURE IN THE Z AXIS.

19:12 RUN # 20 8 SECOND EQUALIZATION PERFORMED IN THE Z AXIS AT LEVEL B. BALLANTINE METER INDICATED THE RUN WAS AT 2.2 G RMS. PLOT HAD SEVERAL OUT OF TOLERANCE CONDITIONS IN THE LOW FREQUENCY RANGE. ANOTHER EQUALIZATION REQUIRED

19:48 RUN # 21 10 SECOND EQUALIZATION PERFORMED IN THE Z AXIS AT LEVEL B. BALLANTINE METER INDICATED THE RUN WAS AT 2.2 G RMS. AT 60 CPS THE +3db TOLERANCE WAS EXCEEDED BUT THE RTE GAVE PERMISSION TO TEST WITH ADJUSTMENTS.

21:30 RUN # 22 PERFORMED 12.5 MINUTE RANDOM VIBRATION TEST AT LEVEL B IN THE Z AXIS. SAMPLES WERE TAKEN AND PLOTTED AT 1, 6 & 12 MINUTES. DURING RUN, BALLANTINE METER INDICATED THE RUN LEVEL WAS 2.2 G RMS

21:43 TEST COMPLETE, SPECIMEN REMOVED FROM FIXTURE. NO VISUAL DEFORMATION OR DAMAGE NOTED.

FORM A93-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: [signature] 7-11 1968

WITNESSED AND UNDERSTOOD: [signature] 7-11 1968

19

North American Aviation, Inc. N 5778-23

DIVISION		
SPACE DOWNEY		
PROJECT NO: LR 6227	CONTRACT NO. ATR 492117	DATE 7-12-68

CONCLUSION: THE GUIDANCE AND NAVIGATIONAL FILTER BOX ASSY. HAS SUCCESSFULLY COMPLETED THE REQUESTED VIBRATION ENVIRONMENT. THE PRECEEDING TEST PHASE HAS BEEN CONDUCTED IN ACCORDANCE WITH THE APPROVED TEST REQUEST. (TR 492117) AND SUPPORTING DOCUMENTS. DATA SUPPORTING THIS TEST ARE NOTED OR REFERENCED HERE IN.

L4T RESPONSIBLE TEST ENGINEER R. Hedgpath

NR/SD INSPECTION DEPARTMENT M.C. Fowler 7-12-68

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: H. W. Simon 7-12 19 68

WITNESSED AND UNDERSTOOD: M.C. Fowler 7-12 19 68

_____ 19 ___

FORM A93-G REV. 7-66

RANDOM

2.5 MINUTES

LR 6227 MEASUREMENT NUMBER LEVEL A- RUN NUMBER

TR 492117 CONTROL ( ), RESPONSE ( ) AXIS DATE 19

TEST TITLE G+N FILTER BOX ASSY

OVERALL G RMS 11.5 SAMPLING

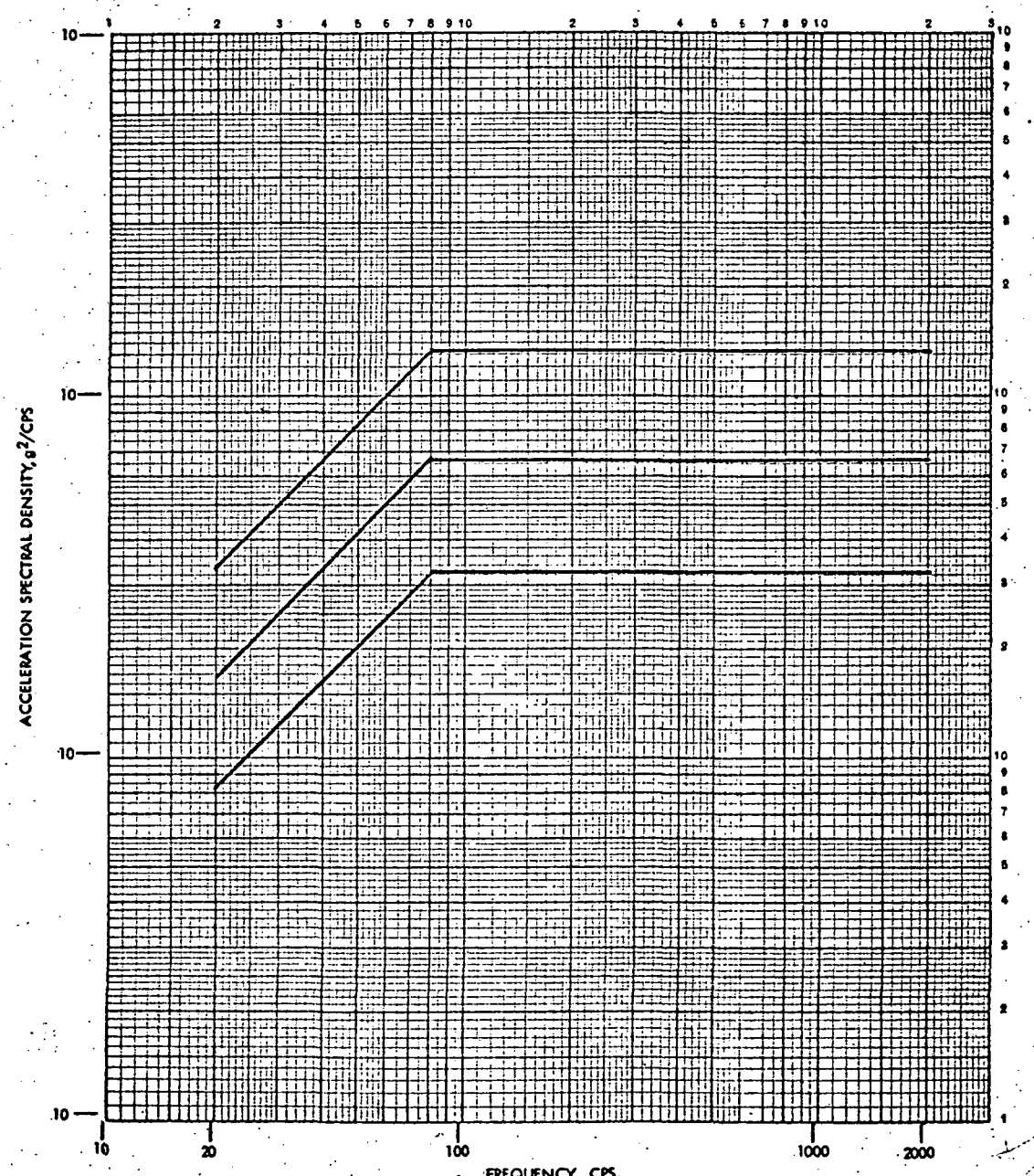
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS 1-2 4 SEC CROSSOVERS 100-500 CPS

FULL SCALE 1.0 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR SPECIMEN P/N 1336-442320

REMARKS S/N



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RANDOM

12.5 MINUTES

LR 6227 MEASUREMENT NUMBER LEVEL B RUN NUMBER

TR 492117 CONTROL ( ), RESPONSE ( ) AXIS DATE 19

TEST TITLE G+N FILTER BOX ASSY

OVERALL G RMS 2.4 SAMPLING

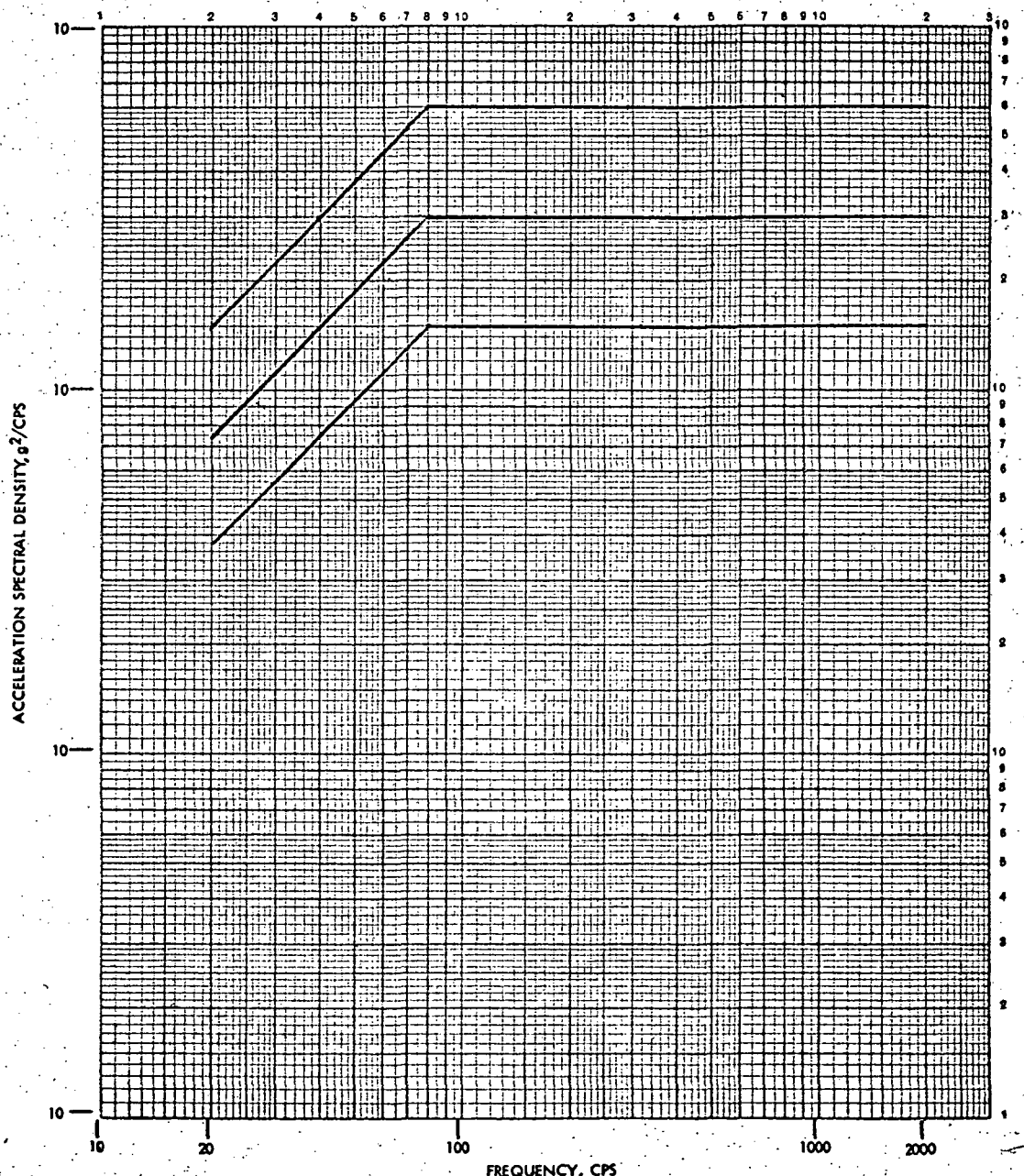
FILTER BW, 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS [redacted] 1-2-4 SEC CROSSOVERS 100-500 CPS

FULL SCALE [redacted] .01 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR SPECIMEN P/N V36-442330

REMARKS S/N



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SINUSOIDAL

LR 6227 MEASUREMENT NUMBER 1 RUN NUMBER 1

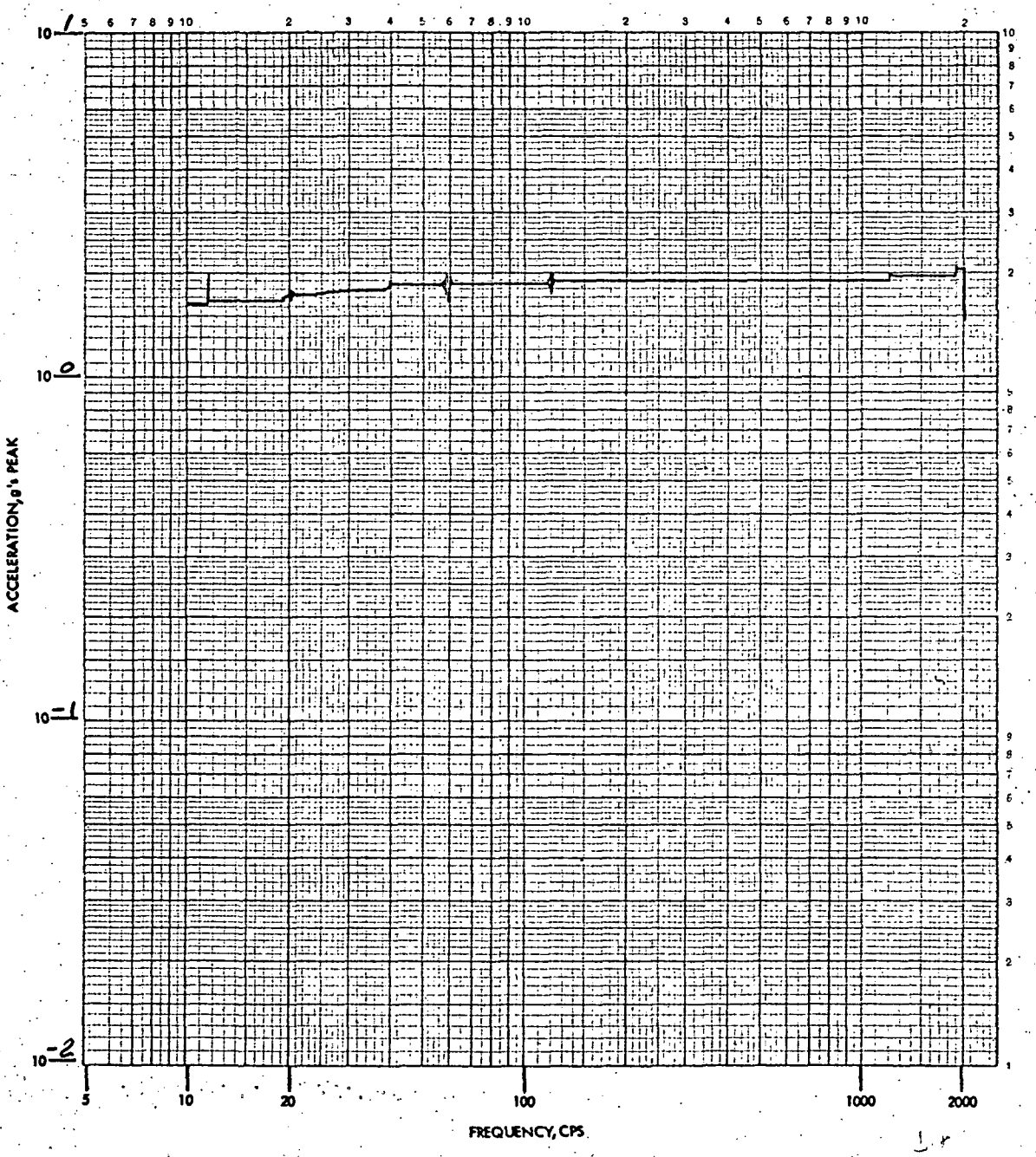
TR 492117 CONTROL (✓), RESPONSE ( ) AXIS X DATE 2-11 19 68

TEST TITLE C & N FILTER BOX ASSY QUAL-TEST.

FULL SCALE 10.0 gPK SWEEP: UP (✓) DOWN ( )

OPERATOR R.E.G. SPECIMEN P/N V36-442330

REMARKS S/N CC362AAA3858



Form 2974-N-1 Rev 8-67

SINUSOIDAL

LR 6227 MEASUREMENT NUMBER 1 RUN NUMBER 2

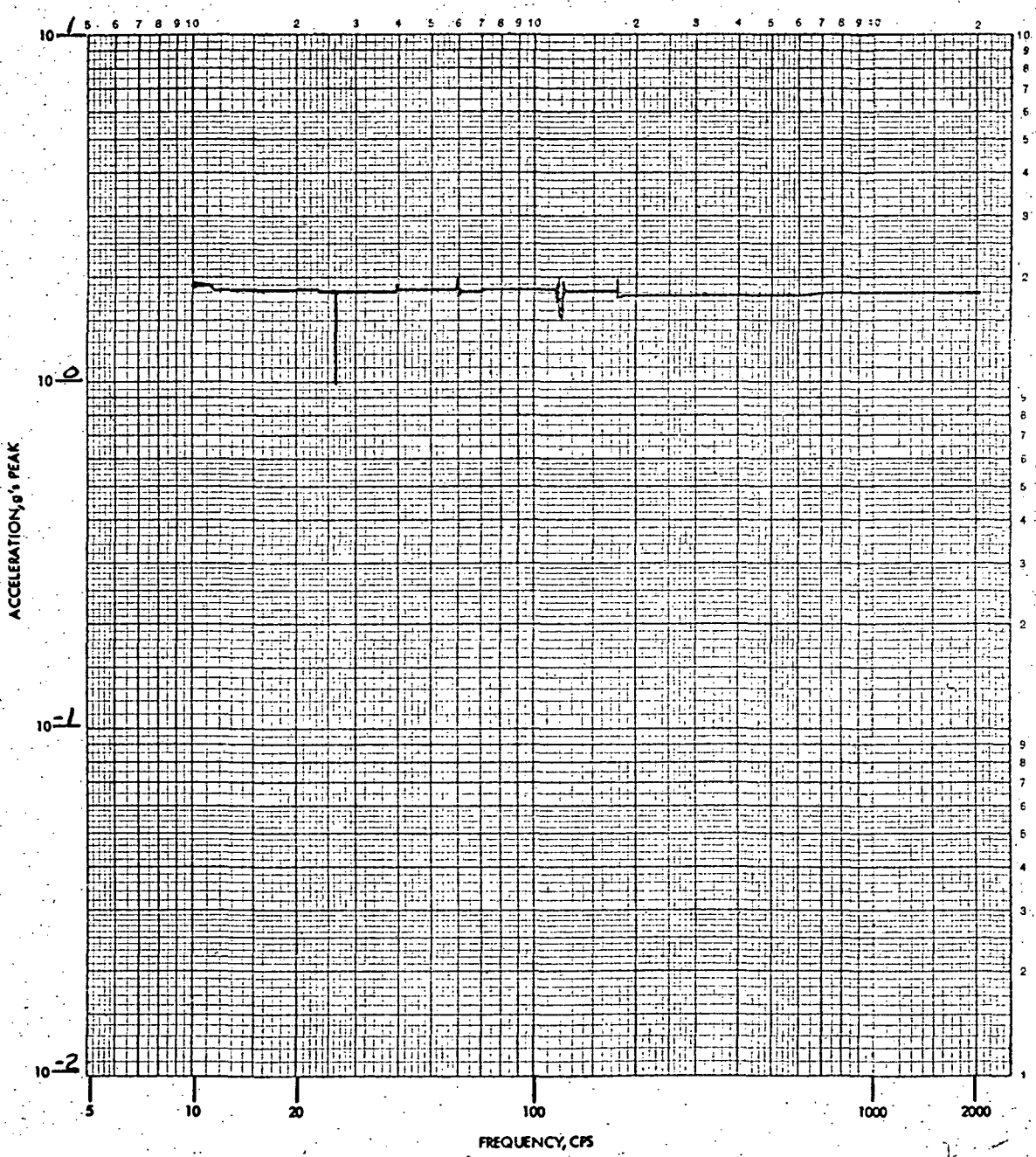
TR 492117 CONTROL (L); RESPONSE ( ) AXIS Y DATE 2-11 19 68

TEST TITLE G & N FILTER BOX ASSY QUAL-TEST

FULL SCALE 10.0 gPK SWEEP: UP (L) DOWN ( )

OPERATOR R.Q.H. SPECIMEN P/N V36-442330

REMARKS S/N 06362 AAH 3858



Form 2974-N-1 Rev 8-67

SINUSOIDAL

LR 6227 MEASUREMENT NUMBER 1 RUN NUMBER 3

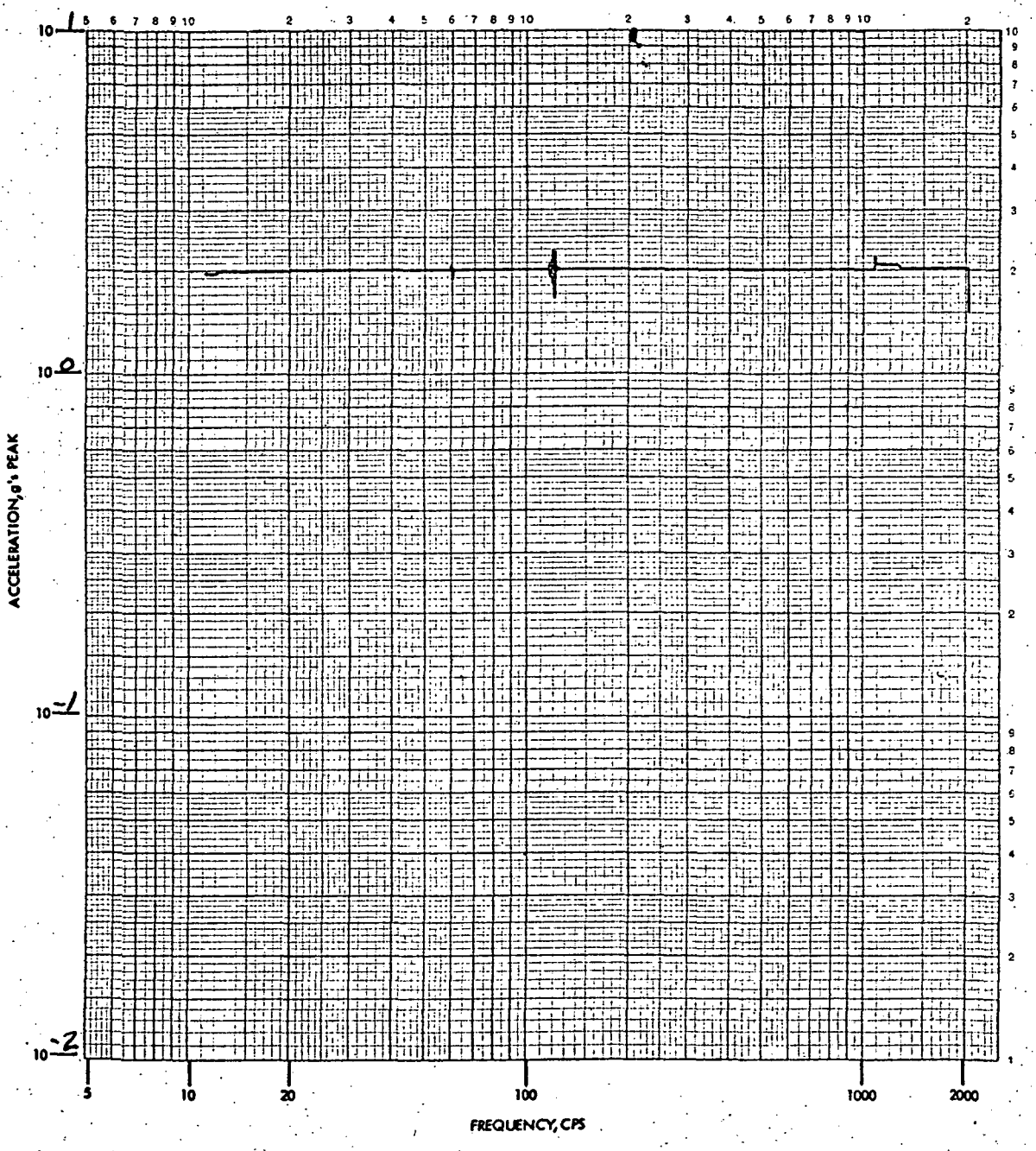
TR 49217 CONTROL (✓), RESPONSE ( ) AXIS Z DATE 7-11 19 68

TEST TITLE G & N FILTER BOX ASSY QUAL TEST

FULL SCALE 10.0 gPK SWEEP: UP (✓) DOWN ( )

OPERATOR R.O.G. SPECIMEN P/N V36-442330

REMARKS S/N 06362 AAH 3858



Form 2974-N-1 Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Z RUN NUMBER 4

TR 49217 CONTROL (X) RESPONSE ( ) AXIS Z DATE 7-11 19 68

TEST TITLE GFN FILTER BOX ASSY

OVERALL G RMS 13 SAMPLING SPEC EQUAL

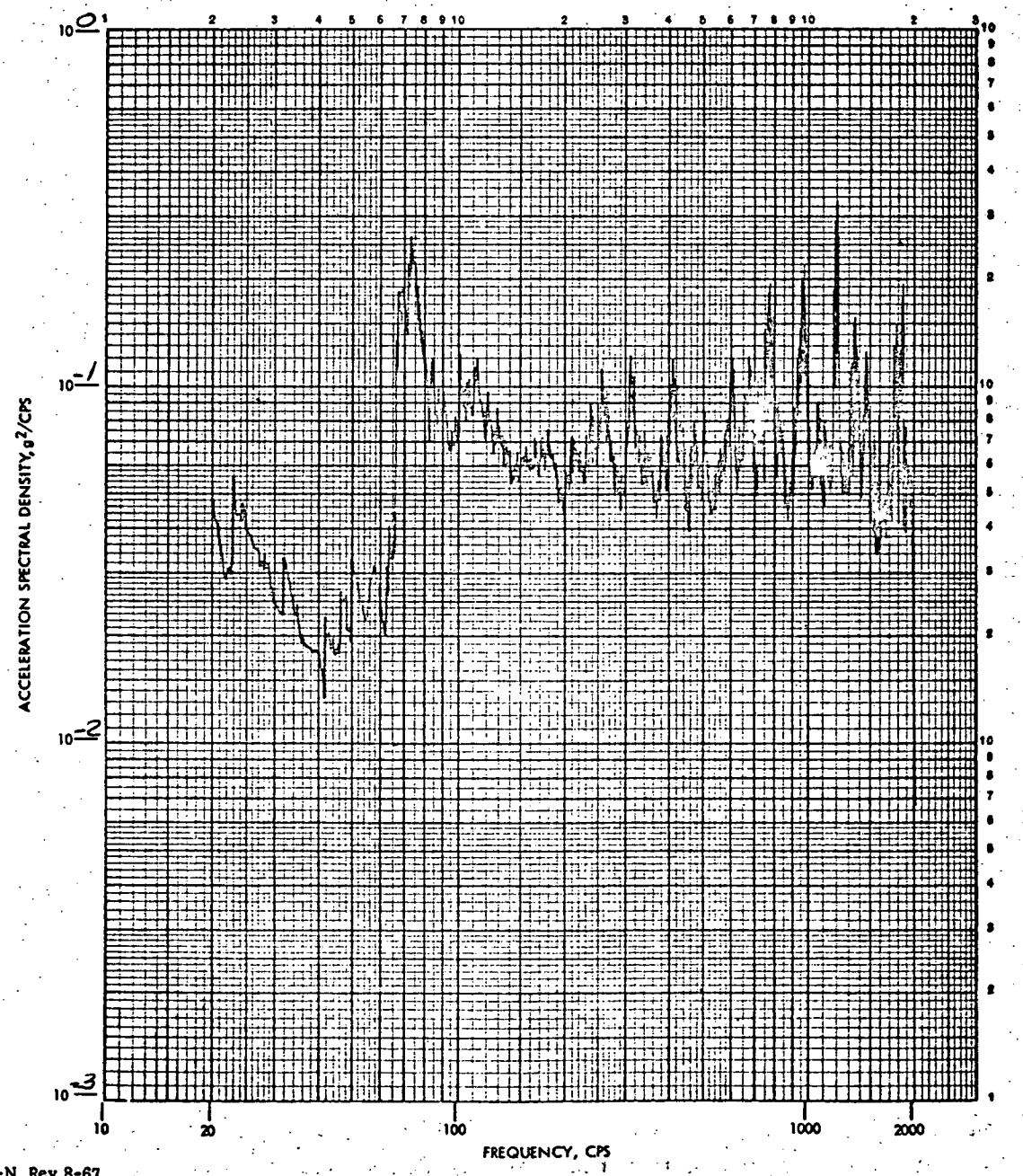
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 1. g^2/ CPS AVG TIME 2.5 SEC

OPERATOR VAI SPECIMEN P/N 636-442330

REMARKS OUT OF SPEC. S/N 06362-AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Z RUN NUMBER 5

TR 492117 CONTROL ( ) RESPONSE ( ) AXIS Z DATE 7-11 19 68

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 14.3 SAMPLING SPEC EQUAL

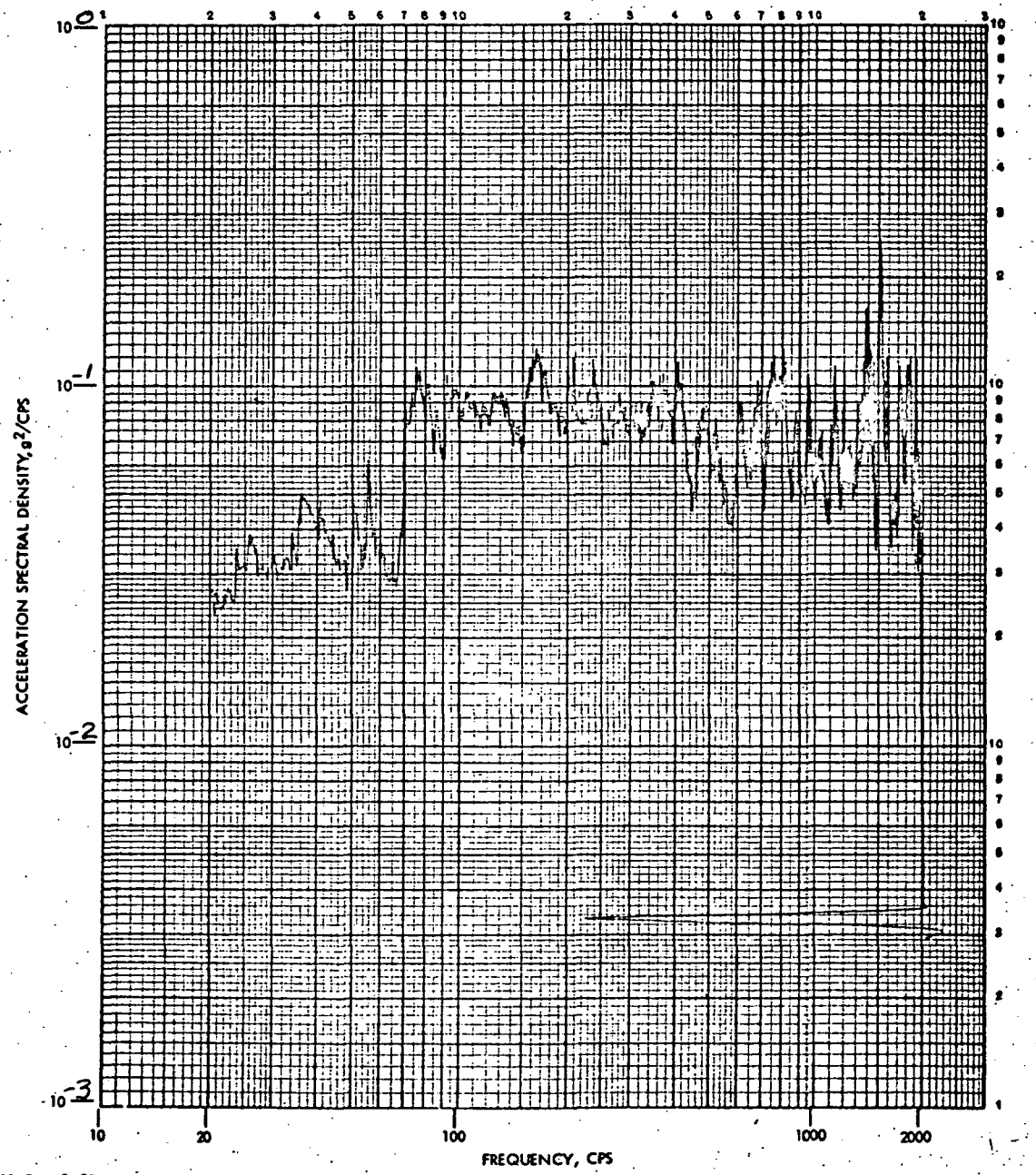
FILTER BW$_e$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 6 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR VAL SPECIMEN P/N V336-442330

REMARKS OUT OF SPEC S/N 06362-AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1Z RUN NUMBER 6

TR 492117 CONTROL ( ), RESPONSE ( ) AXIS Z DATE 7-11 19 68

TEST TITLE G+N FILTER BOX ASSY

OVERALL G RMS 11.3 SAMPLING EQUAL

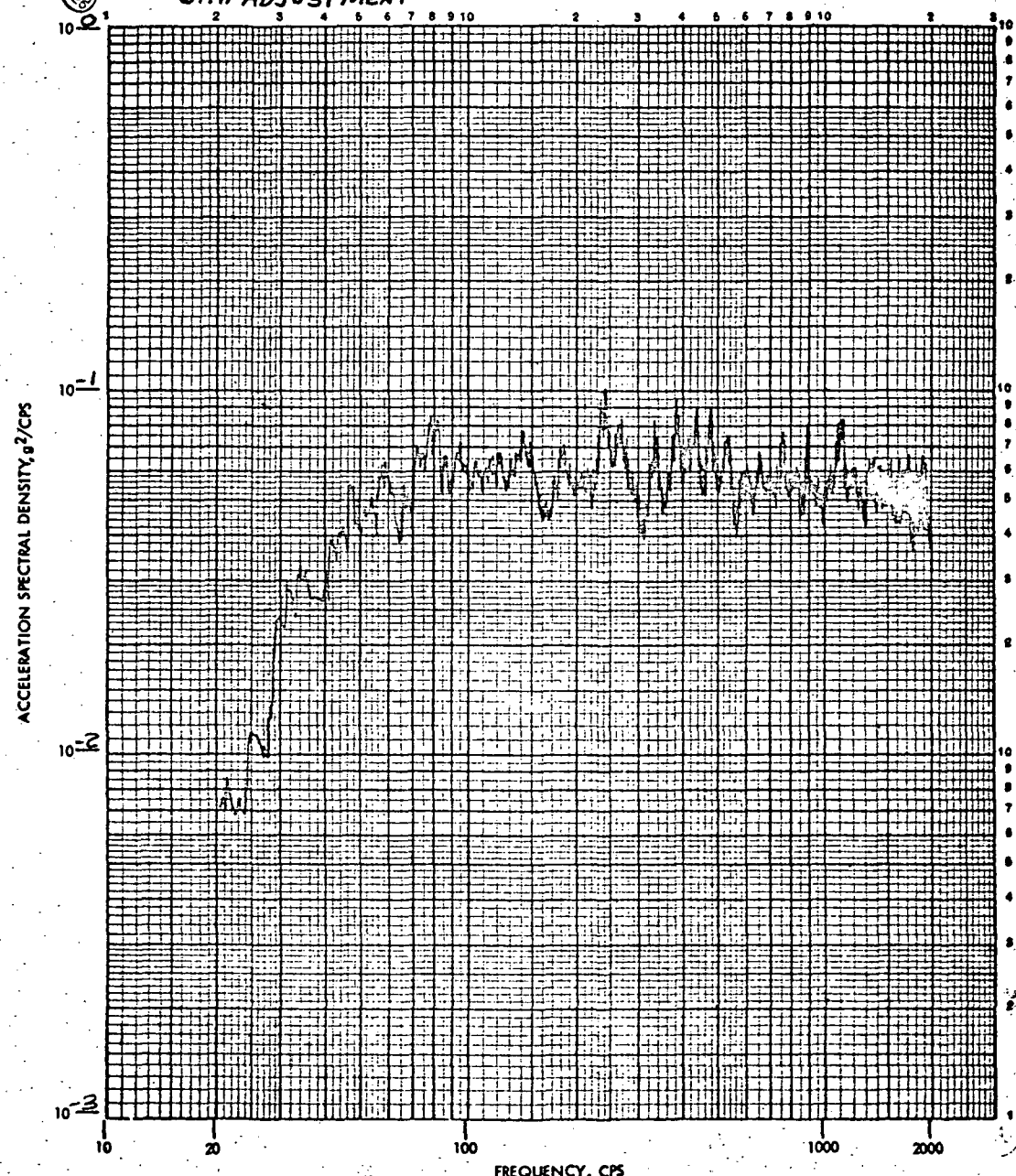
FILTER BW$_e$ 5, 10, 20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5, 10, 20 SEC CROSSOVERS 100 - 500 CPS

FULL SCALE 1.0 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR Dwd SPECIMEN P/N V36-442330

7-11-68 REMARKS OK TO TEST P. W. Simon WITH ADJUSTMENT S/N 06362-AAH385B



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Z RUN NUMBER 7

TR 492117 CONTROL (V) RESPONSE ( ) AXIS Z DATE 2-11 19 68

TEST TITLE GEN FILTER BOX ASSY

OVERALL G RMS 11.3 SAMPLING 2 MIN

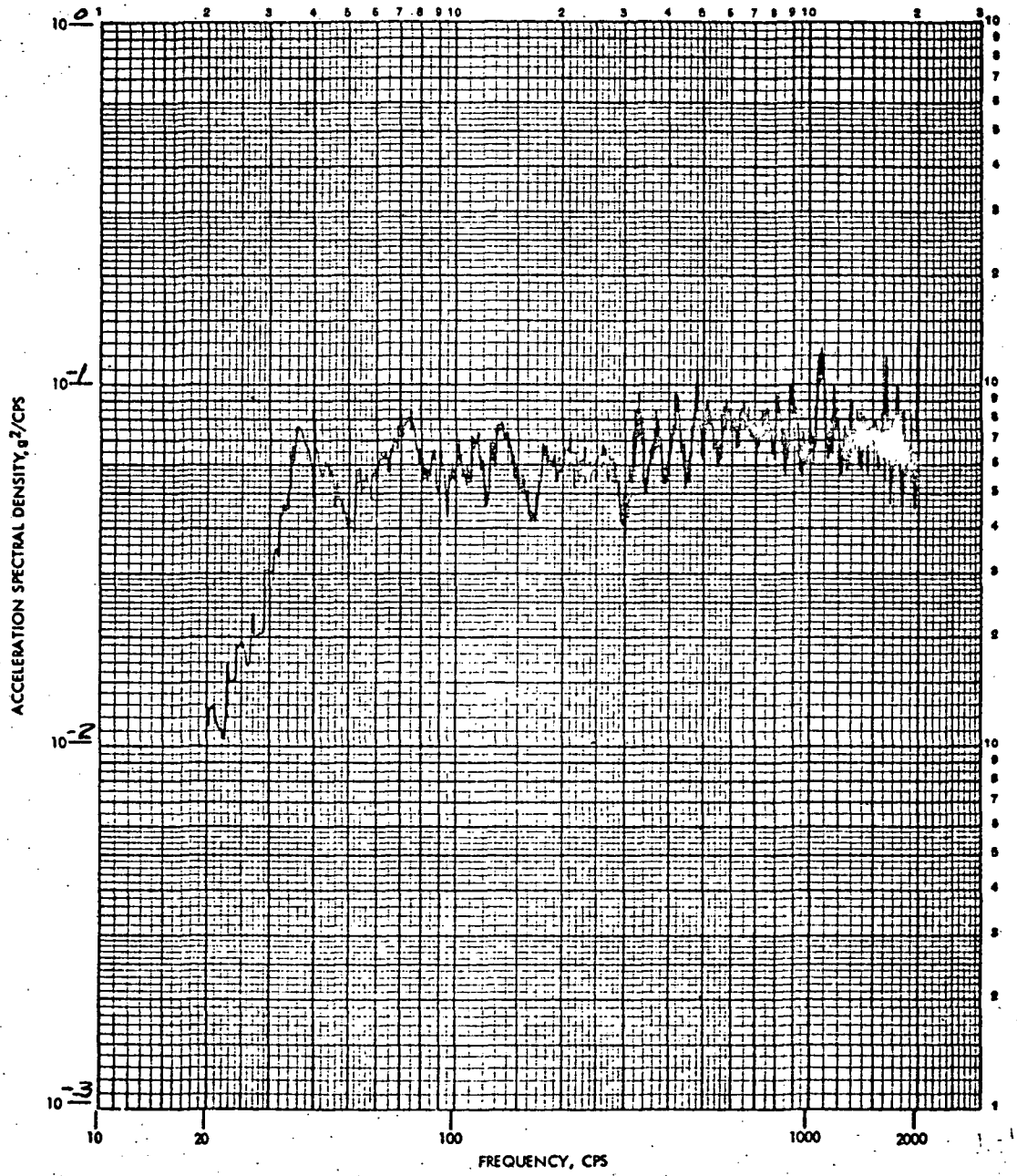
FILTER BW$_e$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 1. g^2/ CPS AVG TIME 2.5 SEC

OPERATOR VAI SPECIMEN P/N V36-442330

REMARKS S/N 06362-AAH3858



Form 2974-N Rev 8-67

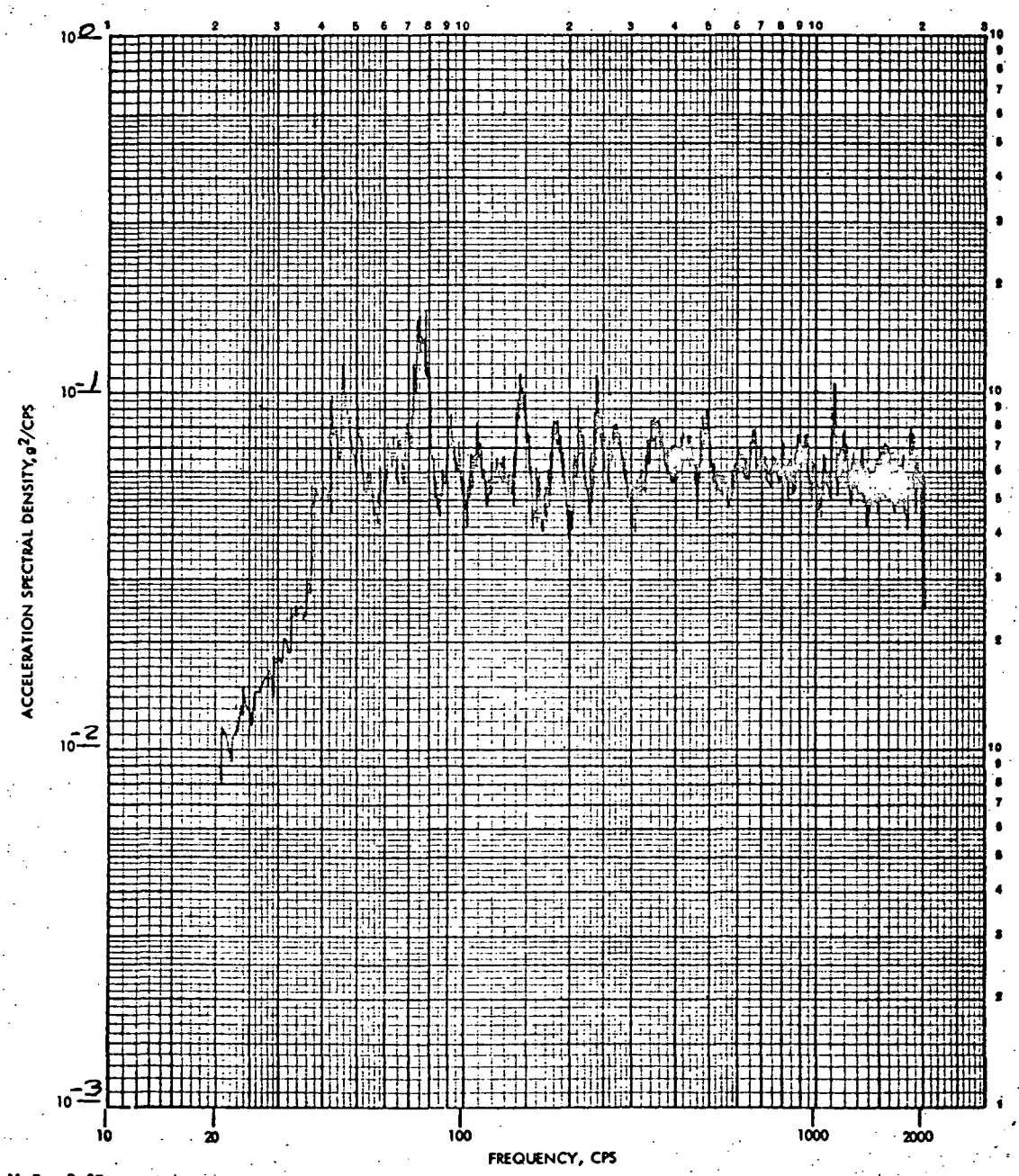
RANDOM

LR 6227 MEASUREMENT NUMBER 1Y RUN NUMBER 8

TR 492117 CONTROL (✓), RESPONSE ( ) AXIS Y DATE 7-11 19 68

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS	11.7	SAMPLING	EQUAL
FILTER BW$_e$	5-10-20 CYCLES	LOOP TIME	5 SEC
SWEEP SPEEDS	.5-1-2 SEC	CROSSOVERS	100-500 CPS
FULL SCALE	1.0 g^2/CPS	AVG TIME	2.5 SEC
OPERATOR	YAL	SPECIMEN P/N	V36-442336
REMARKS	OUT OF SPEC.	S/N	06362-AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1Y RUN NUMBER 9

TR 49217 CONTROL (✓), RESPONSE ( ) AXIS Y DATE 7-11 19 69

TEST TITLE G+N FILTER BOX ASSY.

OVERALL G RMS 11.5 SAMPLING EQUAL

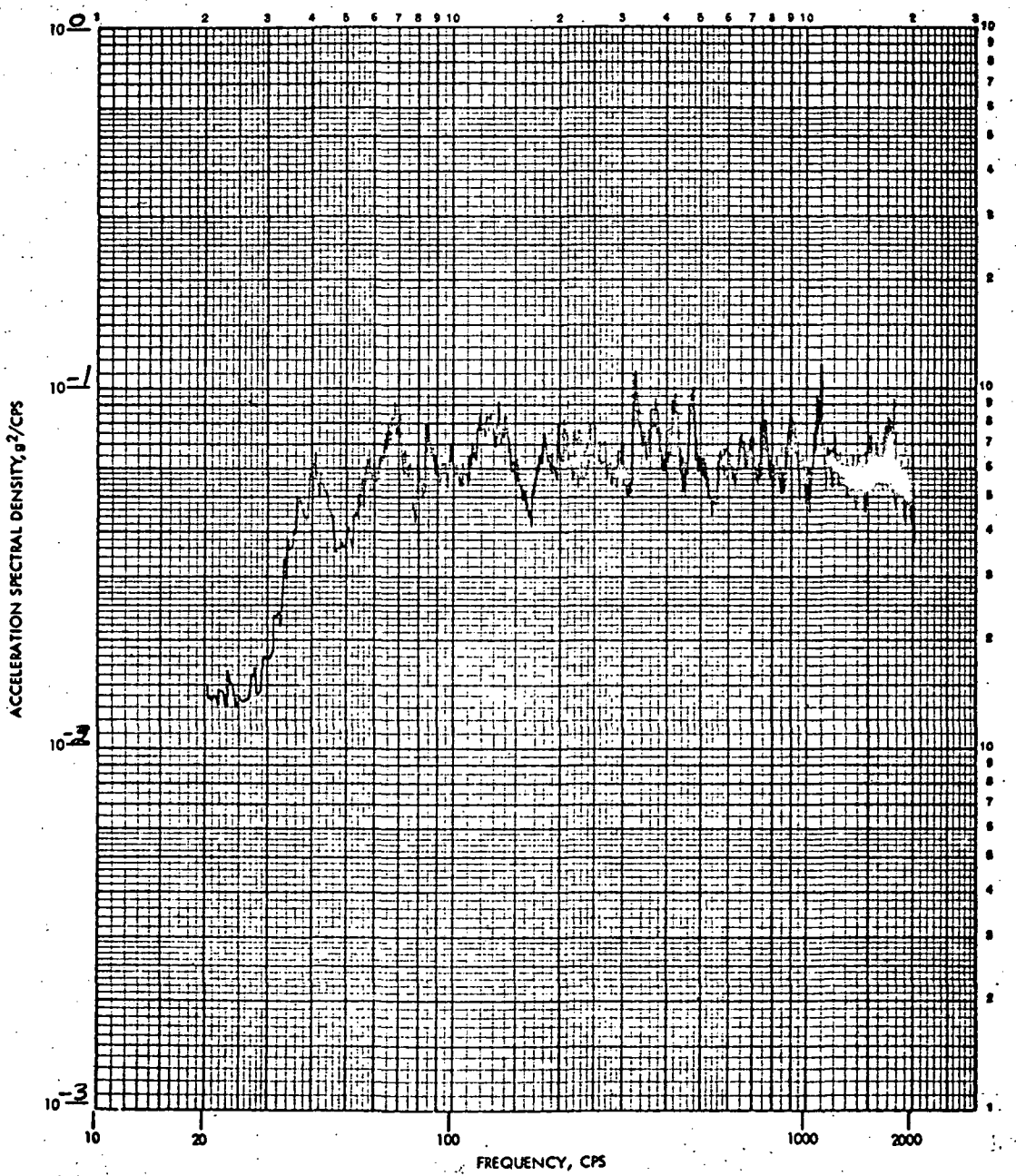
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 1.0 g^2/CPS AVG TIME 2.5 SEC

OPERATOR VAL SPECIMEN P/N V36-442330

REMARKS OK TO TEST R.W. Simon S/N 06362-AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Y RUN NUMBER 10

TR 49217 CONTROL ( ), RESPONSE ( ) AXIS Y DATE 3-11 19 68

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 11.3 SAMPLING 2 MW

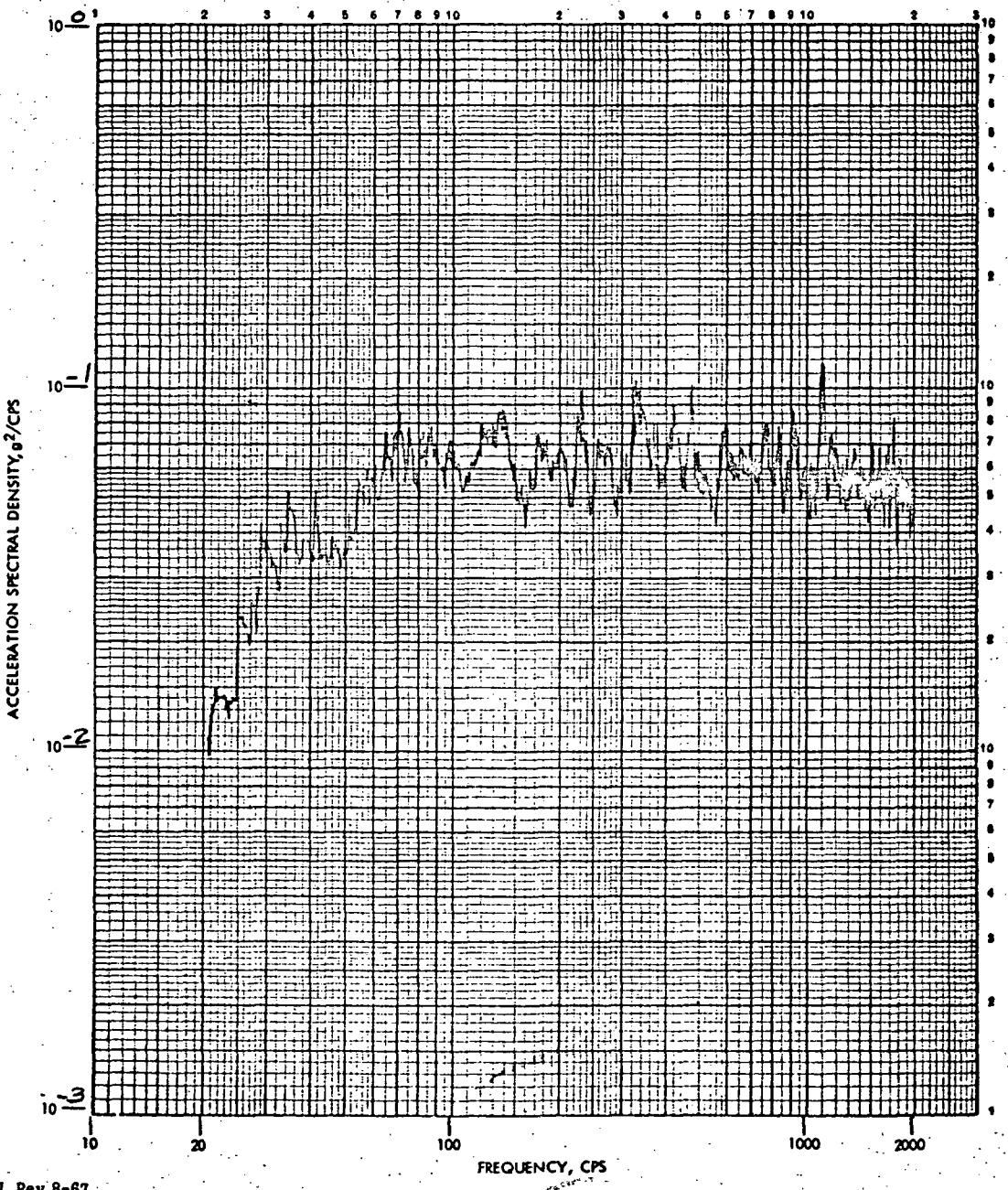
FILTER BW$_e$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 1 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR VAI SPECIMEN P/N 636-442330

REMARKS S/N 06362AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 11

TR 492117 CONTROL (✓) RESPONSE ( ) AXIS X DATE 7-11 1968

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 12.3 SAMPLING SPEC EQUAL

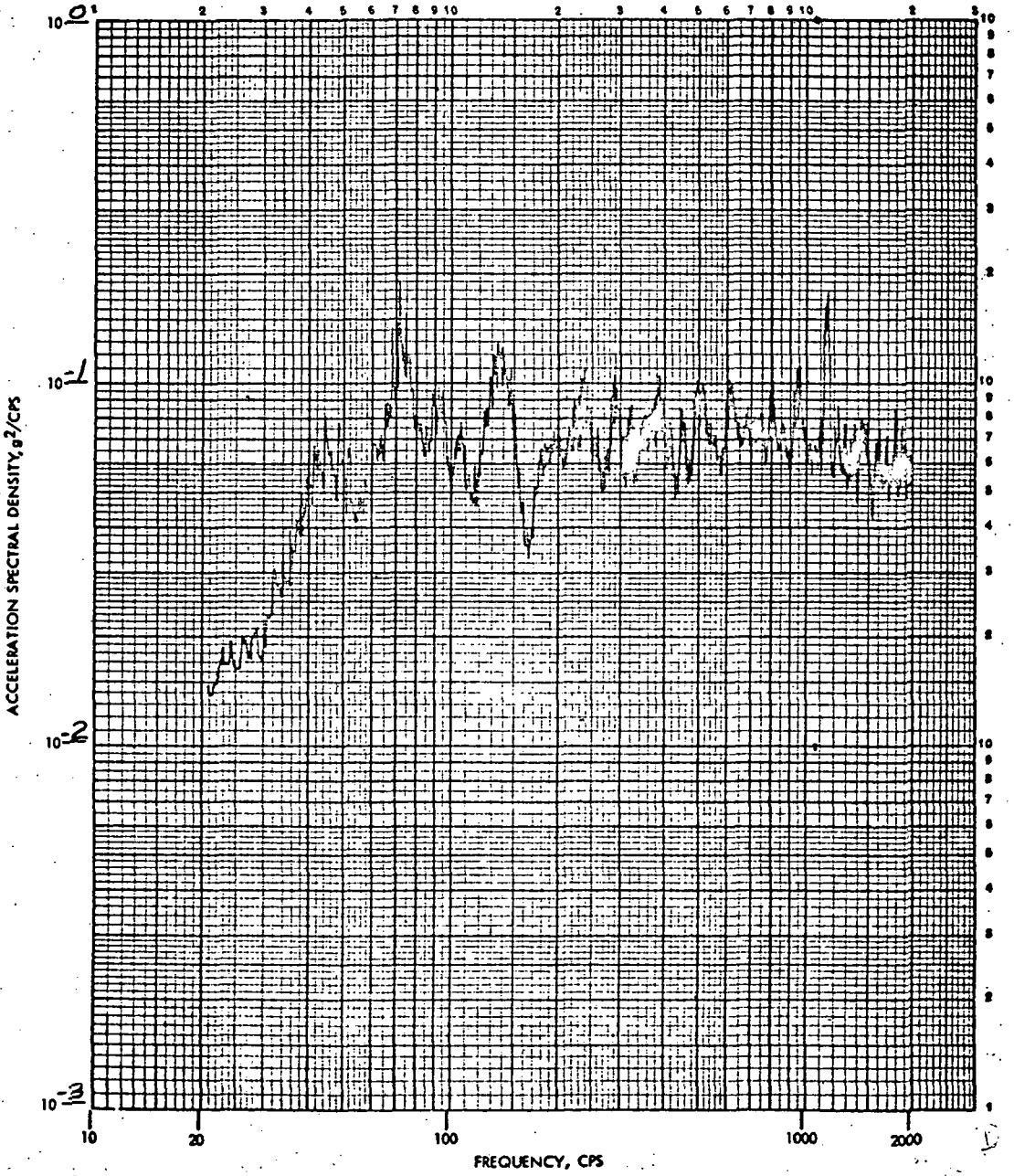
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 1 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR VAL SPECIMEN P/N V36-442330

REMARKS OUT OF SPEC S/N 06362AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 12

TR 492117 CONTROL (✓) RESPONSE ( ) AXIS X DATE 2-11 1968

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 12.5 SAMPLING SPEC EQUAL

FILTER BW, 5-10-20 CYCLES LOOP TIME 5 SEC

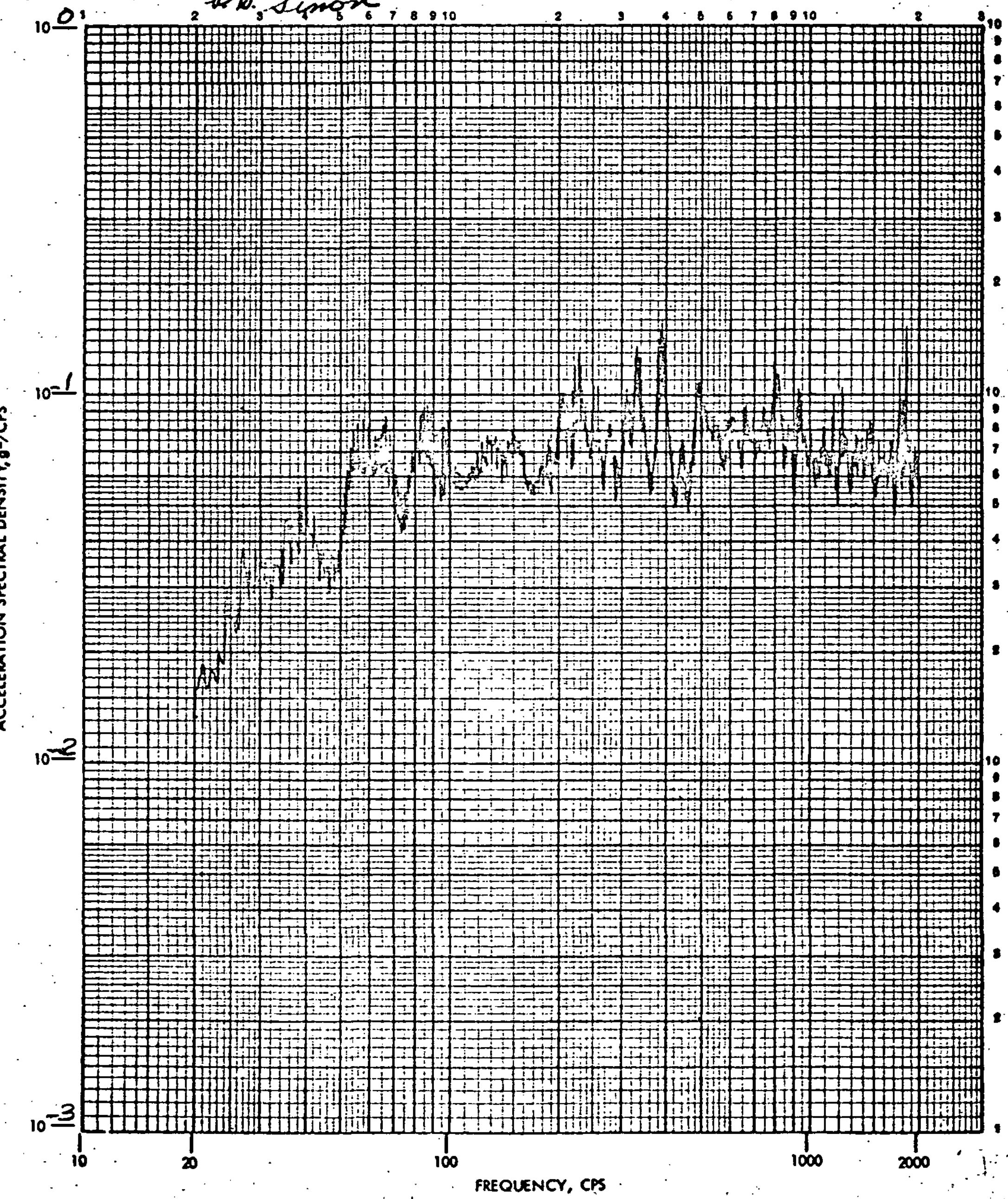
SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 1 g^2/CPS AVG TIME 2.5 SEC

OPERATOR VA1 SPECIMEN P/N V36-442330

REMARKS OK TO TEST WITH ADJUSTMENTS S/N 06362AAH3858

R.W. Simon



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 13

TR 492117 CONTROL (V), RESPONSE ( ) AXIS X DATE 7-11 19 68

TEST TITLE GFN FILTER BOX ASSY

OVERALL G RMS 12.3 SAMPLING 2 MIN

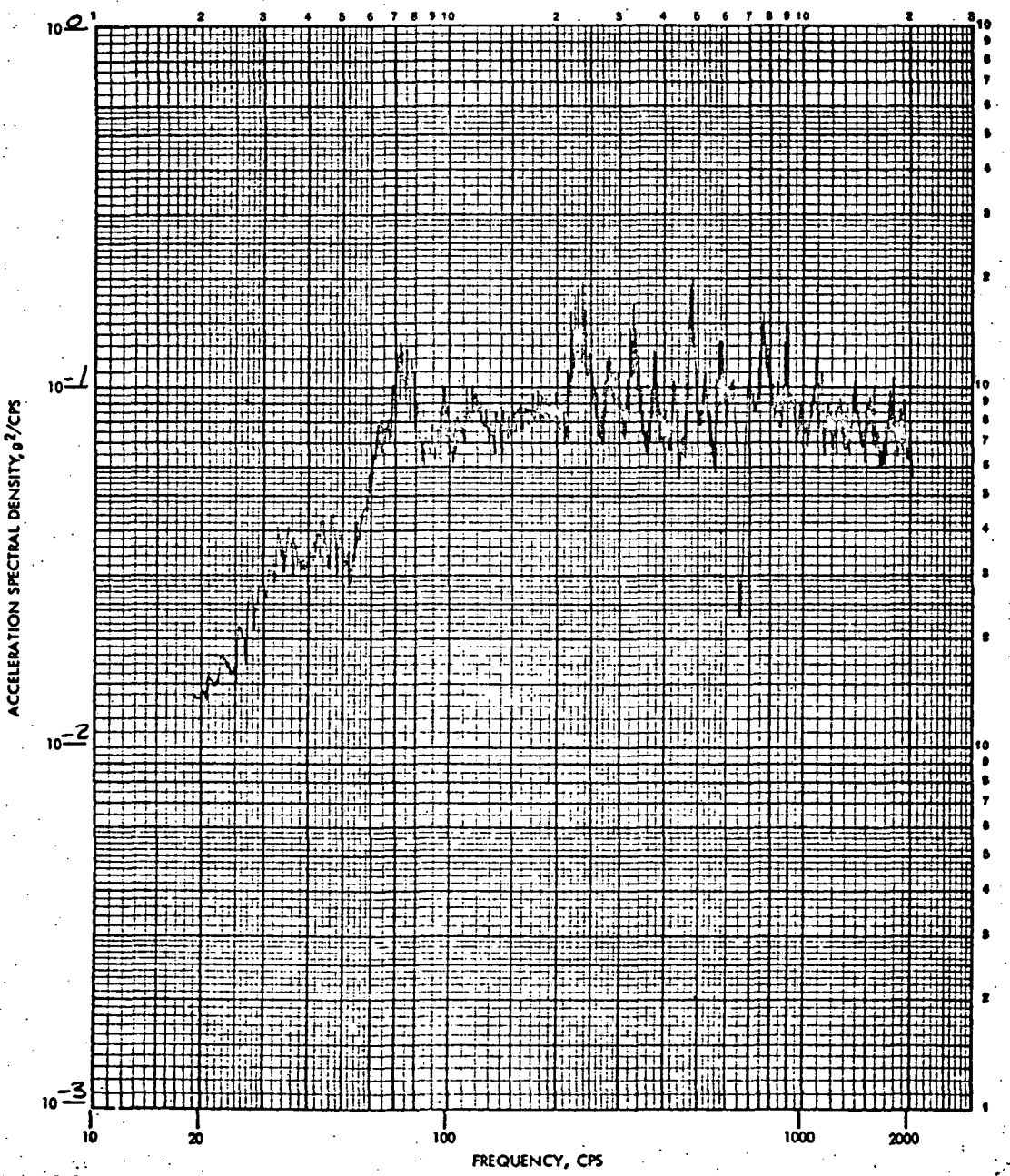
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 1 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR VAI SPECIMEN P/N V36-442330

REMARKS S/N 06362 AH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 14

TR 49217 CONTROL (V), RESPONSE ( ) AXIS X DATE 7-11 1968

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 2.5 SAMPLING SPEC EQUAL

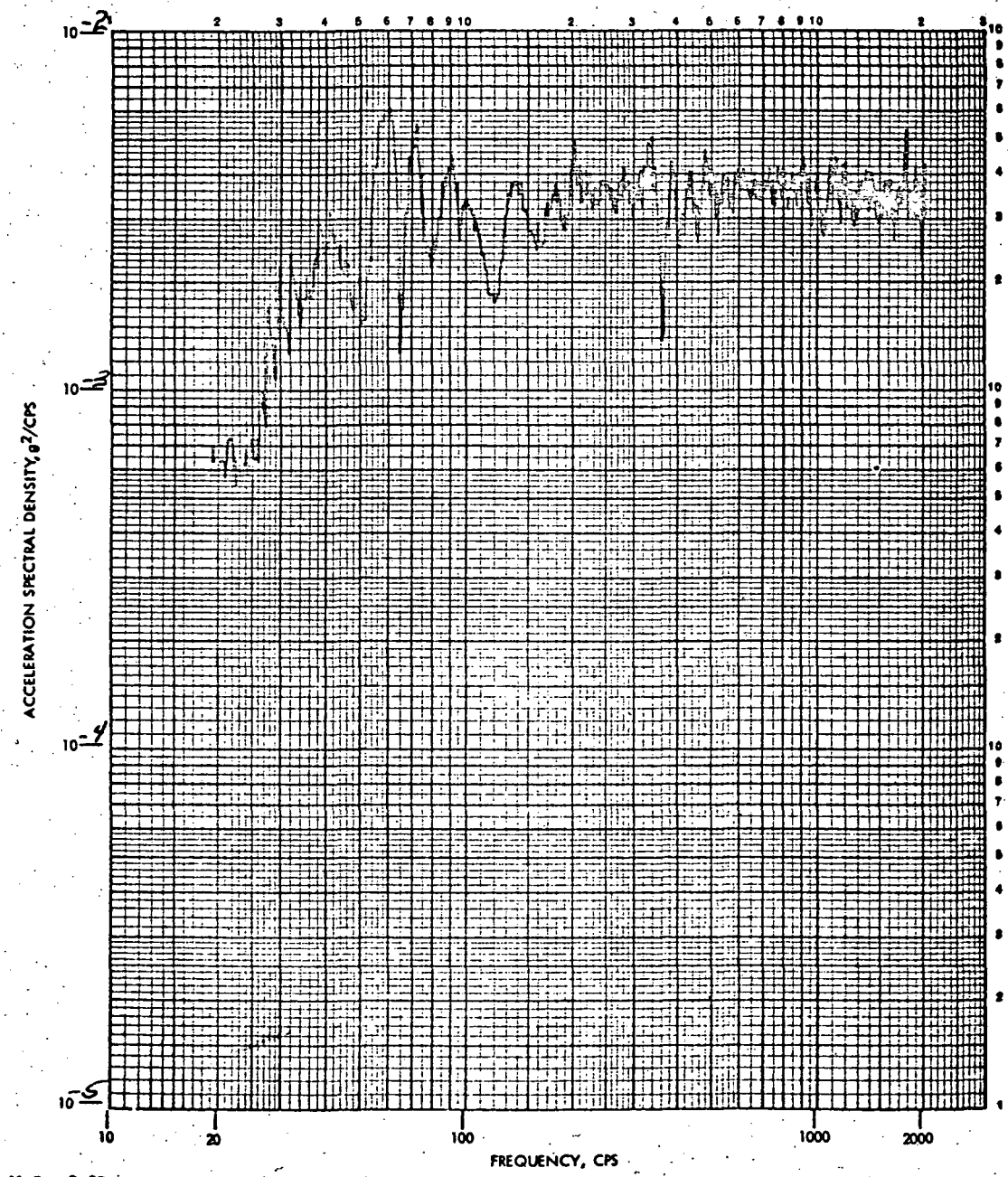
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE .01 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR VAI SPECIMEN P/N V36-442330

REMARKS OUT OF SPEC. S/N 0636 2AAH385B



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 15

TR 49217 CONTROL (✓) RESPONSE ( ) AXIS X DATE 7-11 19 68

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 2.5 SAMPLING SPEC EQUAL

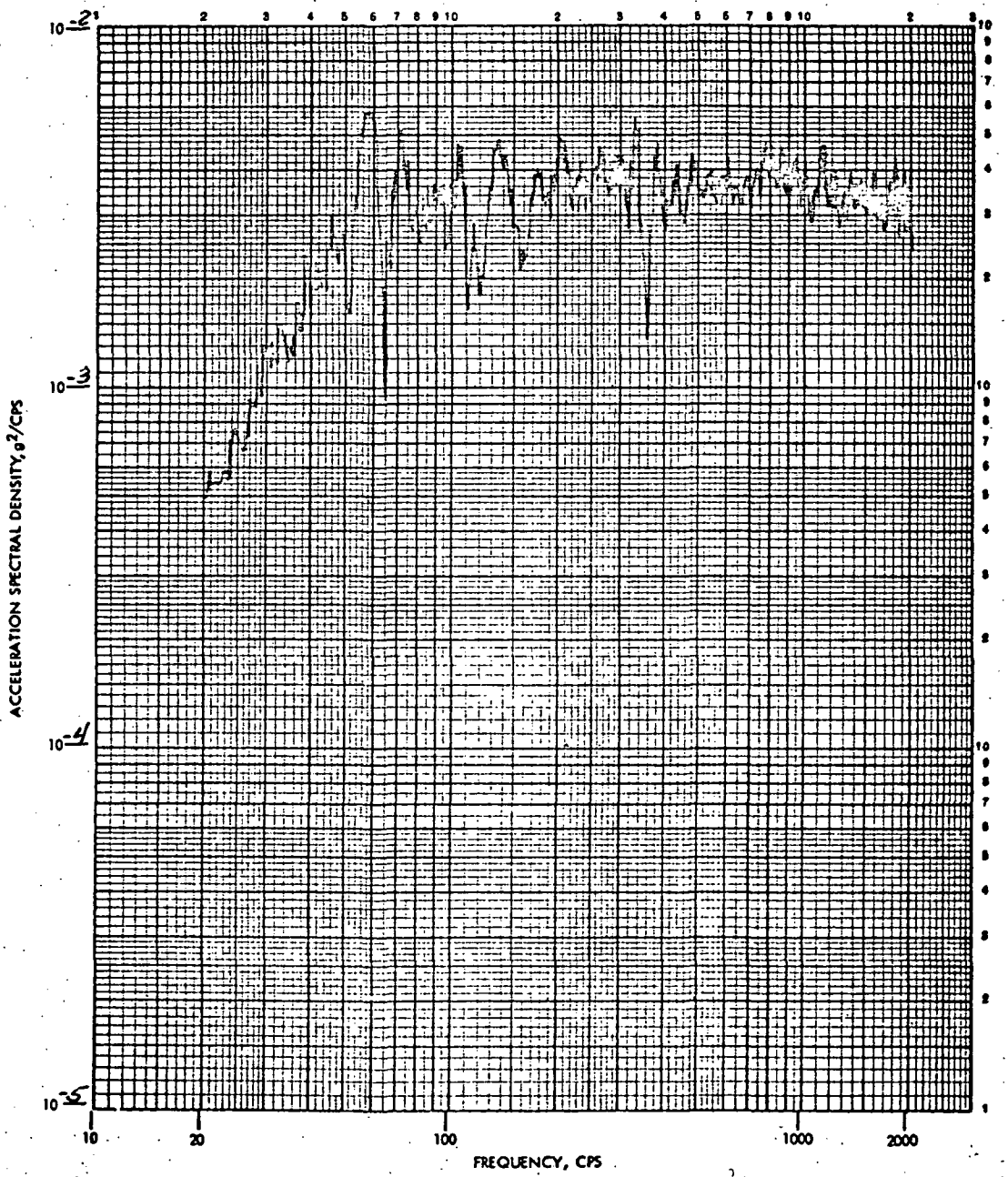
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE .01 g^2/CPS AVG TIME 2.5 SEC

OPERATOR VAL SPECIMEN P/N 636-442330

REMARKS OUT OF SPEC. S/N 06362AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 16

TR 492117 CONTROL ( ) RESPONSE ( ) AXIS X DATE 7-11 1968

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 2.45 SAMPLING SPEC EQUAL

FILTER BW$_e$ 5-10-20 CYCLES LOOP TIME 65 SEC

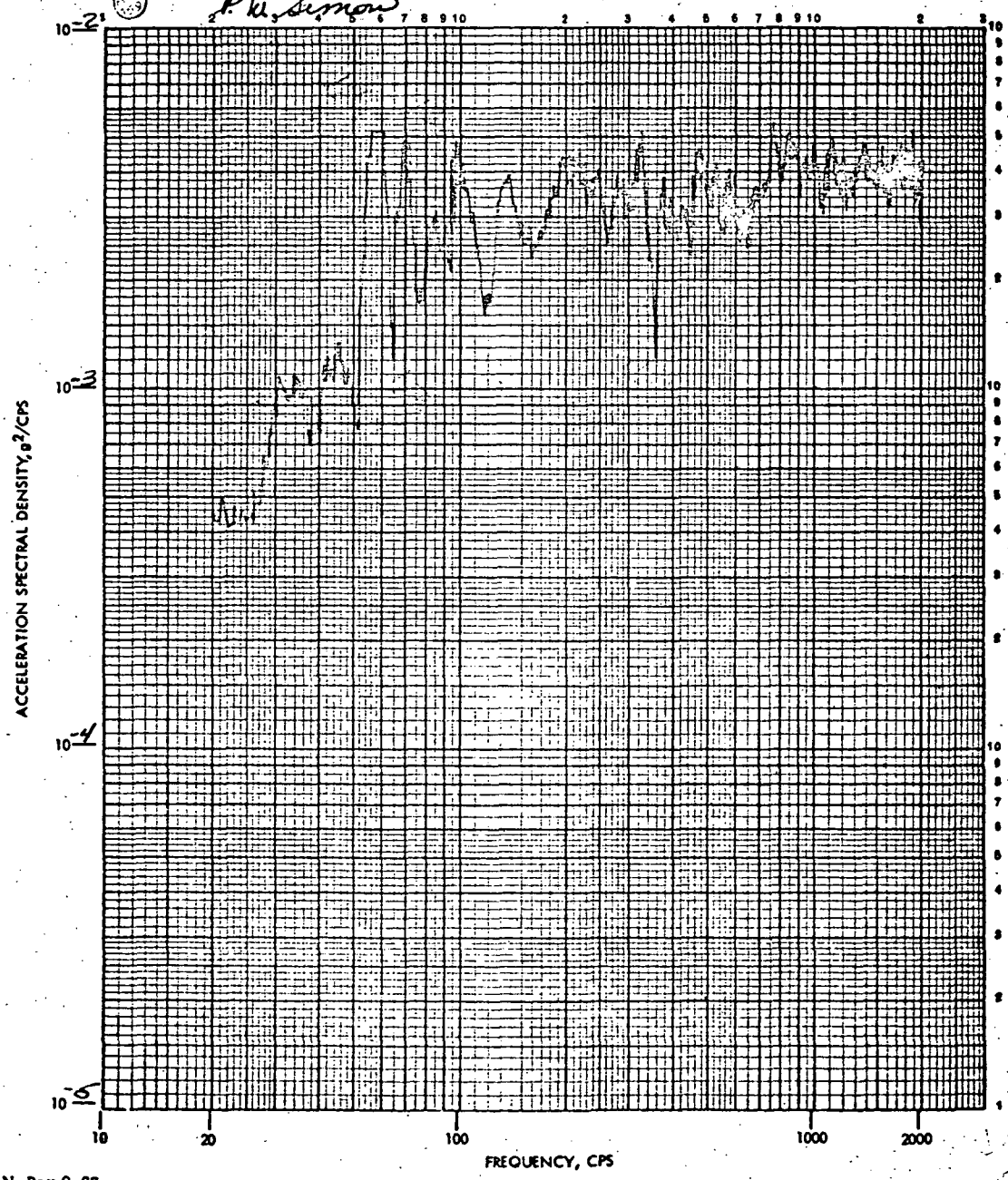
SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE .01 g^2/CPS AVG TIME 21.5 SEC

OPERATOR VAL SPECIMEN P/N V36-442330

REMARKS OK TO TEST WITH ADJUSTMENTS S/N 06362AAH3858

P.W. Simon



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 17

TR 49217 CONTROL (✓), RESPONSE ( ) AXIS X DATE 7-11 19 68

TEST TITLE G & N FILTER BOX ASSY

OVERALL G RMS 2.5 SAMPLING 1 MIN

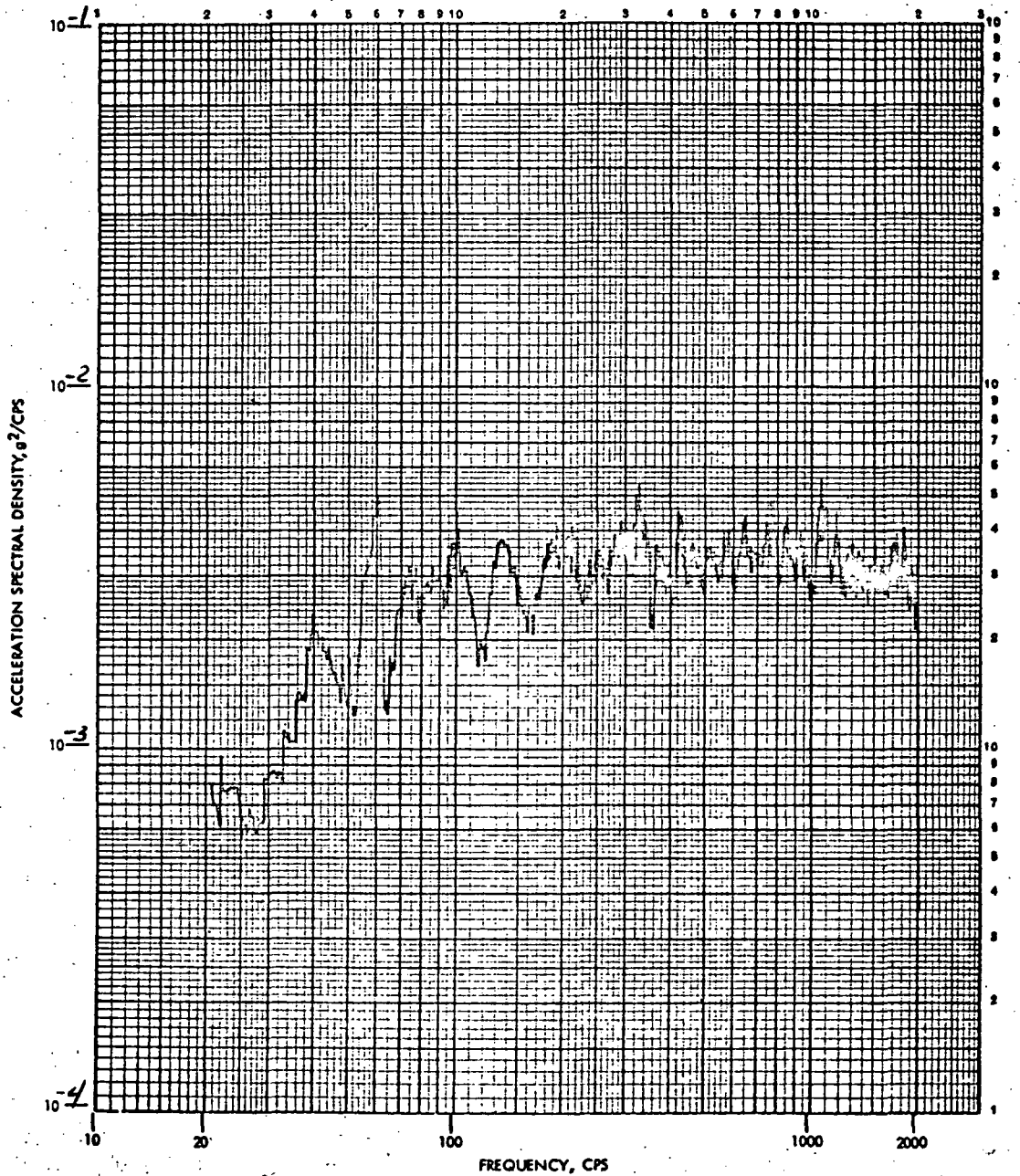
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 0.1 g^2/CPS AVG TIME 2.5 SEC

OPERATOR C.D.G. SPECIMEN P/N 1136-442330

REMARKS S/N EC362APH3848



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 17

TR 492117 CONTROL ( ), RESPONSE ( ) AXIS X DATE 7-11 1968

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 2.49 SAMPLING 6 MIN

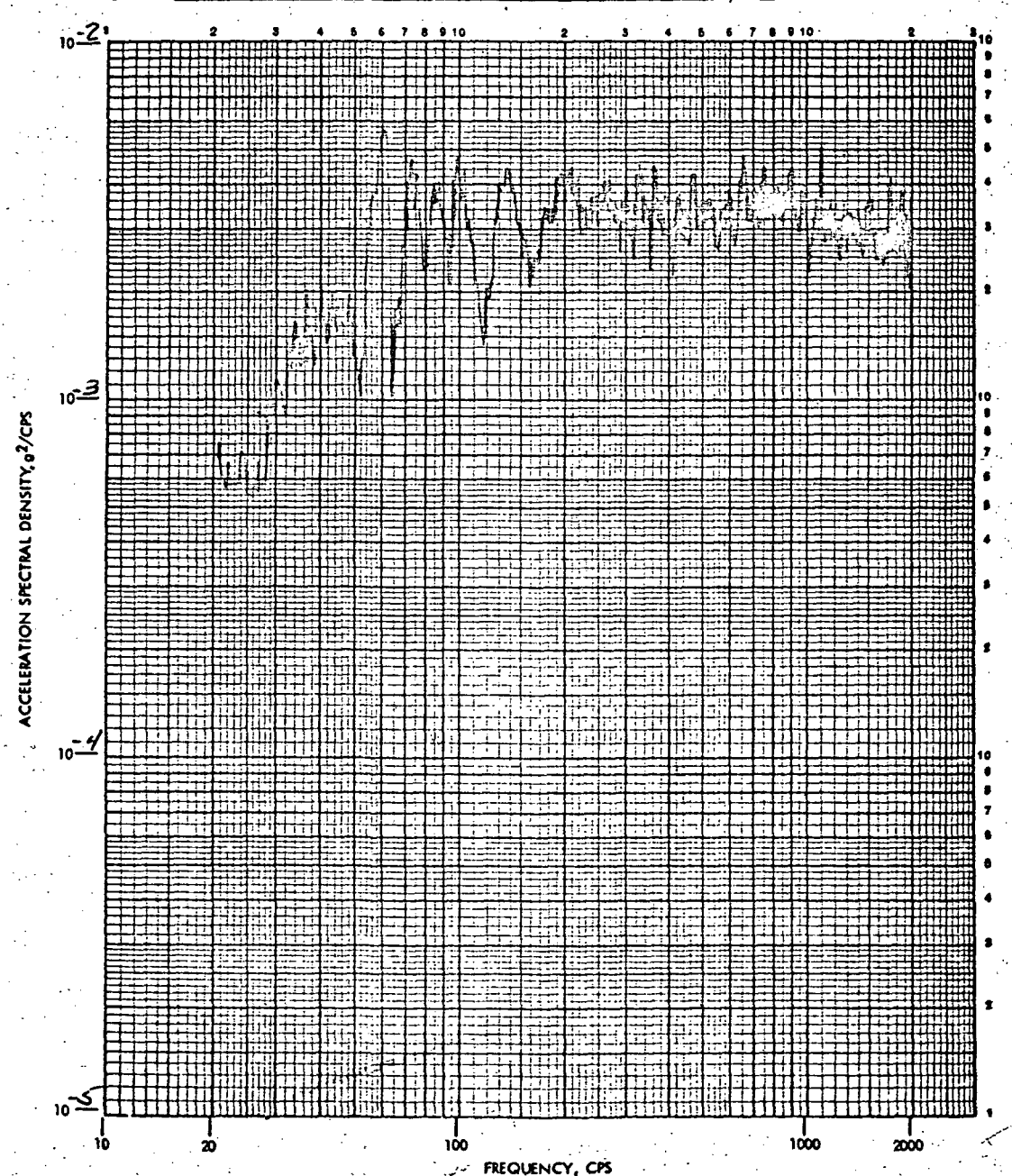
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 0.01 g^2/CPS AVG TIME 2.5 SEC

OPERATOR K.D.G. SPECIMEN P/N V36-442330

REMARKS S/N 0636 2AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-X RUN NUMBER 17

TR 492117 CONTROL (L), RESPONSE ( ) AXIS X DATE 7-11 19 68

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 2.49 SAMPLING 12 MIN

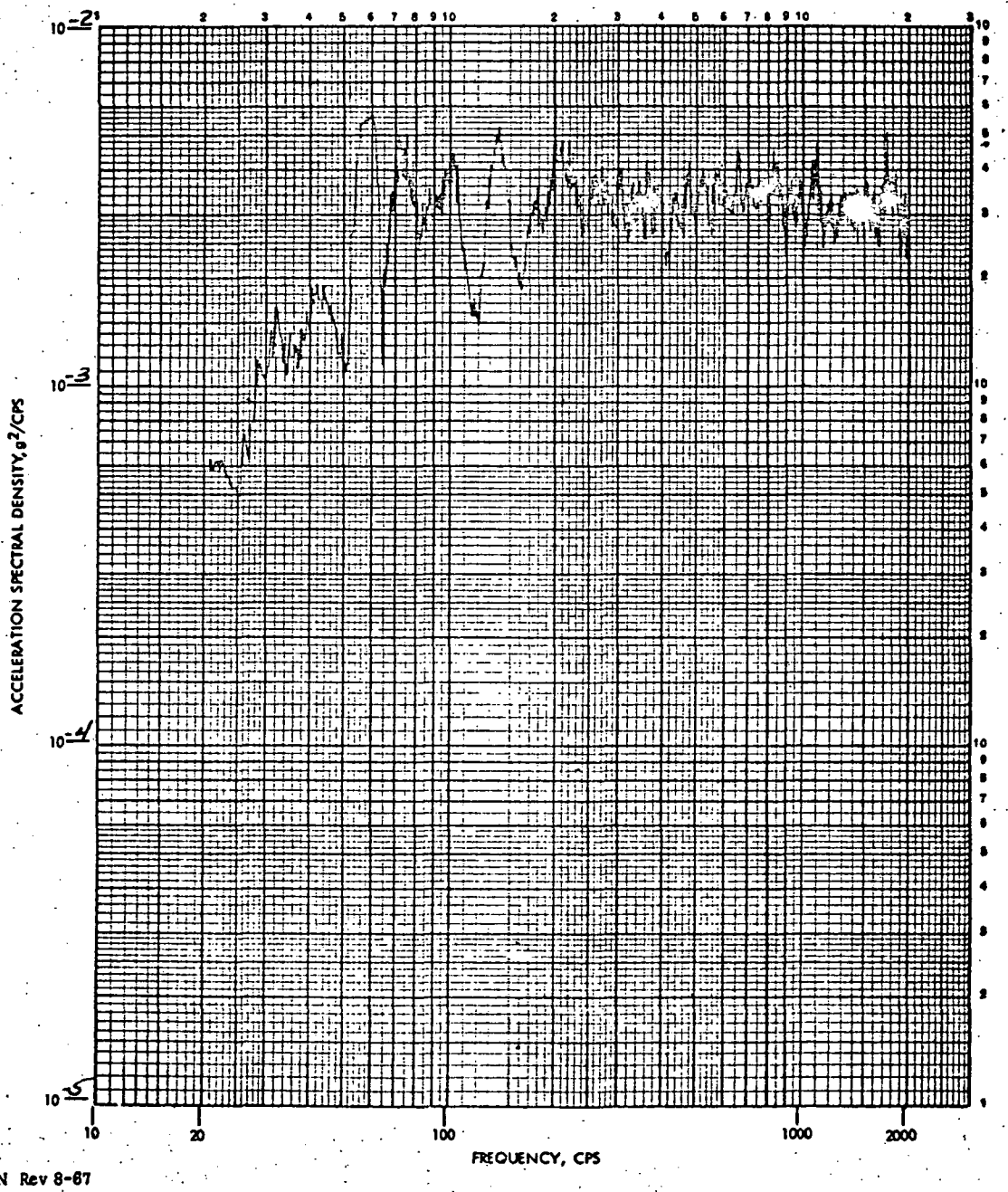
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 0.01 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR L.Q.G. SPECIMEN P/N U36-442330

REMARKS S/N 06362 AAH38-58



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Y RUN NUMBER 18

TR 492117 CONTROL (✓), RESPONSE ( ) AXIS Y DATE 9-11 1968

TEST TITLE G & N FILTER BOX ASSY

OVERALL G RMS 2.2 SAMPLING SPEC. EQUAL

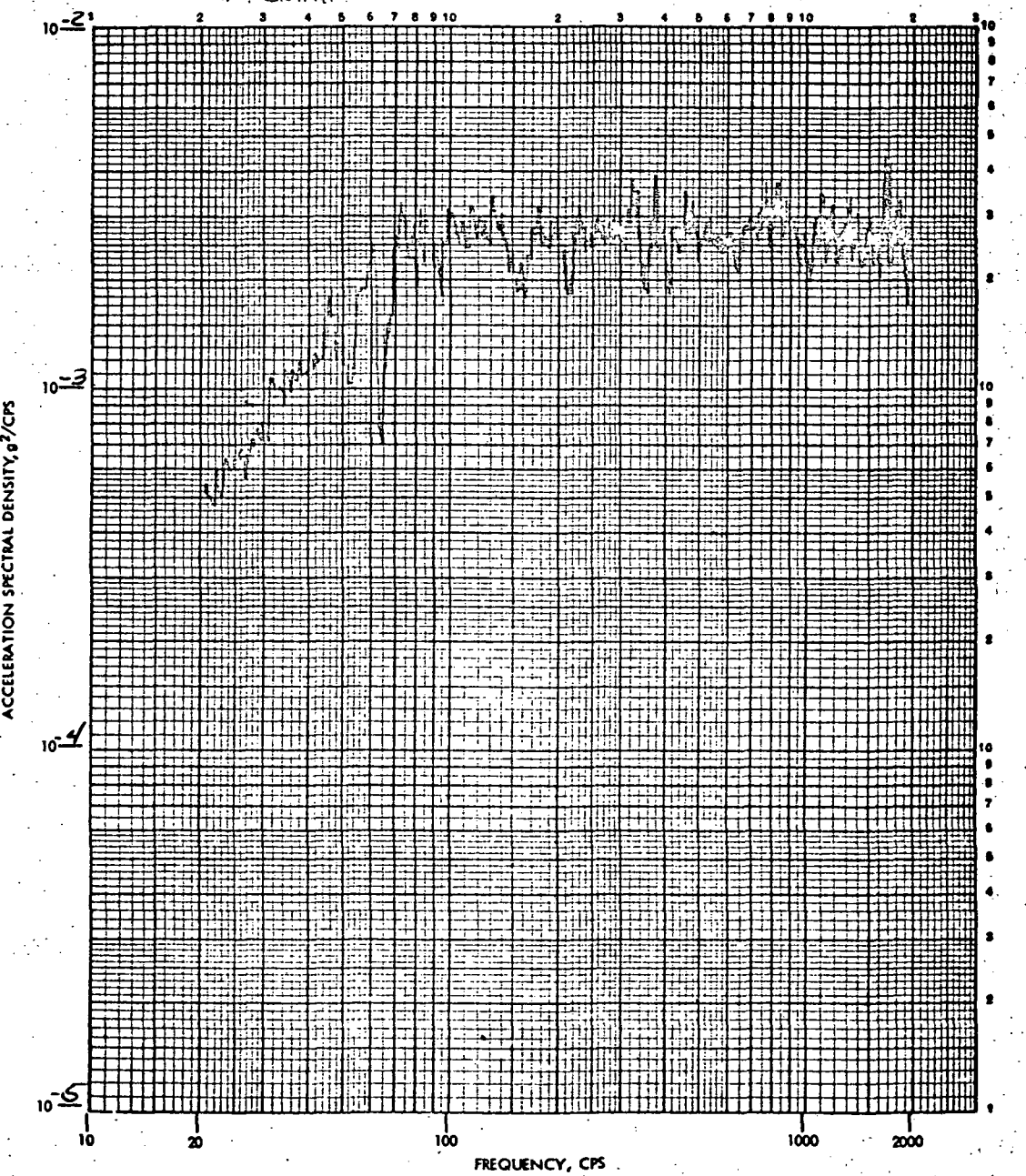
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 0.01 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR R.D.G. SPECIMEN P/N V36-442330

REMARKS OK TO TEST WITH ADJUSTMENTS T.P. SMITH S/N 66362 AAH 3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Y RUN NUMBER 19

TR 492117 CONTROL (✓), RESPONSE ( ) AXIS Y DATE 7-11 19 68

TEST TITLE G & N FILTER BOX ASSY

OVERALL G RMS 2.17 SAMPLING 1 MIN

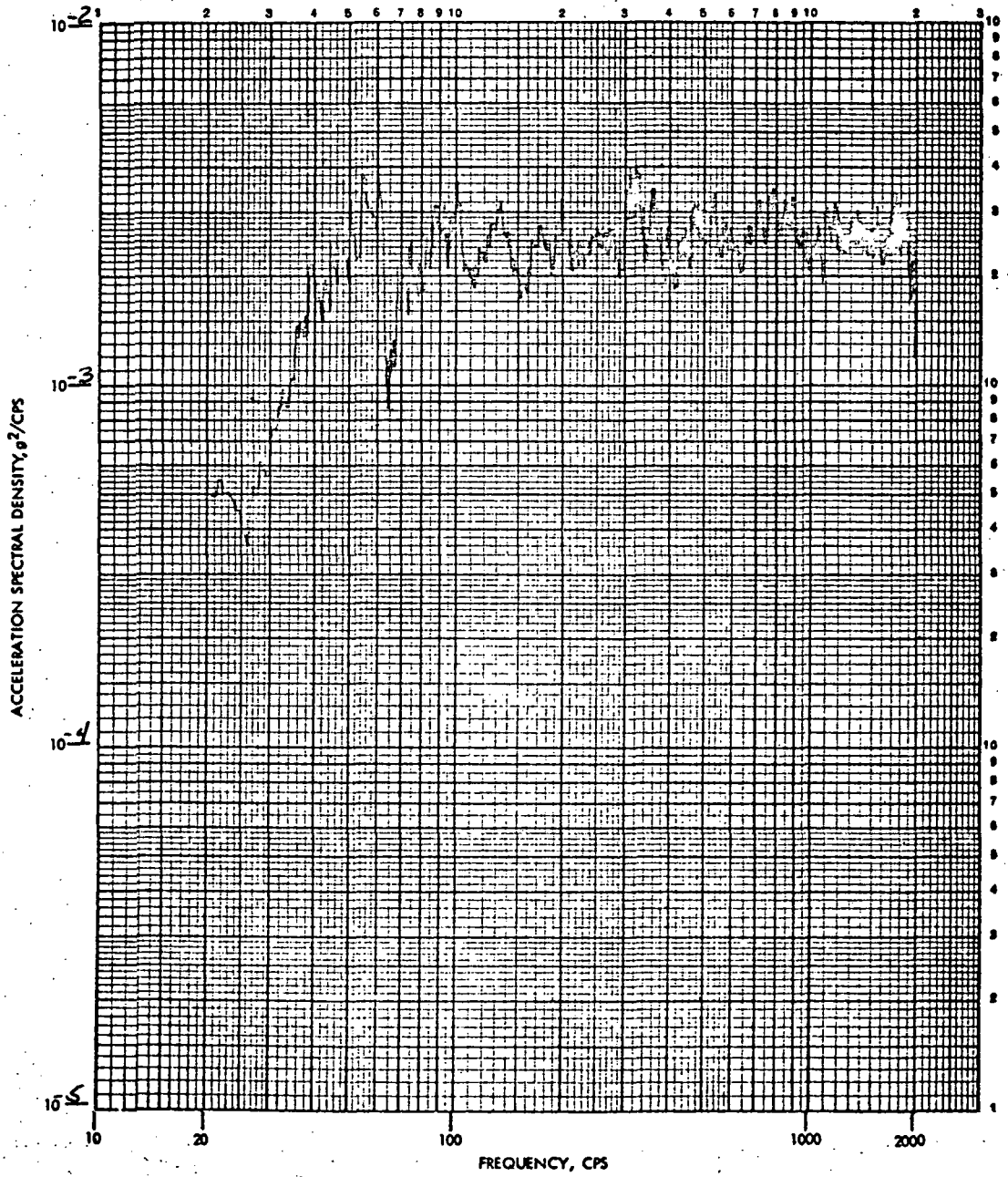
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 0.01 g^2/CPS AVG TIME 2-5 SEC

OPERATOR R.O.A SPECIMEN P/N V36-442330

REMARKS S/N 0636201A43858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Y RUN NUMBER 19

TR 492117 CONTROL ( ), RESPONSE ( ) AXIS Y DATE 7-11 19 68

TEST TITLE G & N FILTER BOX ASSY

OVERALL G RMS 2.2 SAMPLING 6 MIN

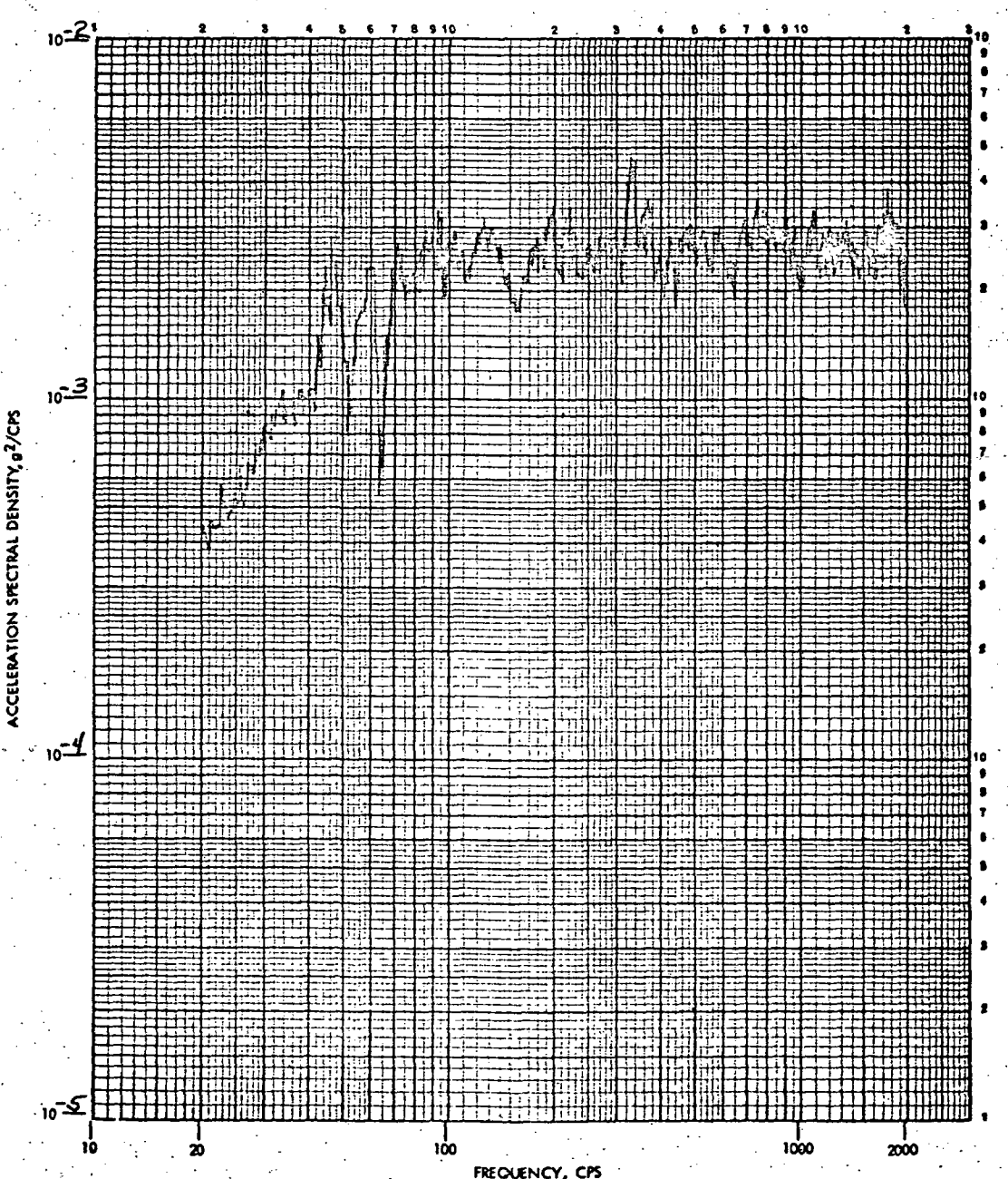
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-600 CPS

FULL SCALE 0.01 g^2/ CPS AVG TIME 2-5 SEC

OPERATOR R.O.N SPECIMEN P/N V36-442330

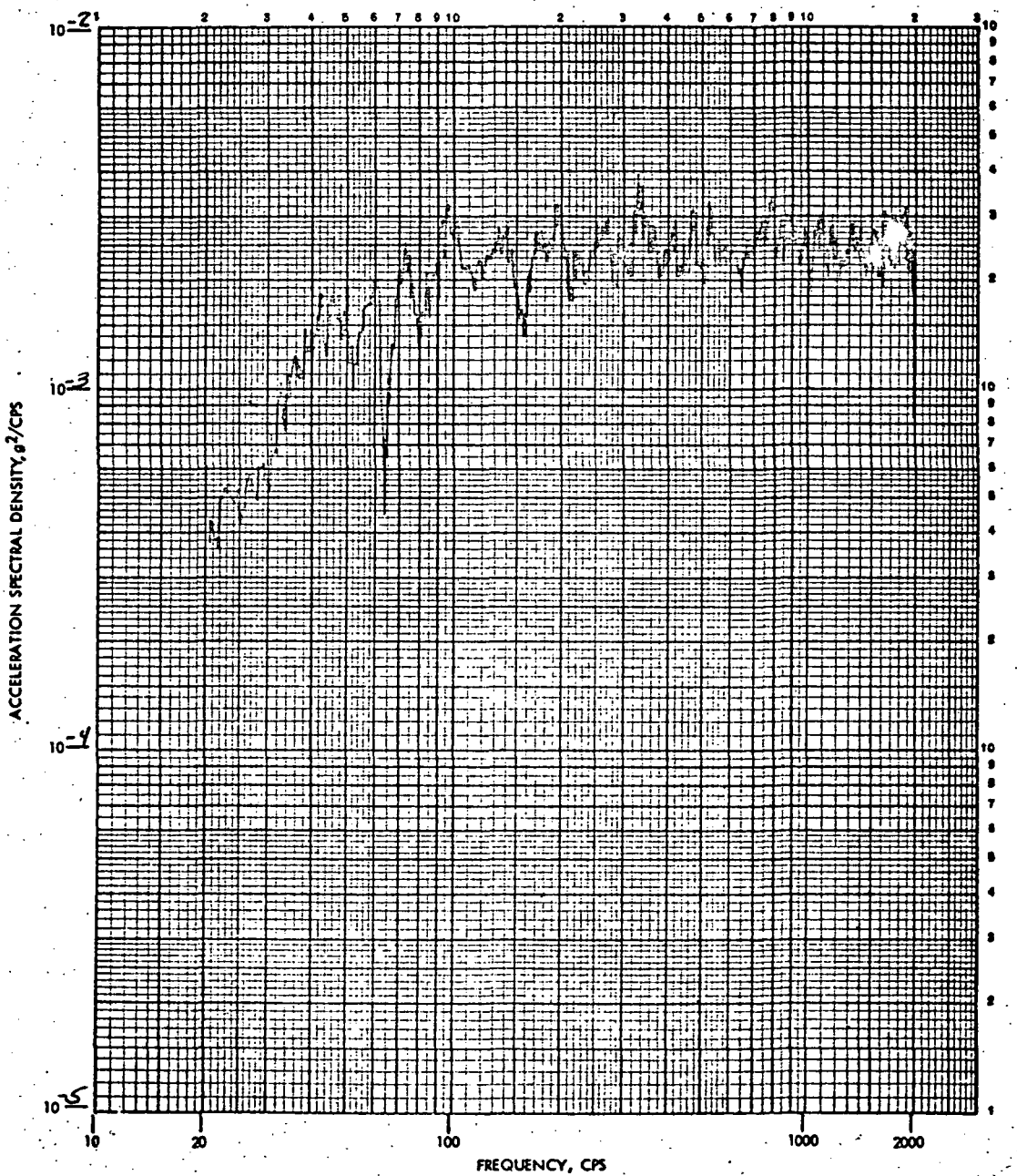
REMARKS S/N 06362 AA H3P58



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Y RUN NUMBER 19
TR 492117 CONTROL (L), RESPONSE ( ) AXIS Y DATE 7-11 19 68
TEST TITLE G & N FILTER BOX ASSY
OVERALL G RMS 2.19 SAMPLING 12 MIN
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC
SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS
FULL SCALE 0.01 g^2/ CPS AVG TIME 2-5 SEC
OPERATOR R.D.G. SPECIMEN P/N V36-442330
REMARKS S/N 06362AAH385



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-7 RUN NUMBER 20

TR 492117 CONTROL (L), RESPONSE ( ) AXIS Z DATE 2-11 19 68

TEST TITLE G&N FILTER BOX ASSY

OVERALL G RMS 2.2 SAMPLING SINE EQUAL

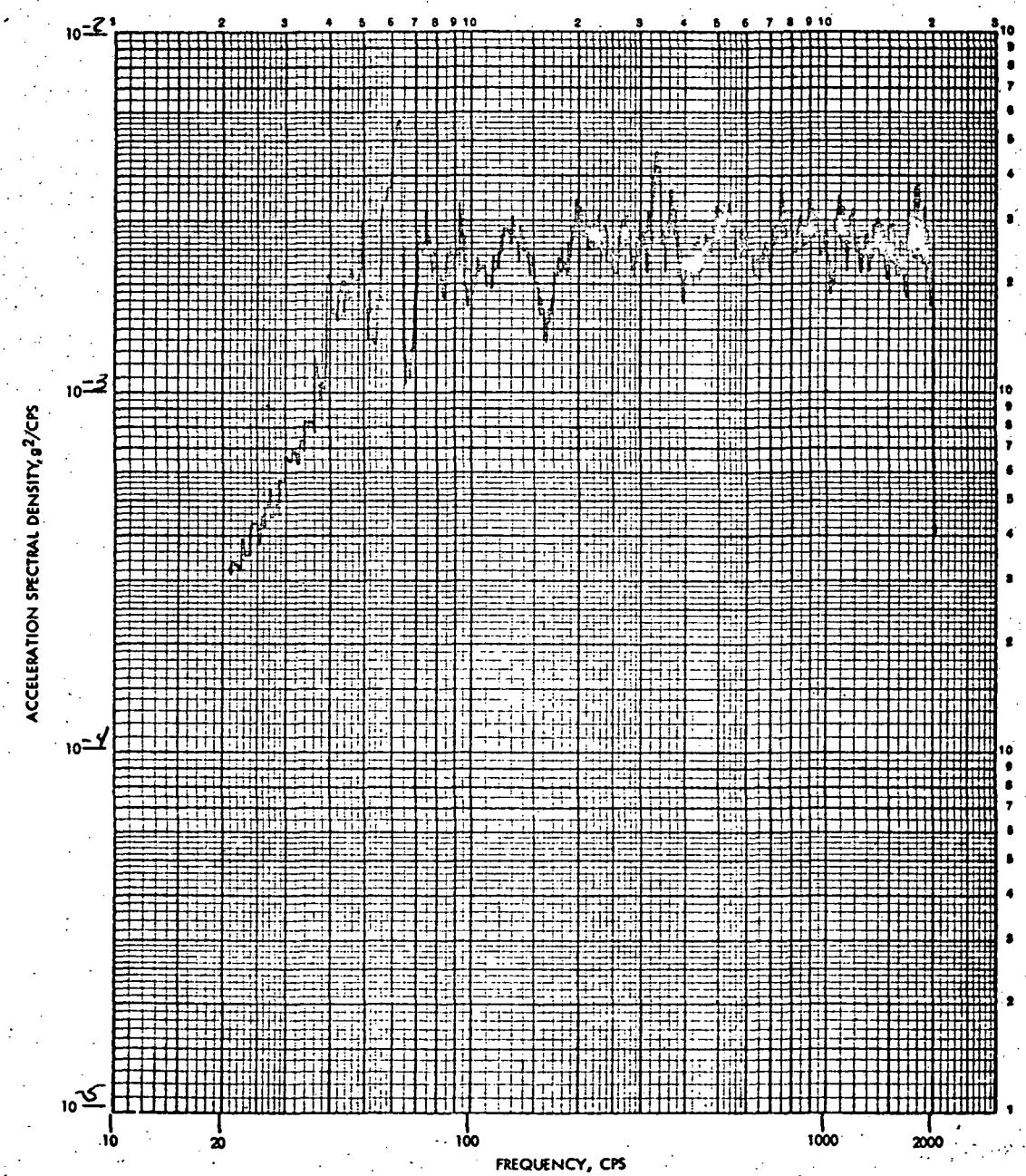
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 0.01 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR RQG SPECIMEN P/N V36-442330

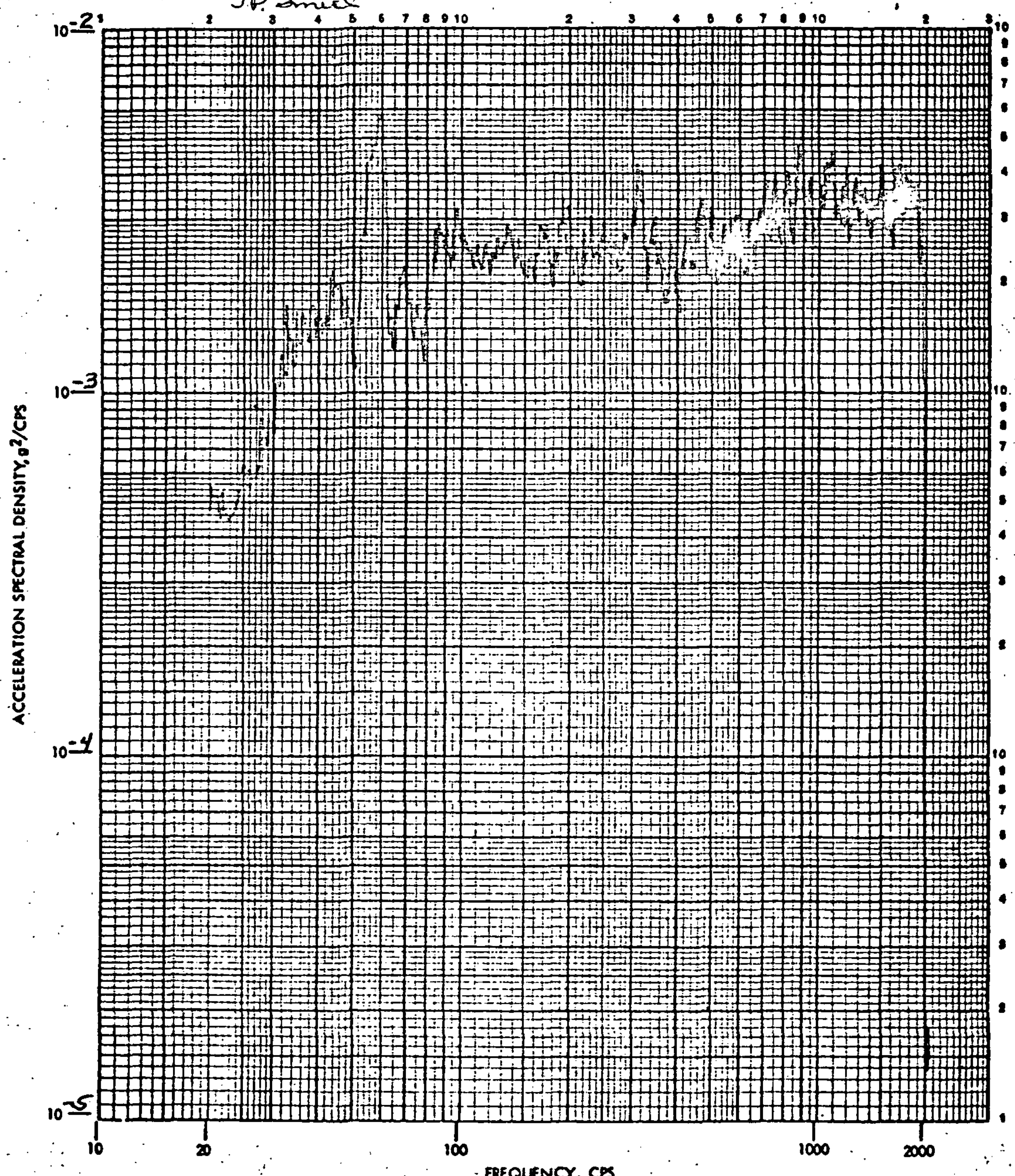
REMARKS OUT OF SPEC S/N 06362AA1/3758



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Z RUN NUMBER 21
TR 192117 CONTROL (✓), RESPONSE ( ) AXIS Z DATE 7-11 1968
TEST TITLE G & N FILTER BOX ASSY
OVERALL G RMS 2.18 SAMPLING SPEC. EQUAL
FILTER BW, 5-10-20 CYCLES LOOP TIME 5 SEC
SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS
FULL SCALE 0.01 g²/CPS AVG TIME 2.5 SEC
OPERATOR R.C.G. SPECIMEN P/N V36-442330
REMARKS OK TO TEST WITH ADJUSTMENTS S/N 06362AAH3858
J.P. Snell



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-7 RUN NUMBER 02

TR 492117 CONTROL (✓), RESPONSE ( ) AXIS Z DATE 7-11 19 68

TEST TITLE G & N FILTER BOX ASSY

OVERALL G RMS 2.2 SAMPLING 1 MIN

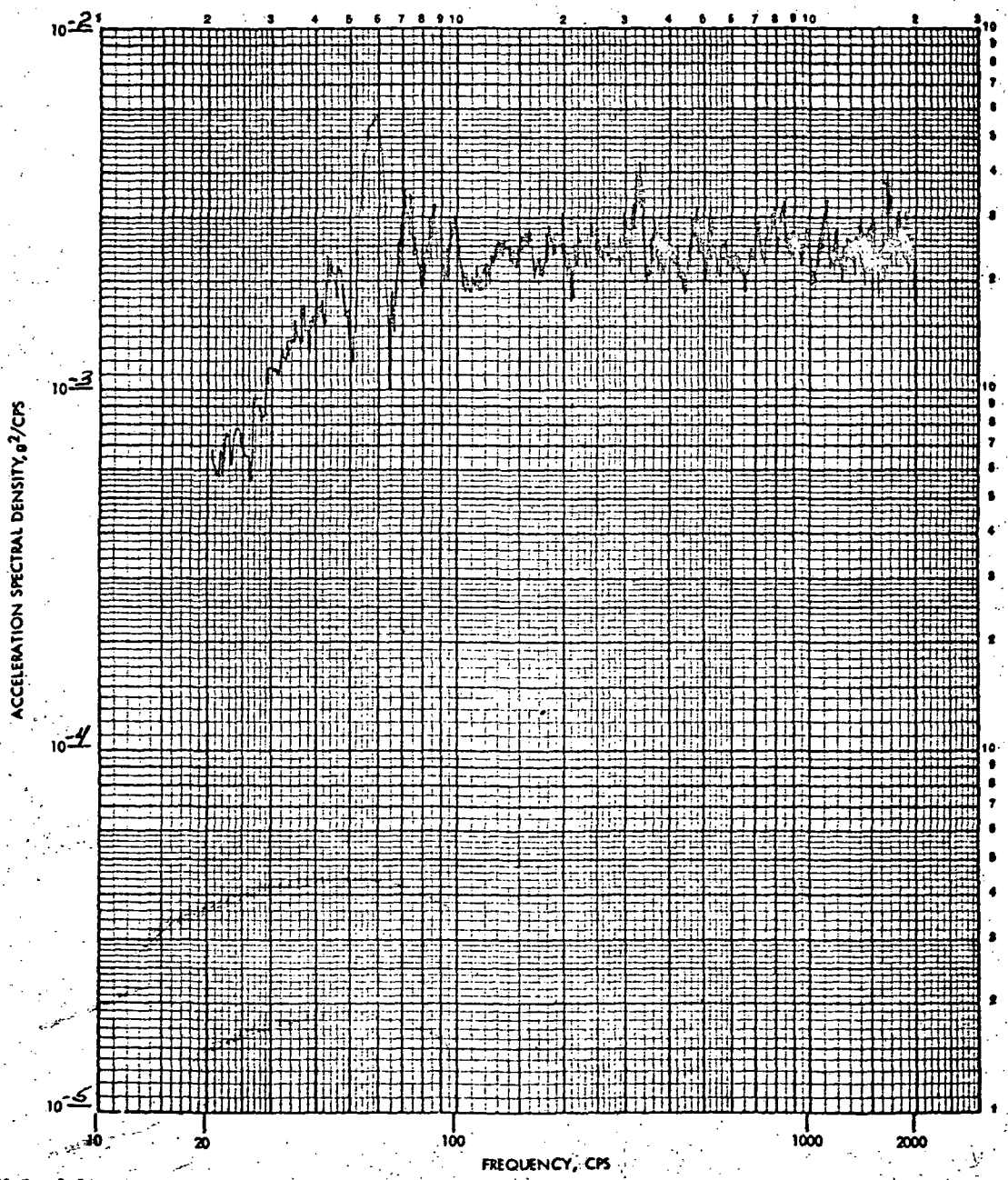
FILTER BW$_e$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE .01 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR R.D.H SPECIMEN P/N V36-442330

REMARKS S/N 0636 2AAH3858



Form 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Z RUN NUMBER 22

TR 492117 CONTROL ( ), RESPONSE ( ) AXIS Z DATE 7-11 19 68

TEST TITLE G & N FILTER BOX ASSY

OVERALL G RMS 2.2 SAMPLING 6 MIN

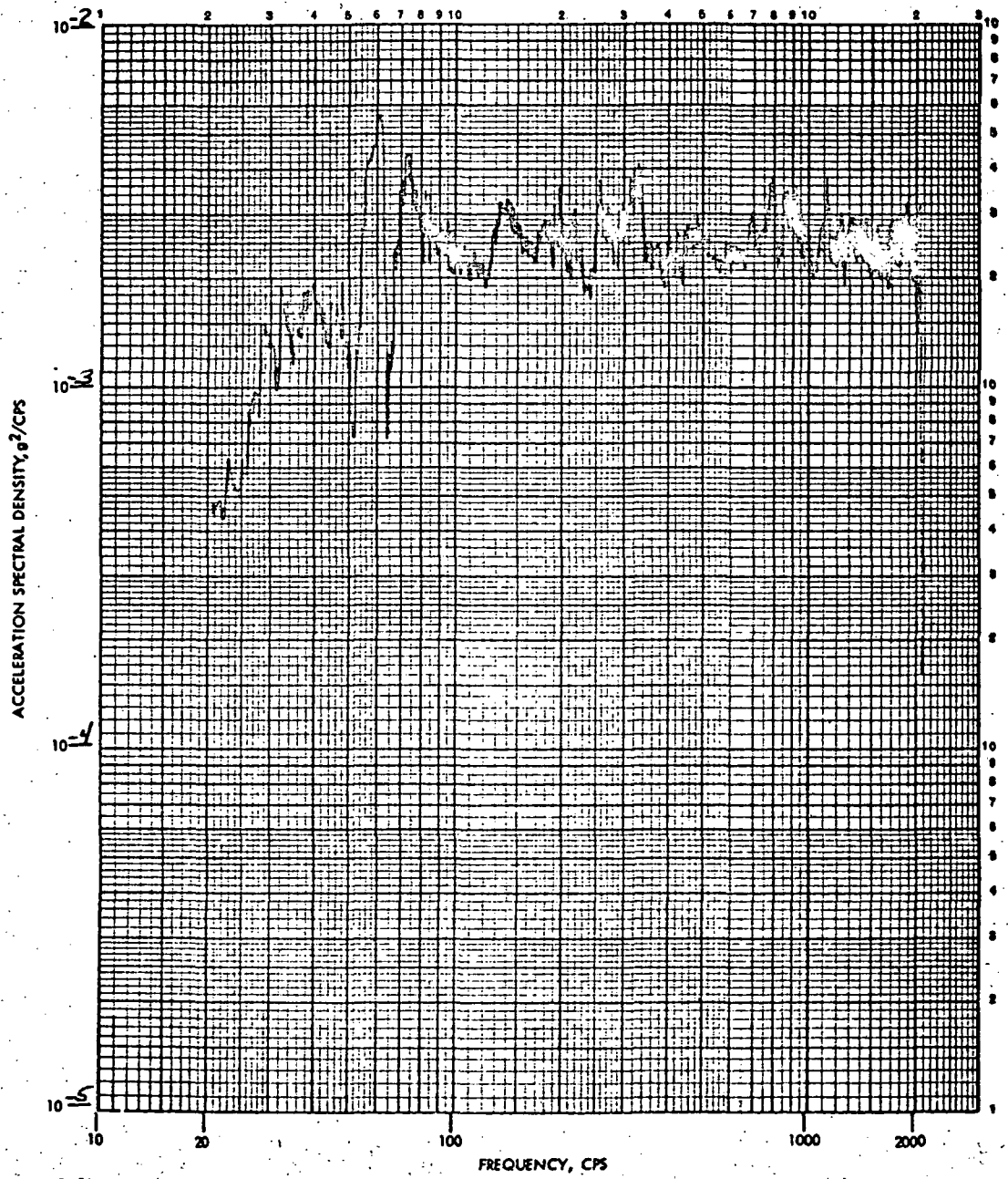
FILTER BW$_s$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS .5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 0.01 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR L.D.G. SPECIMEN P/N U36-442330

REMARKS S/N 6362 AAH 3858



Form. 2974-N Rev 8-67

RANDOM

LR 6227 MEASUREMENT NUMBER 1-Z RUN NUMBER 22

TR 492117 CONTROL (✓), RESPONSE ( ) AXIS Z DATE 7-11 19 68

TEST TITLE G & N FILTER BOX ASSY

OVERALL G RMS 2.16 SAMPLING 12 MIN

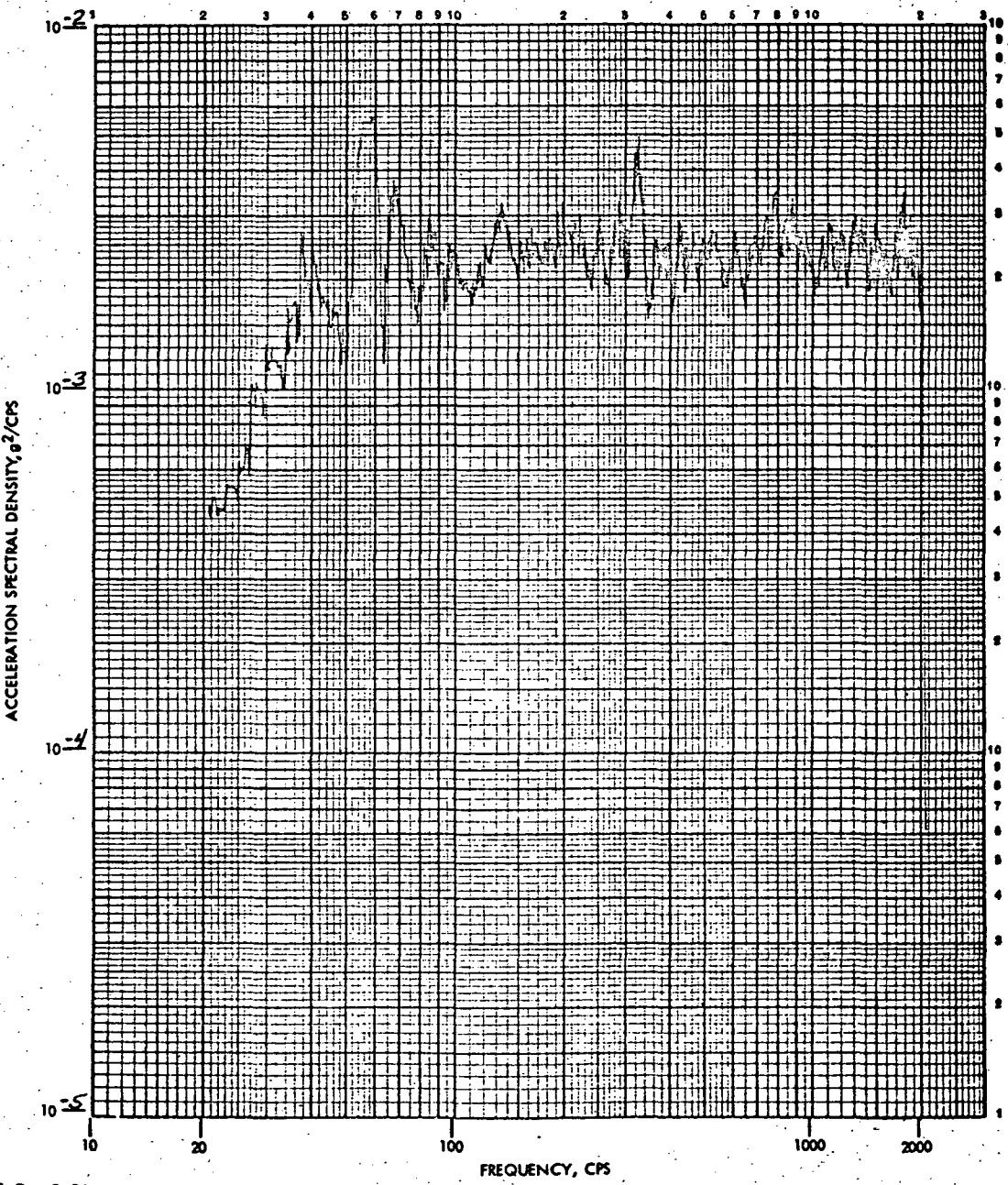
FILTER BW$_e$ 5-10-20 CYCLES LOOP TIME 5 SEC

SWEEP SPEEDS -5-1-2 SEC CROSSOVERS 100-500 CPS

FULL SCALE 0.01 g^2/ CPS AVG TIME 2.5 SEC

OPERATOR R.D.G. SPECIMEN P/N 1136-442330

REMARKS S/N 0362AAH3858



Form 2974-N Rev 8-67

APPENDIX E

CORROSIVE-CONTAMINANTS, OXYGEN-HUMIDITY (CCOH)

North American Aviation, Inc. N 4694-29

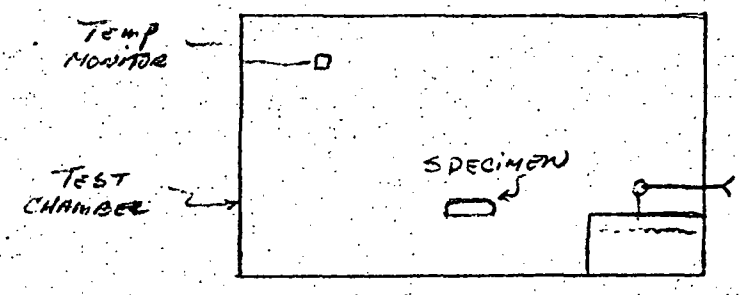
DIVISION		
SPACE		
PROJECT NO: LR. 6227	CONTRACT NO. TR-492117	DATE 7-11-68

G & N FILTER BOX ASSEMBLY P/N 36-442330

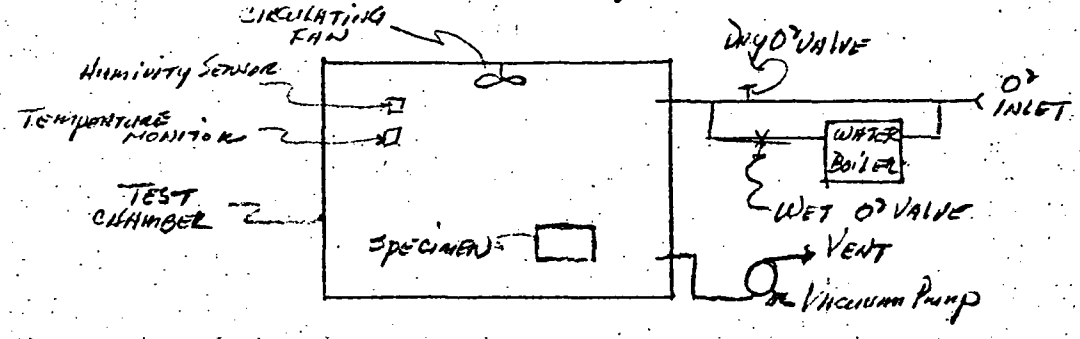
TEST PHASE: HUMIDITY, OXYGEN, CORROSION CONTAMINANTS (CCOH)
PARA: 3.3 OF ~~LR. 6227~~ TR-492117 PAGE 5

TEST SETUP SCHEMATIC:

SALT FOG TEST SETUP



OXYGEN / HUMIDITY TEST SETUP



INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM A93-G REV. 7-66

SIGNATURE: David Agarwal 7-11-68

WITNESSED AND UNDERSTOOD: T. T. Anderson 7-11 19 68

19

North American Aviation, Inc. N 4694-30

DIVISION		
SPACE		
PROJECT NO: LR-6227	CONTRACT NO. TR-492117	DATE 7-11-68

CONTINUED FROM PAGE N-4694-29

SALT FOG TEST EQUIPMENT LIST

NOMENCLATURE	MANUFACTURER	PROP. NO	MET. NO	CALIB DUE
SALT FOG CHAMBER	IND. FILTER & PUMP	N426934	03135	10-10-68
TEMP. RECORDER	BRISTOLS	F304137	24542	7-25-68

OXYGEN / HUMIDITY TEST EQUIPMENT LIST

NOMENCLATURE	MANUFACTURER	PROP NO.	MET. NO.	CALIB DUE
OXYGEN CHAMBER	ALITO CONTROL LABS	S-013675	03128	10-10-68
TEMP RECORDER	BRISTOLS	S-013676	S-513049	10-10-68
OXYGEN ANALYZER	BECKMANS	S012126	11418	10-10-68
ELECTRIC HYGROMETER	HYGRODYNAMICS	NONE	0366	9-24-68

SALT FOG CHAMBER TEMPERTURE 95°F. SALT SOLUTION SPECIFIC GRAVITY 1.0053. SALT SOLUTION PH 6.7 SOLUTION WAS MIXED WITH 19% SALT BY WEIGHT.

THE SPECIMEN IS EQUAL TO THAT DEFINED IN THE THE APPROVED TEST REQUEST (TR-492117) AND THE TEST SETUP IS ADEQUATE TO MEET THE REQUIREMENTS OF THE CCOH TEST AS DEFINED IN THAT TEST REQUEST.

SIGNED Robt Wyatt 7-12-68
LV T. RESPONSIBLE TEST ENGINEER

VERIFIED L.S. Lucas 695-412 12 July 68
NR/SD APOLLO ENGINEER

VERIFIED L.D. Williamson 7/12/68
NR/SD INSPECTION

FORM 493-G REV. 7-66

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: David Dorman 7-11-68
WITNESSED AND UNDERSTOOD: L.D. Williamson 7/12/68
19

North American Aviation, Inc. N 4694-31

DIVISION		
SPACE		
PROJECT NO: LR-6227	CONTRACT NO. TR-492117	DATE 7-11-68

CONTINUED FROM PAGE N-4694-30

SALT FOG TEST:

7-11-68-

THE SPECIMEN WAS PLACED IN THE SALT FOG CHAMBER. EXPOSURE STARTED AT 2315 HRS. THE TEST WAS COMPLETED AT 0015 HRS AND THE SALT FOG CHAMBER PURGE STARTED. THE SPECIMEN WAS TRANSFERRED TO THE OXYGEN/HUMIDITY CHAMBER AT 0100 HRS. SALT FOG INSPECTION REVEALED NO VISIBLE EVIDENCE OF CORROSION. (ANM 571) 7-12-68. 7-11-68 (ANM 571)

7-12-68-

BEGAN CHAMBER PUMP DOWN TO 80,000 FT. AT 0200 HRS. REACHED 80,000 AT 0210 HRS AND BACK FILLED CHAMBER TO 5 PSIA AT 0220 HRS. REACHED SPECIFICATION OF 125°F TEMPERATURE, PURE OXYGEN ATMOSPHERE AND 5 PSIA AT 0800-7-12-68. START OF 12 HR. DRY OXYGEN ATMOSPHERE EXPOSURE CYCLE. ANM

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE David Ogomow 7-12-1968

WITNESSED AND UNDERSTOOD: J. T. Andrews 7-12 1968

_______ 19__

FORM A05-G REV. 7-66

North American Aviation, Inc. N 4694-32

DIVISION: SPACE

PROJECT NO: LR-6227 | CONTRACT NO. TR-492117 | DATE 7-12-68

CONTINUED FROM PAGE N-4694-31

DATE	TIME	CHAMBER TEMP	PRESSURE PSIA	ALTITUDE FEET	HUMIDITY %	OXYGEN %	RECORDED BY	REMARKS
7-12-68	0800*	125°	5.01	27,000	NONE	91%	D.H.O	*START OF 12 HR. DRY OXYGEN EXPOSURE. D.H.O
	0900	125°	5.01	27,000	NONE	92%	D.H.O	
	1000	125°	5.01	27,000	NONE	93%	D.H.O	
	1100	125°	5.01	27,000	NONE	93%	D.H.O	
	1200	125°	5.01	27,000	NONE	93%	D.H.O	
7-12-68	1300	125°	5.01	27,000	—	92%	E.H.O.	
	1400	125°	5.01	27,000	—	90%	E.H.O.	
	1500	125°	5.01	27,000	—	92%	E.H.O.	
	1600	125°	5.01	27,000	—	90%	E.H.O.	
	1700	125°	5.01	27,000	—	90%	E.H.O.	
	1800	125°	5.01	27,000	—	90%	E.H.O.	
7-12-68	1900	125°	5.01	27,000	—	90%	E.H.O.	
	2000	125°	5.01	27,000		90%	E.H.O.	END OF DRY OXYGEN 7-12-8 (ANM 571)
7-12-68 *	2100	125° (ANM 571)	5.01	27,000	95%		E.H.O.	PORTION OF TEST 2000
	2200	109°	5.01	27,000	90%	E.H.O.		7-12-68 BEGIN CO2 HUMIDITY
	2300	123°	5.01	27,000	90%	E.H.O.		PORTION OF TEST AT
	2400	124°	5.01	27,000	90%	E.H.O.		2000 7-12-68 E.H.O. (ANM 571) 7-12-8
7-13-68	0100	125°	5.01	27,000	98%		D.H.O	*START 2 HR. RAMP TO
	0200	125°	5.01	27,000	96%		D.H.O	125°-5° AT 2100-7-12-68 E.H.O. (ANM 571)
	0300	125°	5.01	27,000	97%		D.H.O	
	0400	125°	5.01	27,000	96%		D.H.O	
	0500*	125°	5.01	27,000	96%		D.H.O	*END OF 6 HR. SOAK OF 125° START DOWN RAMP TO 60° D.H.O
	0600	115°	5.01	27,000	98%		D.H.O	(ANM 571) 7-13-8
	0700	110°	5.01	27,000	98%		D.H.O	
	0800	105°	5.01	27,000	98%		D.H.O	
	0900	100°	5.01	27,000	98%		D.H.O	
	1000	95°	5.01	27,000	97%		D.H.O	
	1100	90°	5.01	27,000	96%		D.H.O	
	1200	85°	5.01	27,000	95%			

OXYGEN FLOW FOR REMAINDER OF TEST WILL HAVE A PURITY OF 95% ± 5%

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: David Ogonowski 7-13-68

WITNESSED AND UNDERSTOOD: J. T. Adams 7-13 1968

FORM 493-G REV. 7-66

SPACE DIVISION OF NORTH AMERICAN ROCKWELL CORPORATION

North American Aviation, Inc.

N 4694-33

DIVISION: SPACE

PROJECT NO: LR-6227 | CONTRACT NO. TR-492117 | DATE 7-13-68

CONTINUED FROM PAGE N-4694-32

DATE	TIME	CHAMBER TEMP.	PRESSURE PSIA	ALTITUDE FEET	HUMIDITY %	RECORDED BY	OXYGEN %	REMARKS
7-13-68	1300	76°	5.01	27,000	95%	EJN		
7-13-68	1400	70°	5.01	27,000	98%	EJN		
7-13-68	1500	68°	5.01	27,000	96%	EJN		END 10 HR DOWN RAMP TO 60±10°F START 6 HR. SOAK AT 60±10 [stamp] 6/13/68 EJN
7-13-68	1600	65°	5.01	27,000	92%	EJN		
7-13-68	1700	64°	5.01	27,000	96%	EJN		
7-13-68	1800	64°	5.01	27,000	92%	EJN		
7-13-68	1900	64°	5.01	27,000	95%	EJN		
7-13-68	2000	65°	5.01	27,000	95%	EJN		
7-13-68	2100	65°	5.01	27,000	98%	EJN		END OF 6 HR. SOAK AT 60±10 START 2 HR. RAMP TO 125±5 AT 2100 7-13-68 EJN [stamp ANA 571] 2100-7-13-68-FINISHED cyc #1 DUO
7-13-68	2200	100°	5.01	27,000	87%	EJN		
7-13-68	2300	122°	5.01	27,000	90%	EJN		
7-13-68	2400	123°	5.01	27,000	93%	EJN		
7-14-68	0100	125°	5.01	27,000	98%	DUO		
7-14-68	0200	125°	5.01	27,000	98%	DUO		
7-14-68	0300	125°	5.01	27,000	98%	DUO		
7-14-68	0400	125°	5.01	27,000	98%	DUO		
7-14-68	0500 *	125°	5.01	27,000	98%	DUO		* 0500-7-14-68-START DOWN RAMP TO 60°F WITHIN 10 HRS DUO [stamp]
7-14-68	0600	115°	5.01	27,000	98%	DUO		
7-14-68	0700	110°	5.01	27,000	98%	DUO		
7-14-68	0800	102°	5.01	27,000	98%	DUO		
7-14-68	0900	98°	5.01	27,000	98%	DUO		
7-14-68	1000	92°	5.01	27,000	98%	DUO		
7-14-68	1100	82°	5.01	27,000	98%	DUO		
7-14-68	1200	80°	5.01	27,000	98%	DUO		
7-14-68	1300	79°	5.01	27,000	97%	EJN		
7-14-68	1400	66°	5.01	27,000	95%	EJN		
7-14-68	1500 *	60°	5.01	27,000	96%	EJN		* END 10 HR. DOWN RAMP TO 60°, START 6 HR. SOAK AT 60°±10
7-14-68	1600	62°	5.01	27,000	95%	EJN		

(Written vertically in Oxygen column:) OXYGEN FLOW FOR REMAINDER OF THE TEST WILL BE A PURITY OF 95% ± 5% DUO

(Left margin:) cyl #1

CONTINUED ON PAGE N4694-34

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: E.J. Nuttall 7-14 1968

WITNESSED AND UNDERSTOOD: J. H. Pitley 7-14 1968

_____ 19__

FORM A93-G REV. 7-66

North American Aviation, Inc. N 4694-34

DIVISION: SPACE

PROJECT NO: LR 6227 | CONTRACT NO: TA 492117 | DATE: 7-14-68

CONTINUED FROM PAGE N4694-33

DATE	TIME	CHAMBER TEMP °F	PRESSURE PSIA	ALTITUDE FT.	HUMIDITY %	OXYGEN %	RECORDED BY	REMARKS
7-14-68	1700	65°	5.01	27,000	98%	OXYGEN FLOW OF 99.5% EJL	EJL	
↕	1800	66°	5.01	27,000	98%		EJL	
	1900	65°	5.01	27,000	97%		EJL	
7-14-68	2000	65°	5.01	27,000	98%		EJL	
↕ Cycl #2	2100	65°	5.01	27,000	98%		EJL	END 6HR SOAK AT 60±0° START RAMP TO 125±5°F AT 2100 7-14-68 EJL
	2200	100°	5.01	27,000	90%		EJL	
	2300	123°	5.01	27,000	90%		EJL	DRAINED CHAMBER OF
7-14-68	2400	122°	5.01	27,000	98%		EJL	WATER 2230 EJL 7-14-68
7-15-68	0100	126°	5.01	27,000	98%	FOR REMAINDER OF TEST WILL HAVE A PURITY	DWO	
7-15-68	0200	122°	5.01	27,000	98%		DWO	
7-15-68	0300	125°	5.01	27,000	96%		DWO	
7-15-68	0400 *	125°	5.01	27,000	93%		DWO	*END OF 6HR 125°F SOAK. START
7-15-68	0500	125°	5.01	27,000	97%		DWO	10HR DOWNRAMP TO 60°F. DWO 7-15-68
7-15-68	0600	112°	5.01	27,000	98%		DWO	
7-15-68	0700	110°	5.01	27,000	98%		DWO	
7-15-68	0800	105	5.01	27,000	98%		DWO	
7-15-68	0900	100°	5.01	27,000	98%		DWO	
7-15-68	1000	92°	5.01	27,000	98%		DWO	
7-15-68	1100	85°	5.01	27,000	98%		DWO	
7-15-68	1200	80°	5.01	27,000	98%		DWO	
7-15-68	1300	75°	5.01	27,000	90%		EJL	
7-15-68	1400	65°	5.01	27,000	90%		EJL	
7-15-68	1500	60°	5.01	27000	98%		EJL	
7-15-68	1600	63	5.01	27000	98%		EJL	
7-15-68	1700	61°	5.01	27,000	98%		EJL	
7-15-68	1800	62°	5.01	27,000	98%		EJL	
7-15-68	1900	65°	5.01	27,000	98%		EJL	
7-15-68	2000	65°	5.01	27,000	98%		EJL	

CONTINUED ON PAGE N4694-35

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: E J [signature] 7-14 1968

WITNESSED AND UNDERSTOOD: E. [signature] 7-15 1968

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FORM A88-G REV. 7-66

North American Aviation, Inc. N 4694-35

DIVISION: SPACE

PROJECT NO: LR6227 | CONTRACT NO.: TR 492117 | DATE: 7-15-68

CONTINUED FROM PAGE N4694-34

	DATE	TIME	CHAMBER TEMP °F	PRESSURE PSIA	ALTITUDE FT.	HUMIDITY %	OXYGEN %	RECORDED BY	REMARKS
CYCLE #3	7-15-68	2100*	65°	5.01	27,000	98%		EJD	* END 6 HR. SOAK AT 60°±10
	7-15-68	2200	98°	5.01	27,000	98%		EJD	START RAMP TO 125°±5 EJD
	7-15-68	2300	126°	5.01	27,000	90%		EJD	7-15-68
	7-15-68	2400	123°	5.01	27,000	98%		EJD	DRAINED WATER FROM
	7-16-68	0100	125°	5.01	27,000	98%		DHO	CHAMBER 2300 7-15-68 EJD
	7-16-68	0200	127°	5.01	27,000	98%		DHO	
	7-16-68	0300	125°	5.01	27,000	98%		DHO	
	7-16-68	0400	127°	5.01	27,000	98%		DHO	
	7-16-68	0500*	125°	5.01	27,000	98%		DHO	* 0500-7-16-68 - END OF 6 HR. 125°F SOAK. START DOWN RAMP TO 60°F DHO
	7-16-68	0600	112°	5.01	27,000	98%		DHO	
	7-16-68	0700	105°	5.01	27,000	98%		DHO	
	7-16-68	0800	100°	5.01	27,000	98%		DHO	
	7-16-68	0900	95°	5.01	27,000	98%		DHO	
	7-16-68	1000	90°	5.01	27,000	98%		DHO	
	7-16-68	1100	88°	5.01	27,000	94%		DHO	
	7-16-68	1200	85°	5.01	27,000	96%		DHO	
	7-16-68	1300	75°	5.01	27,000	90%		EJD	
	7-16-68	1400	72°	5.01	27,000	90%		EJD	
	7-16-68	1500*	65°	5.01	27,000	90%		EJD	* END 10 HR. DOWN RAMP TO
	7-16-68	1600	65°	5.01	27,000	90%		EJD	60°±10 START 6 HR. SOAK AT
	7-16-68	1700	65°	5.01	27,000	90%		EJD	60°±10 EJD 7-16-68
	7-16-68	1800	66°	5.01	27,000	90%		EJD	
	7-16-68	1900	66°	5.01	27,000	95%		EJD	* END 6 HR SOAK AT 60°±10 EJD
	7-16-68	2000	66°	5.01	27,000	95%		EJD	START RAMP TO 125°±5 [illegible]
CYCLE #4	7-16-68	2100*	66°	5.01	27,000	95%		EJD	
	7-16-68	2200	90°	5.01	27,000	98%		EJD	E-1
	7-16-68	2300	121°	5.01	27,000	95%		EJD	DRAINED WATER FROM
	7-16-68	2400	123°	5.01	27,000	95%		EJD	CHAMBER 2345 EJD
	7-17-68	0100	126°	5.01	27,000	98%		DHO	
	7-17-68	0200	127°	5.01	27,000	98%		DHO	0200-7-17-68 - CHANGED CHART DHO

Oxygen column (written vertically): OXYGEN FLOW FOR REMAINDER OF TEST WILL HAVE A PURITY FLOW OF 95±5% EJD

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: E. J. [illegible] 7-15 1968

WITNESSED AND UNDERSTOOD: [illegible] 7-15 1968

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FORM A93-G REV. 7-66

North American Aviation, Inc. N 4694-36

DIVISION SPACE

PROJECT NO: LR-6227 | CONTRACT NO. TR-492117 | DATE 7-17-68

CONTINUED FROM PAGE N-4694-35

DATE	TIME	CHAMBER TEMP.°	PRESSURE PSIA	ALTITUDE FEET	HUMIDITY %	OXYGEN %	RECORDED BY	REMARKS
7-17-68	0300	125°	5.01	27,000	98%	OXYGEN FLOW FOR REMAINDER OF TEST WILL HAVE A PURITY & FLOW OF 96% ± 5% AND	DHO	
7-17-68	0400	125°	5.01	27,000	98%		DHO	
7-17-68	0500*	125°	5.01	27,000	93%		DHO	*0500-7-17-68-END OF 6 HR SOAK OF 125-START DOWN RAMP TO 60°F DHO
7-17-68	0600	116°	5.01	27,000	93%		DHO	
7-17-68	0700	105°	5.01	27,000	98%		DHO	
7-17-68	0800	100°	5.01	27,000	98%		DHO	
7-17-68	0900	95°	5.01	27,000	98%		DHO	
7-17-68	1000	90°	5.01	27,000	96%		DHO	
7-17-68	1100	87°	5.01	27,000	98%		DHO	
7-17-68	1200	85°	5.01	27,000	96%		DHO	
7-17-68	1300	78°	5.01	27,000	90%		EJL	
7-17-68	1400	70°	5.01	27,000	90%		EJL	
7-17-68	1500	67°	5.01	27,000	90%		EJL	
7-17-68	1600	65°	5.01	27,000	90%		EJL	
7-17-68	1700	65°	5.01	27,000	90%		EJL	
7-17-68	1800	66°	5.01	27,000	90%		EJL	
7-17-68	1900	66°	5.01	27,000	90%		EJL	
7-17-68	2000	66°	5.01	27,000	90%		EJL	
7-17-68	2100*	66°	5.01	27,000	90%		EJL	*END TEST 7-17-68-2100 EJL

THE RAW DATA ACCUMULATED DURING THE PRECEDING CCOH TEST CONSISTS OF 6 CIRCULAR BRISTOL TEMP. CHARTS I.D. NO. 55250 MARKED T-1 THROUGH T-6 AND ONE I.D. NO 11175 MARKED S-I.

INSTRUCTIONS

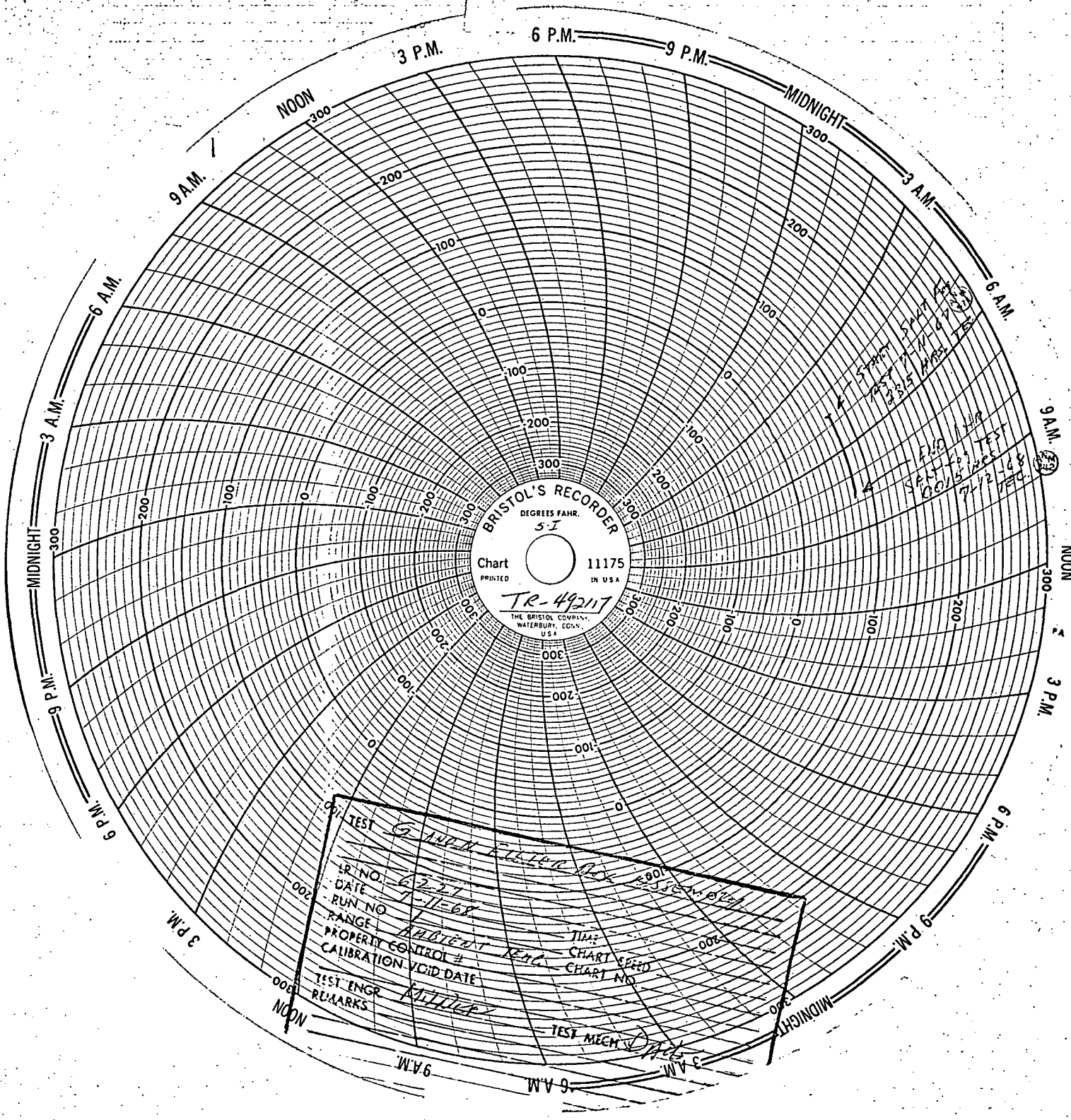
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. G. Schjoth 7-17 1968

WITNESSED AND UNDERSTOOD: [signature] 7-17 1968

_______ _______ 19__

FORM A93-G REV. 7-66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DEGREES FAHR.
5-I
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TR-49217
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WATERBURY, CONN.
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DATE
RUN NO.
RANGE
PROPERTY CONTROL #
CALIBRATION VOID DATE
TEST ENGR
REMARKS
TIME
CHART SPEED
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TEST MECH
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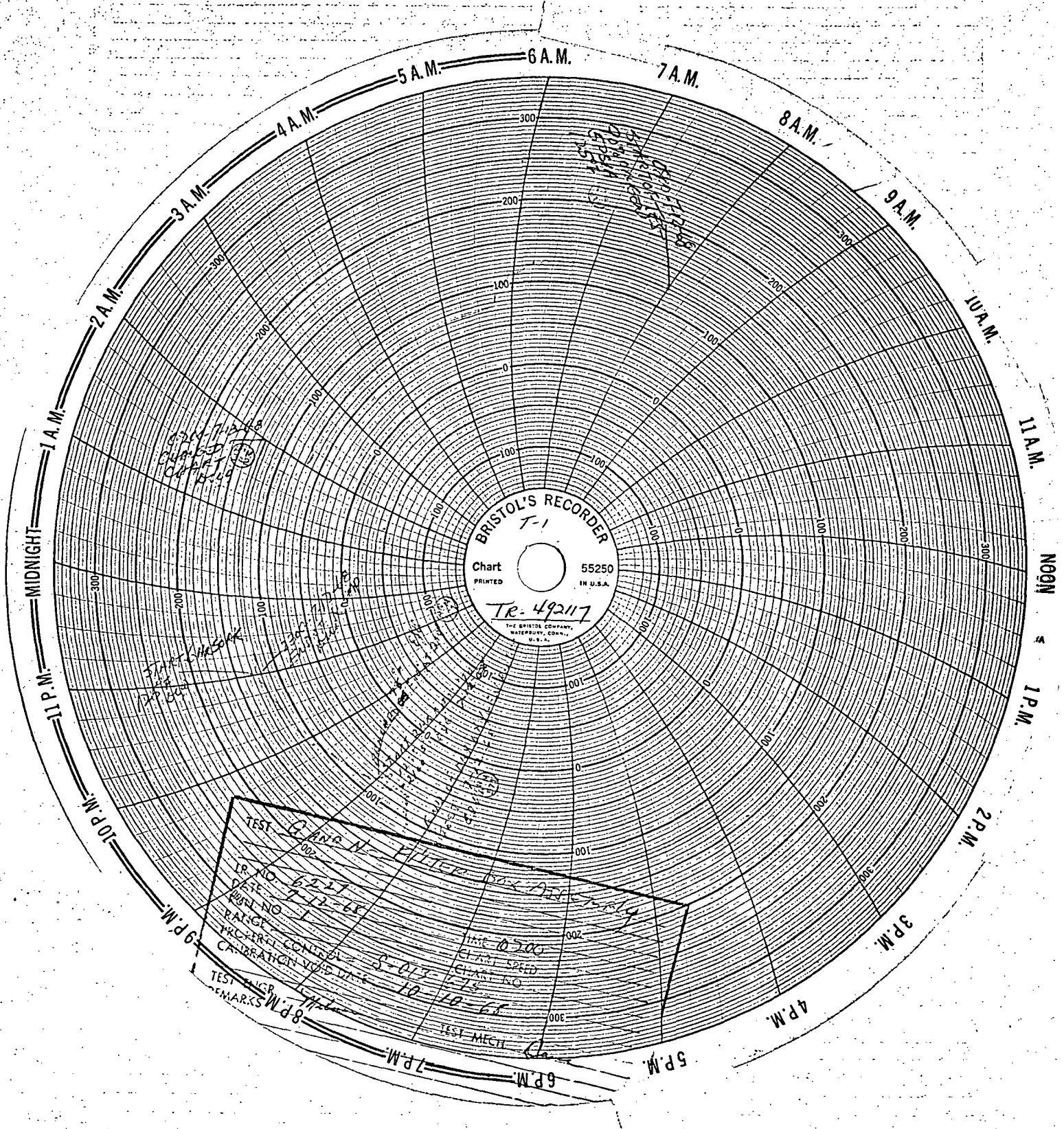
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T-1
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Tr-49217
THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.
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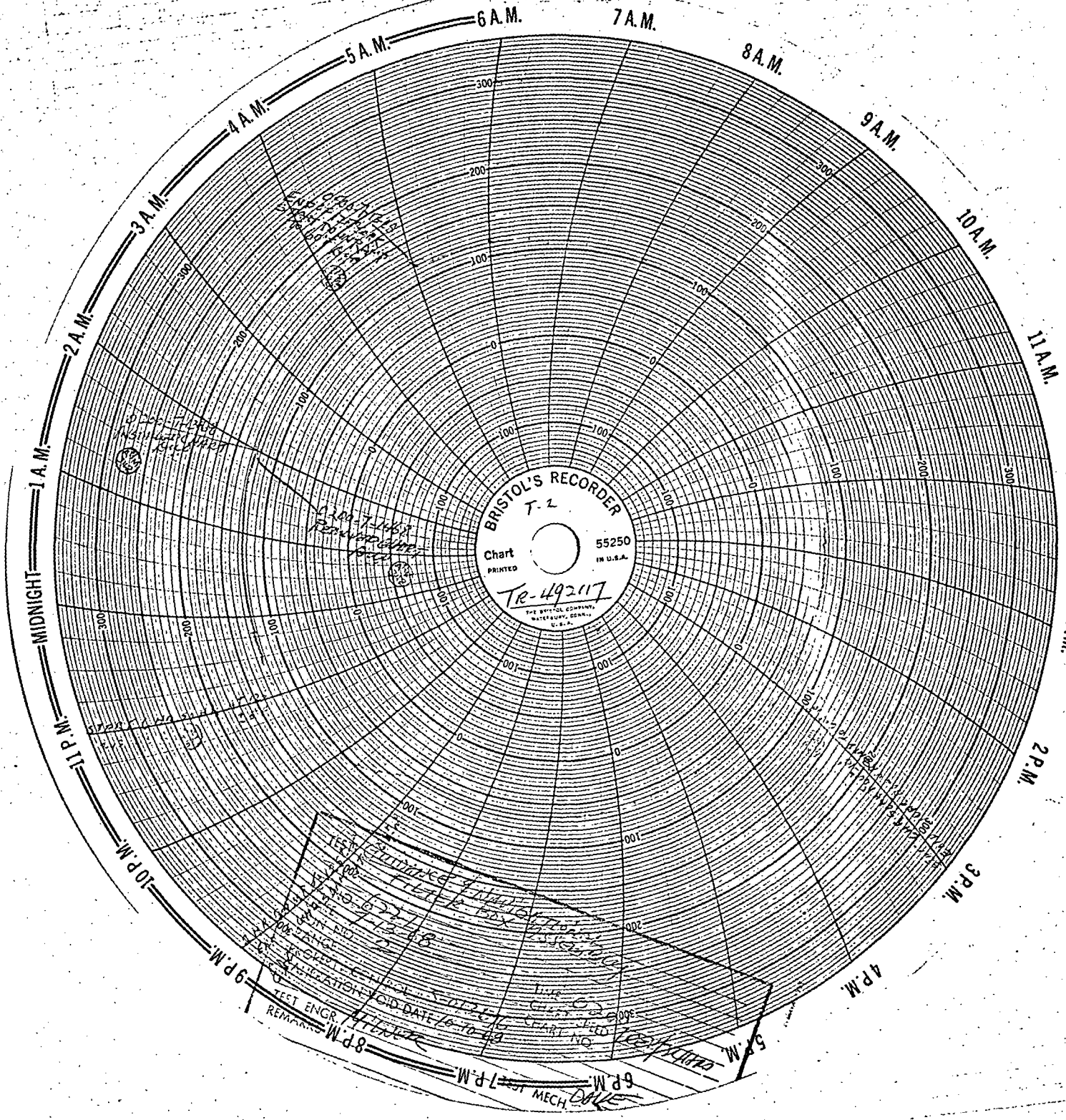
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BRISTOL'S RECORDER
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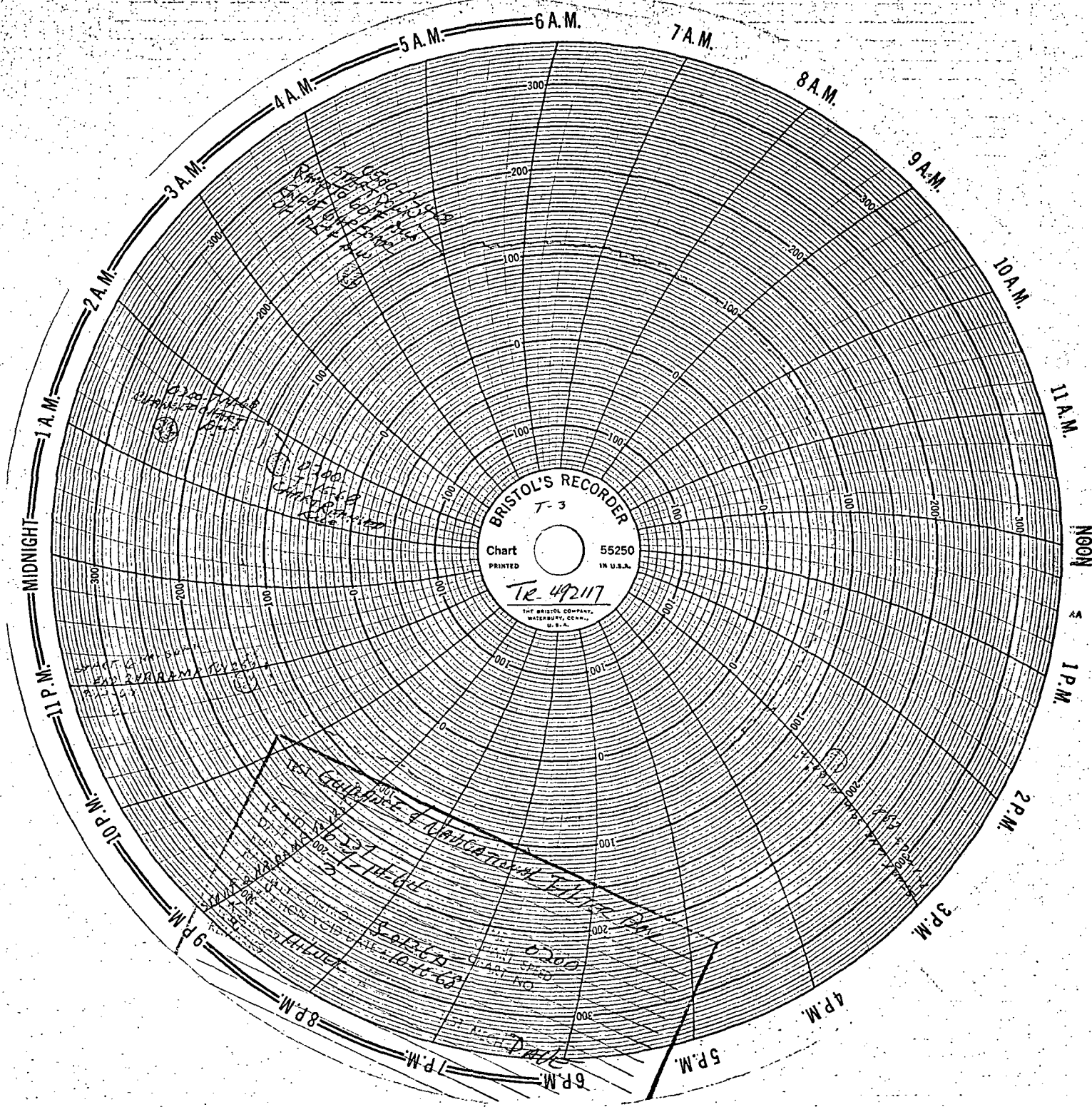
IN U.S.A.
TR-492117
THE BRISTOL COMPANY
WATERBURY, CONN.
U.S.A.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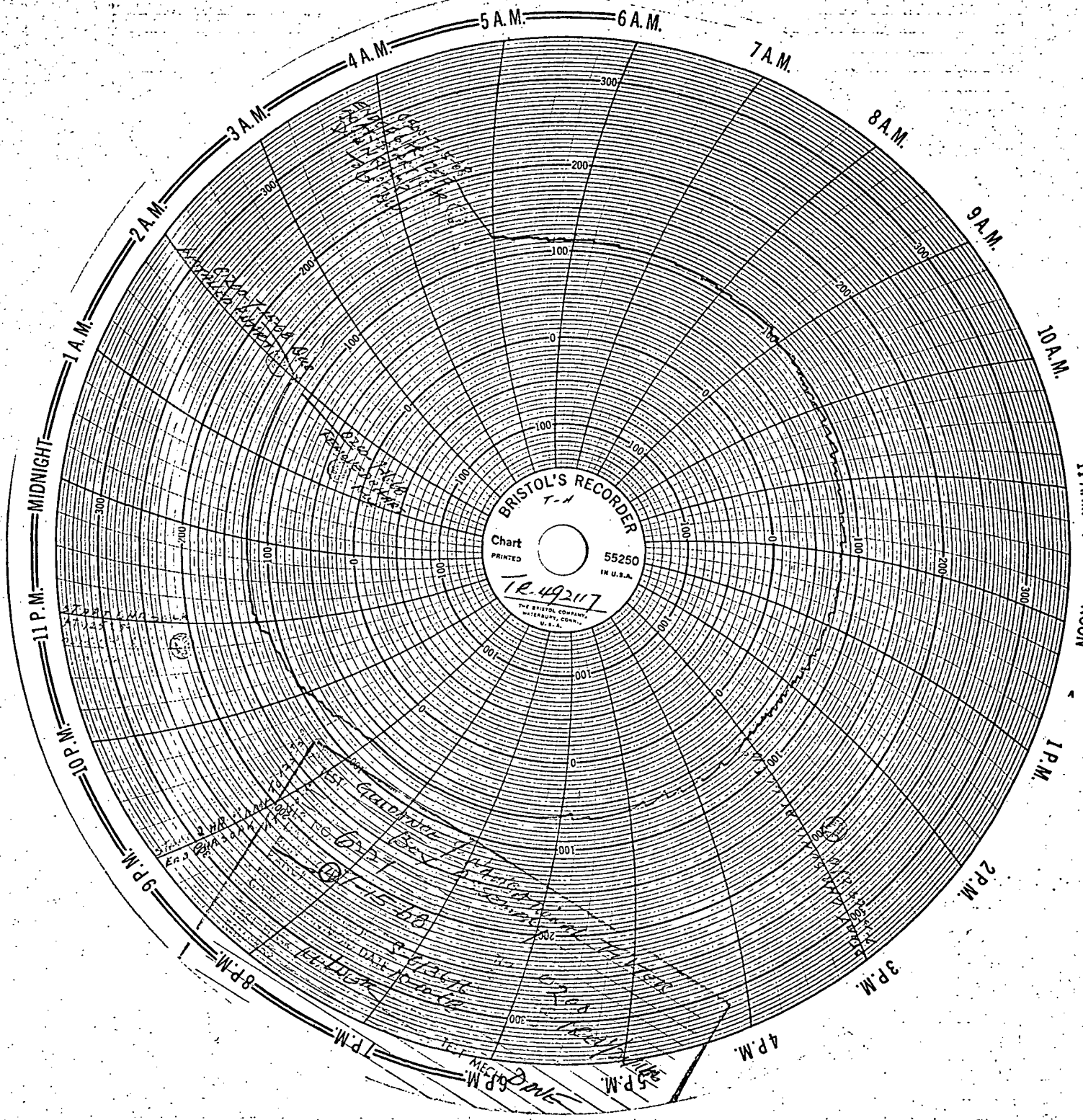
THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.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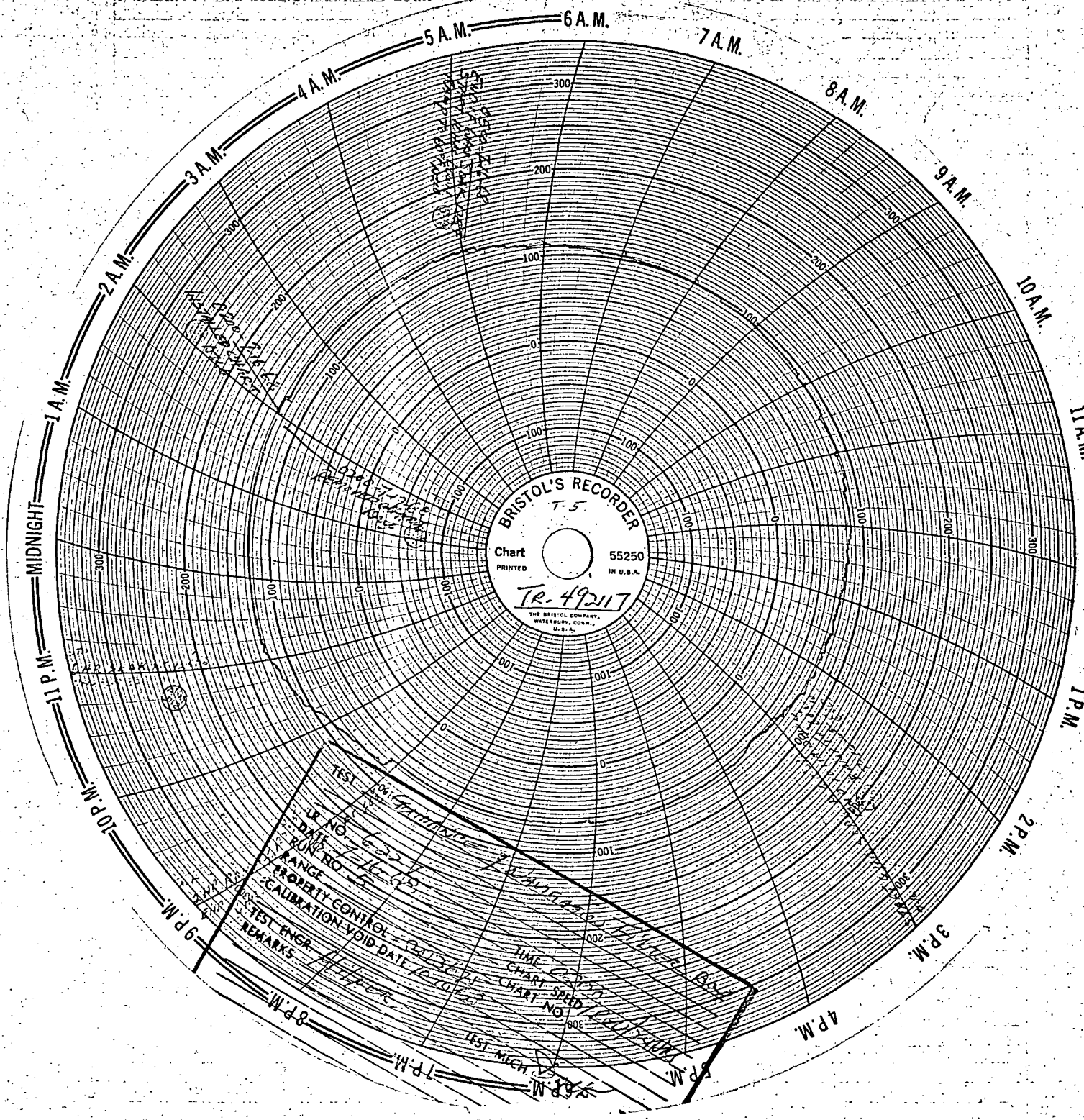
THE BRISTOL COMPANY
WATERBURY, CONN.
U.S.A.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TR. 49217
THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.
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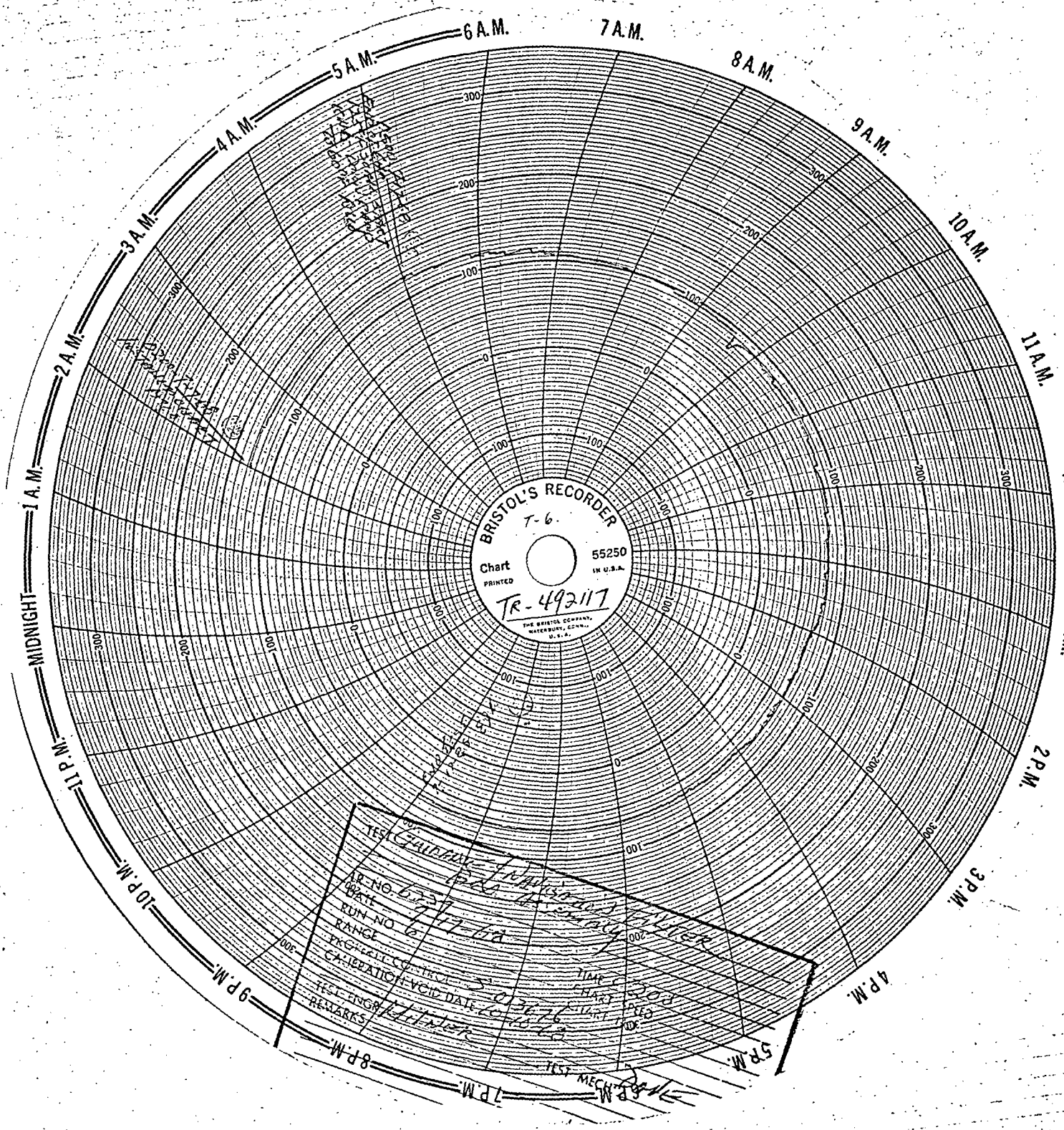
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THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.
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RANGE
CALIBRATION
REMARKS
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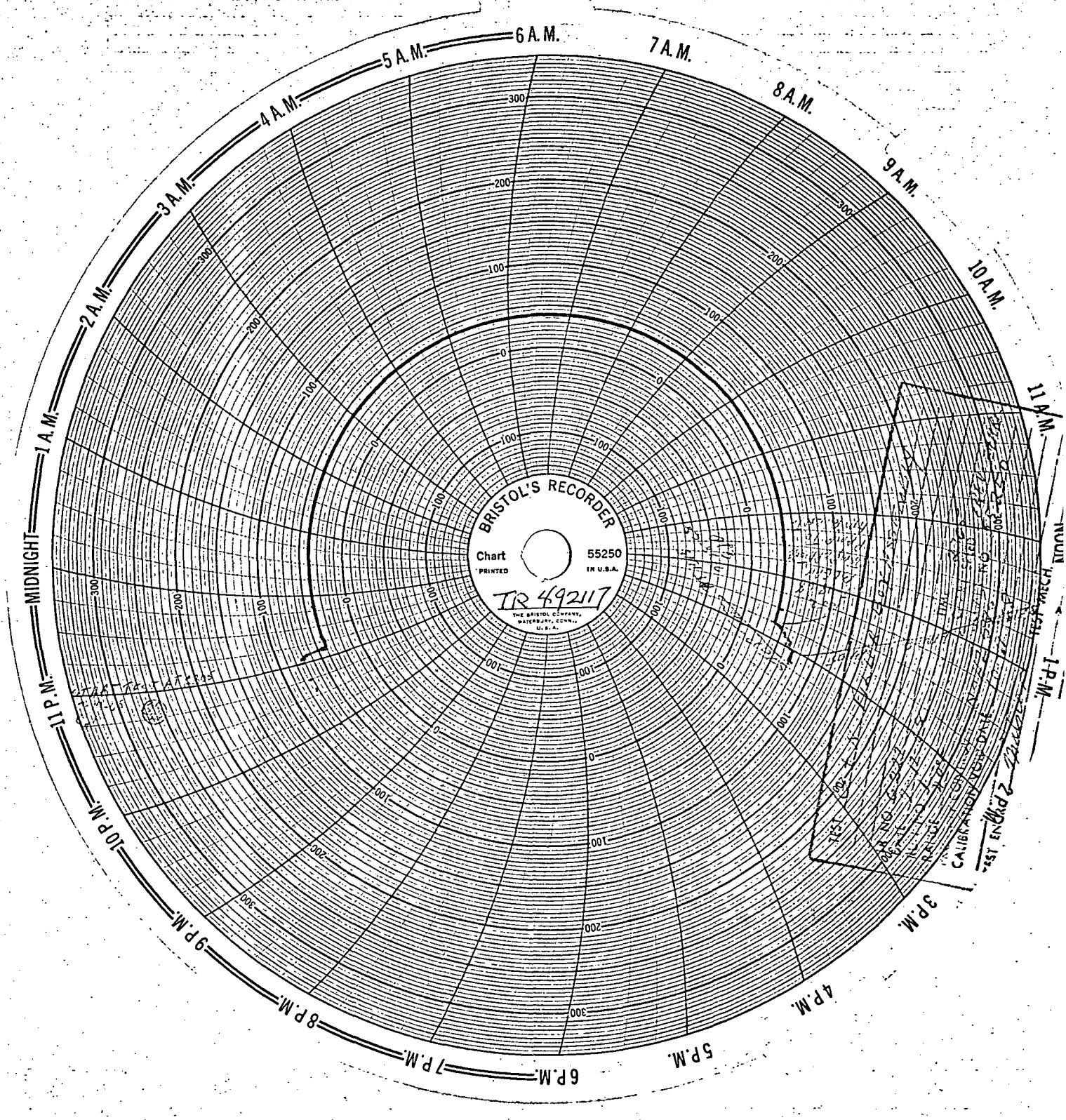
APPENDIX F

HIGH/LOW TEMPERATURE-LIFE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THE BRISTOL COMPANY
WATERBURY, CONN.
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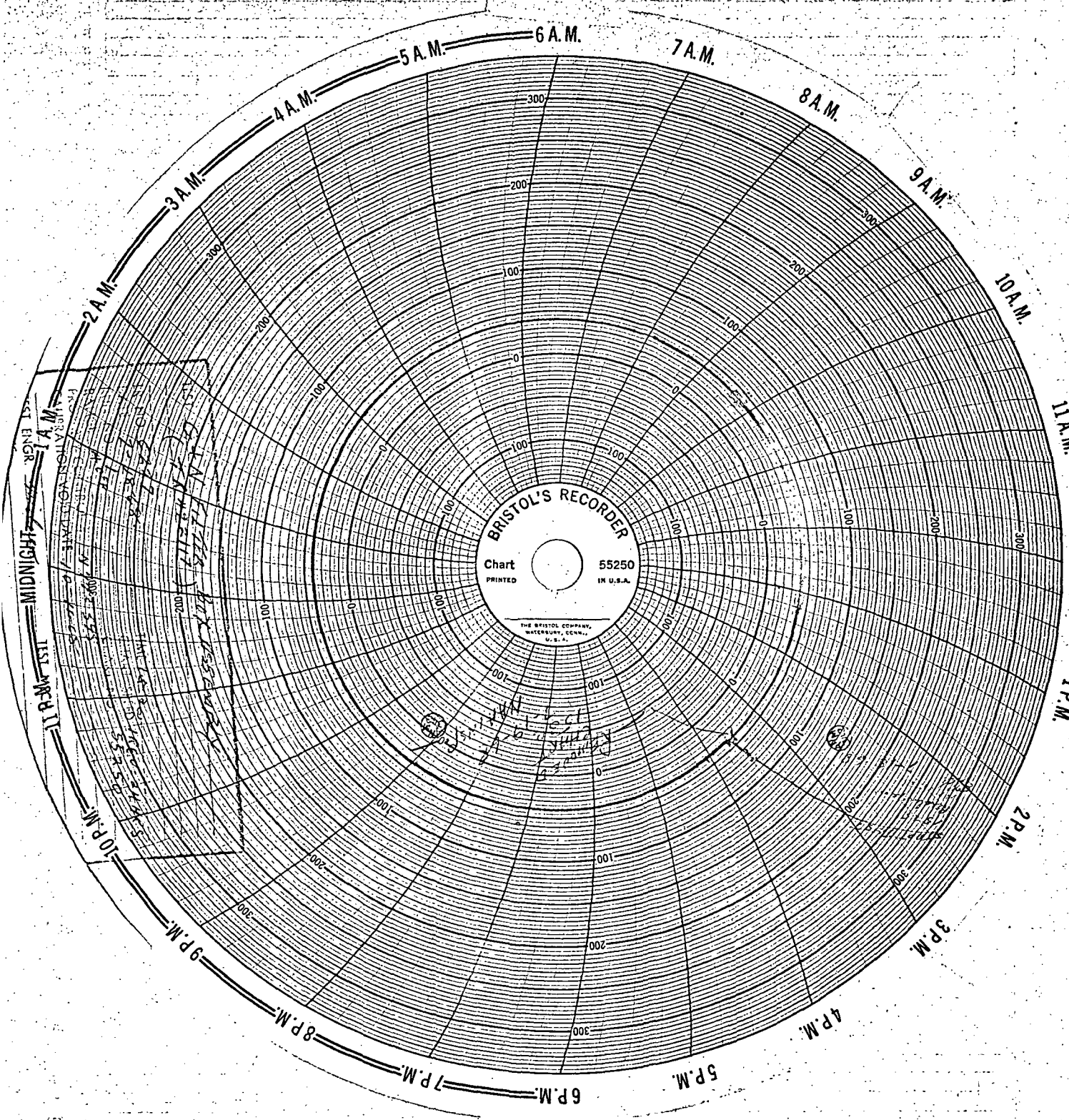
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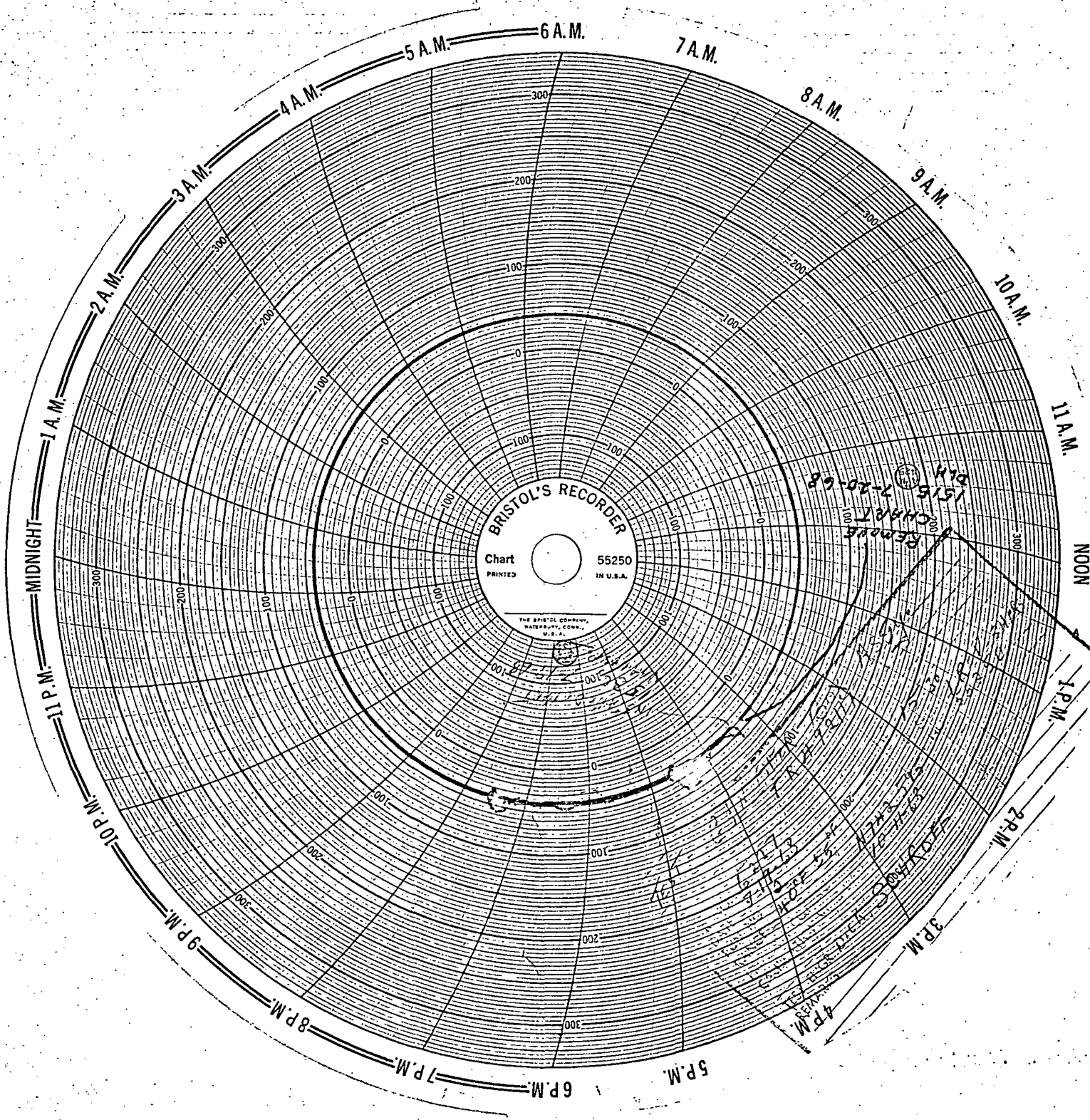
THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.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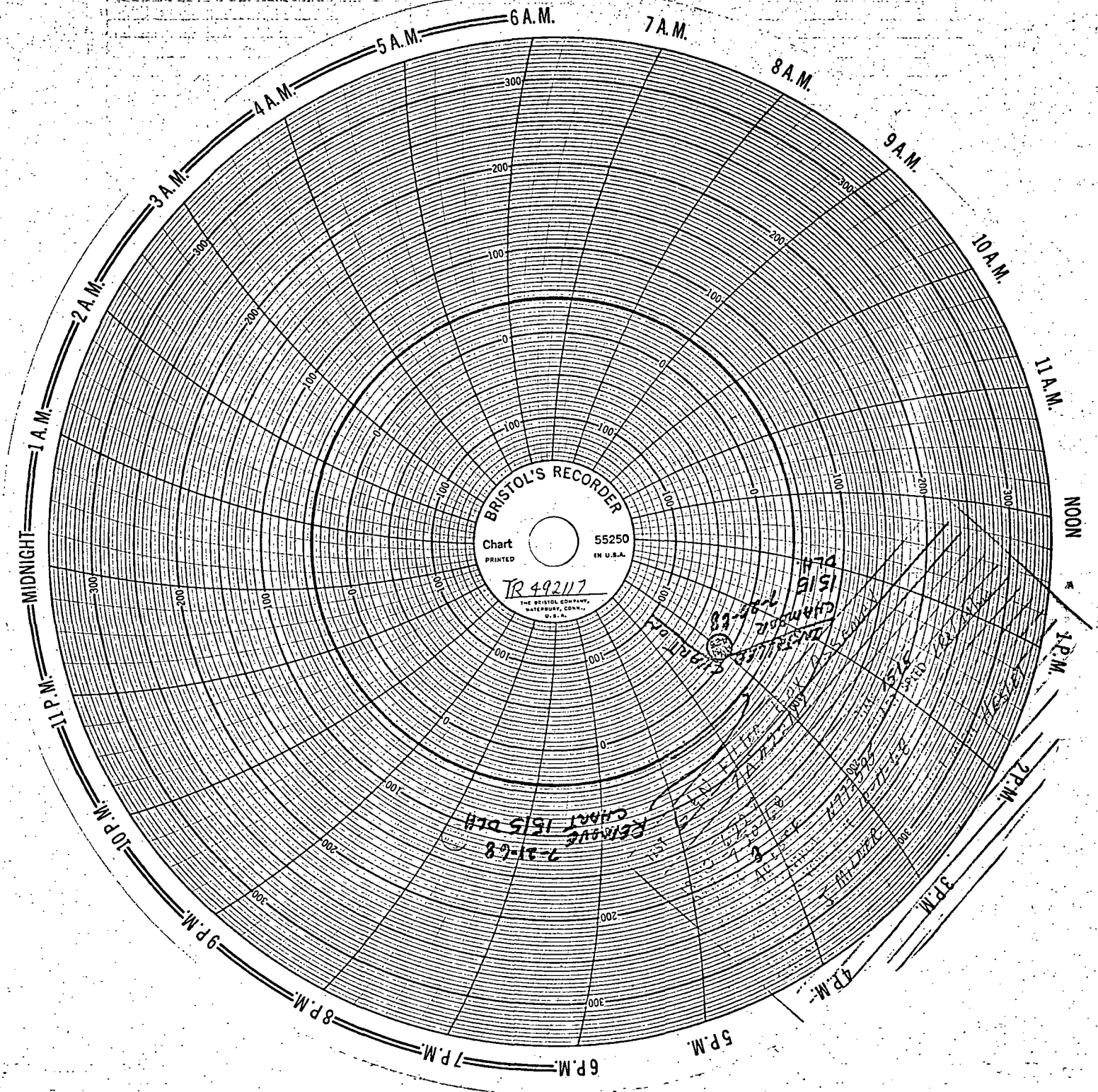
IN U.S.A.
THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.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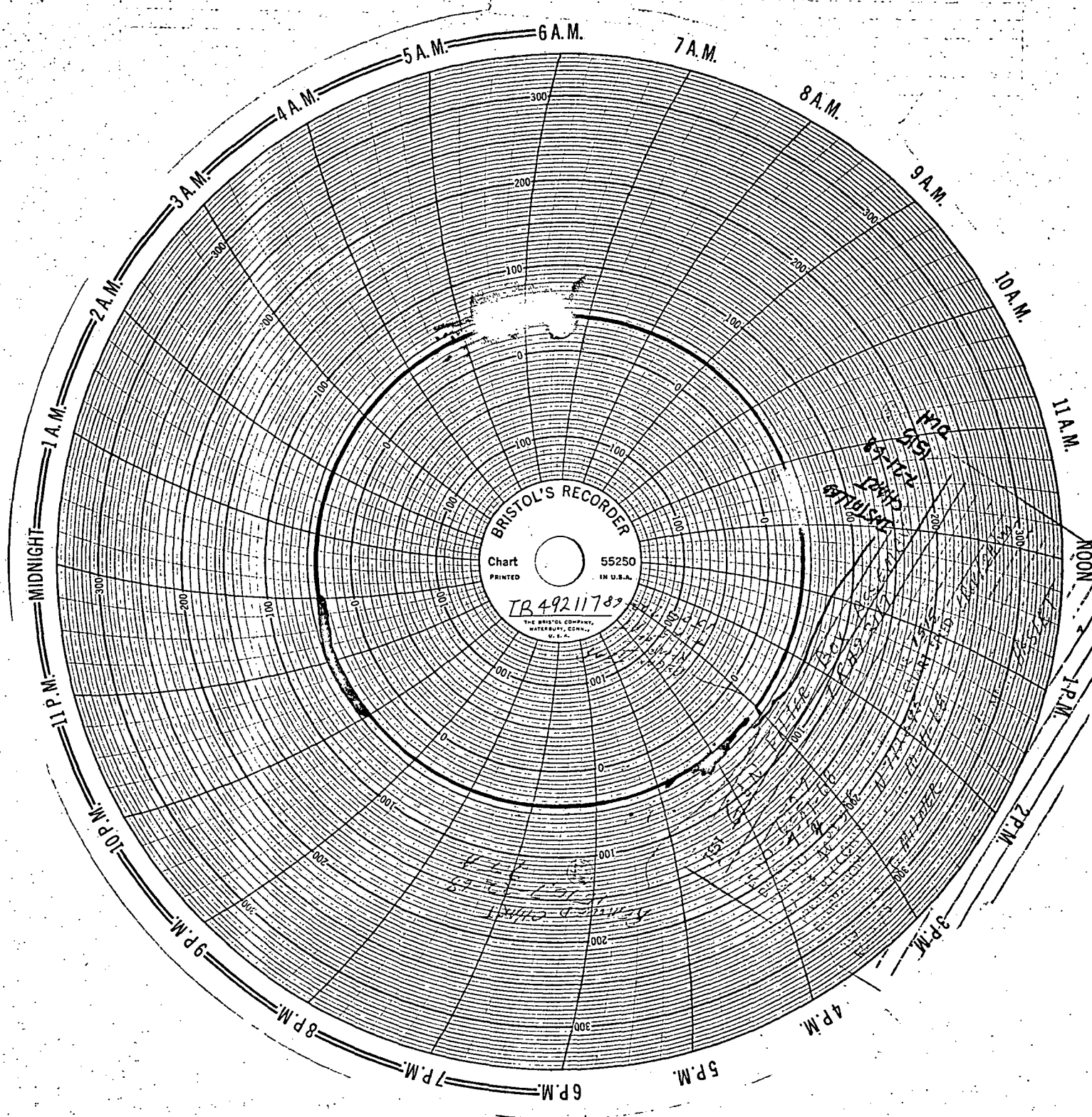
IN U.S.A.
TR 492117
THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.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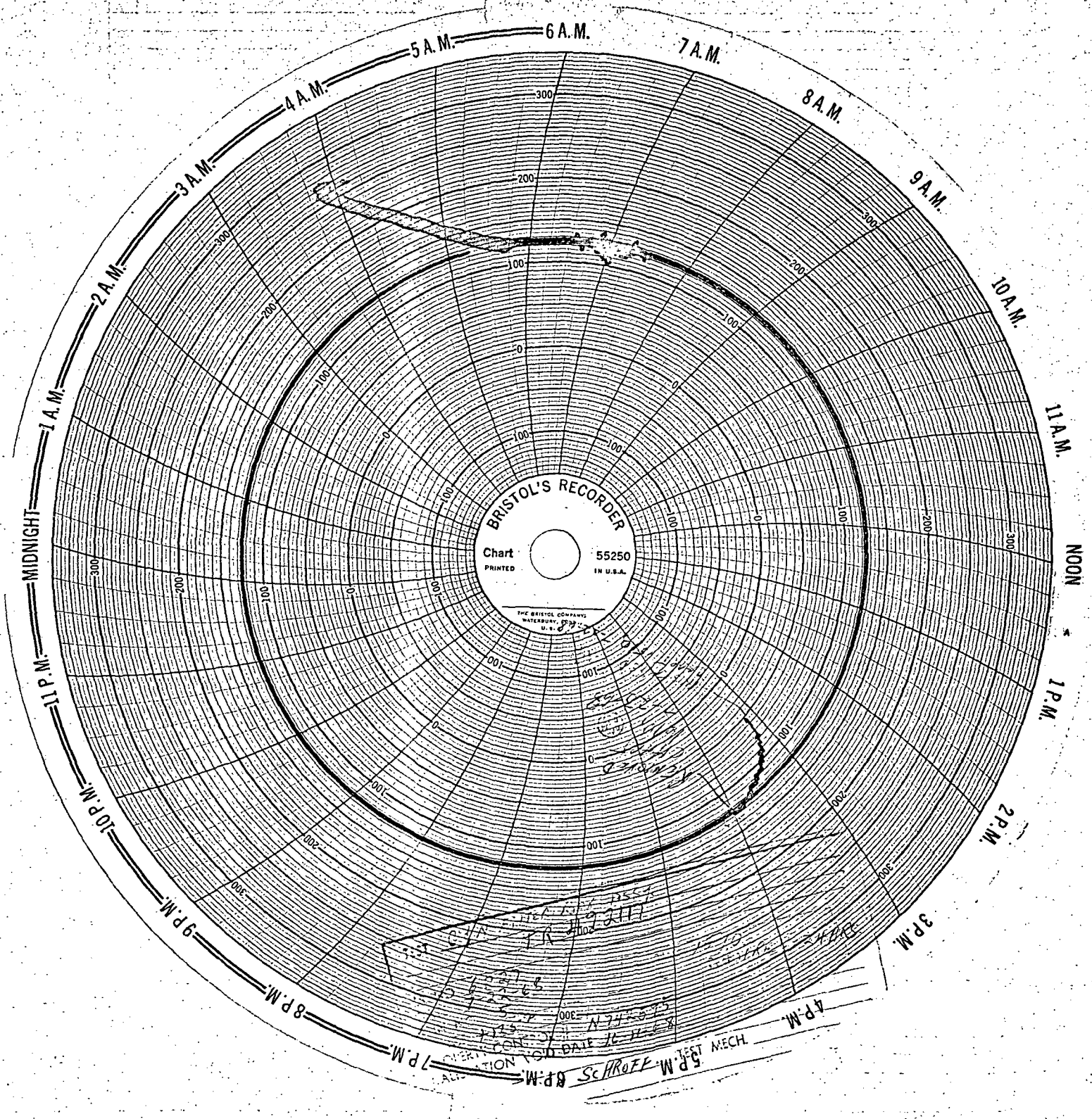
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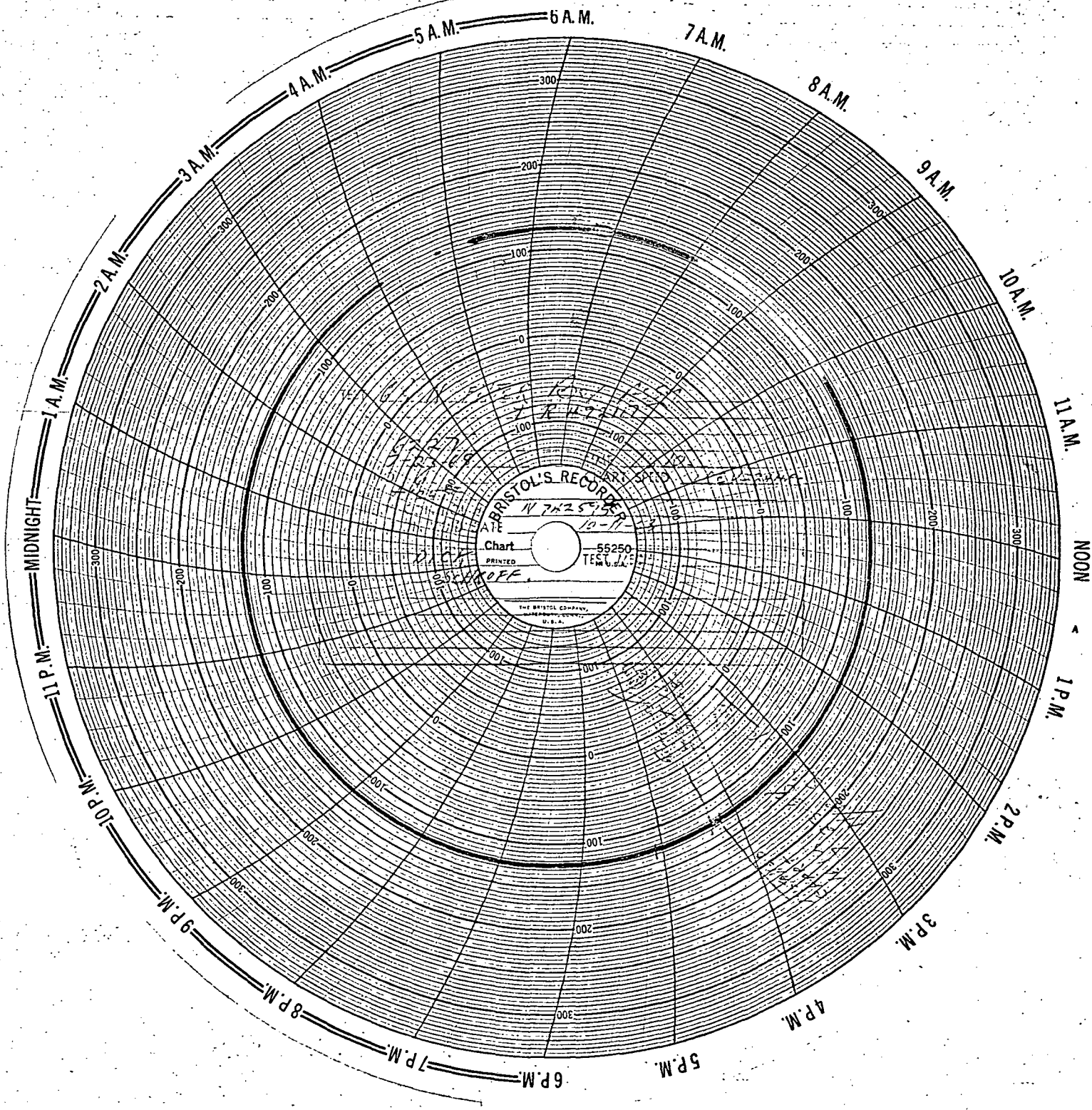
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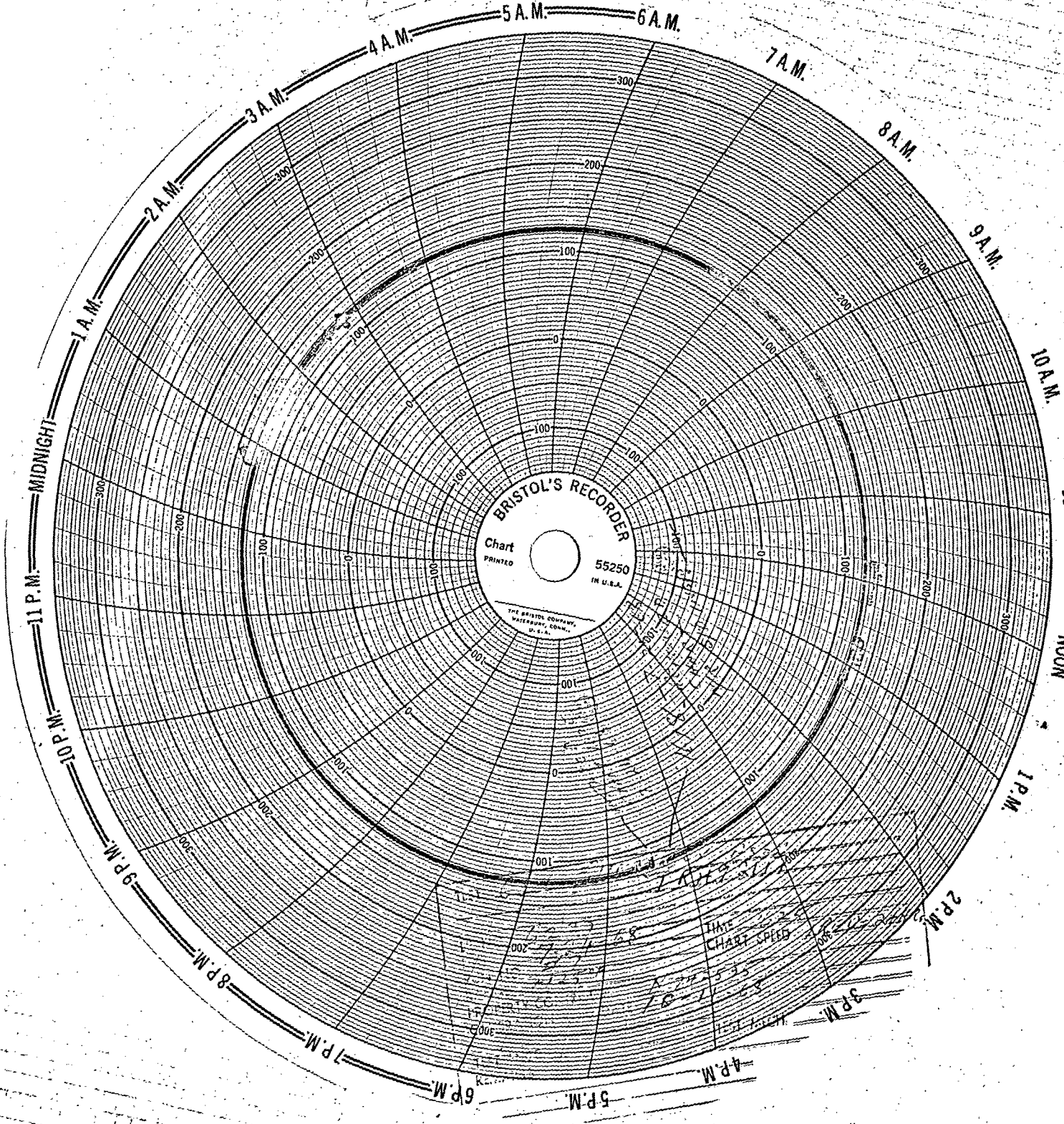
WATERBURY, CONN.
U.S.A.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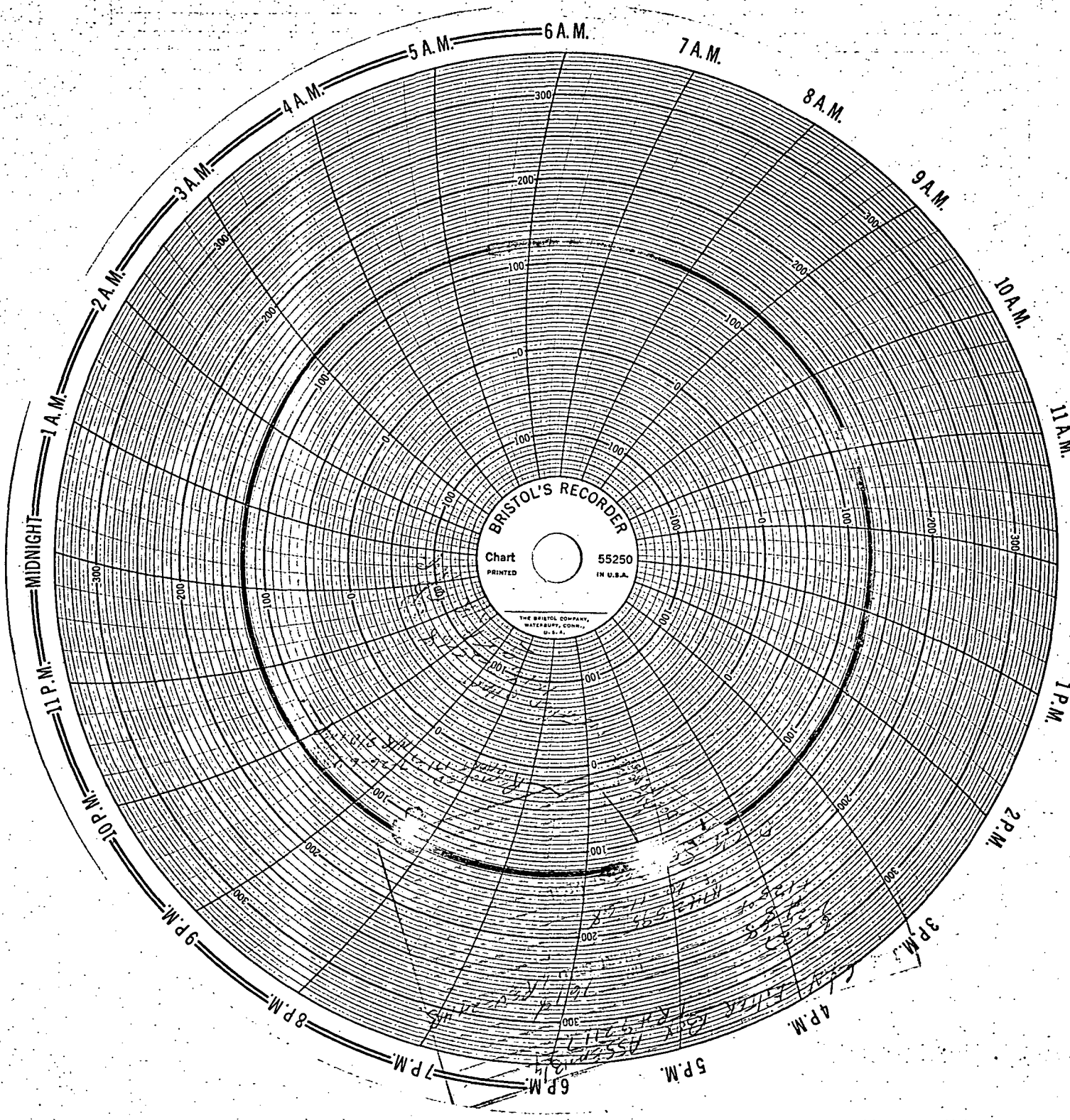
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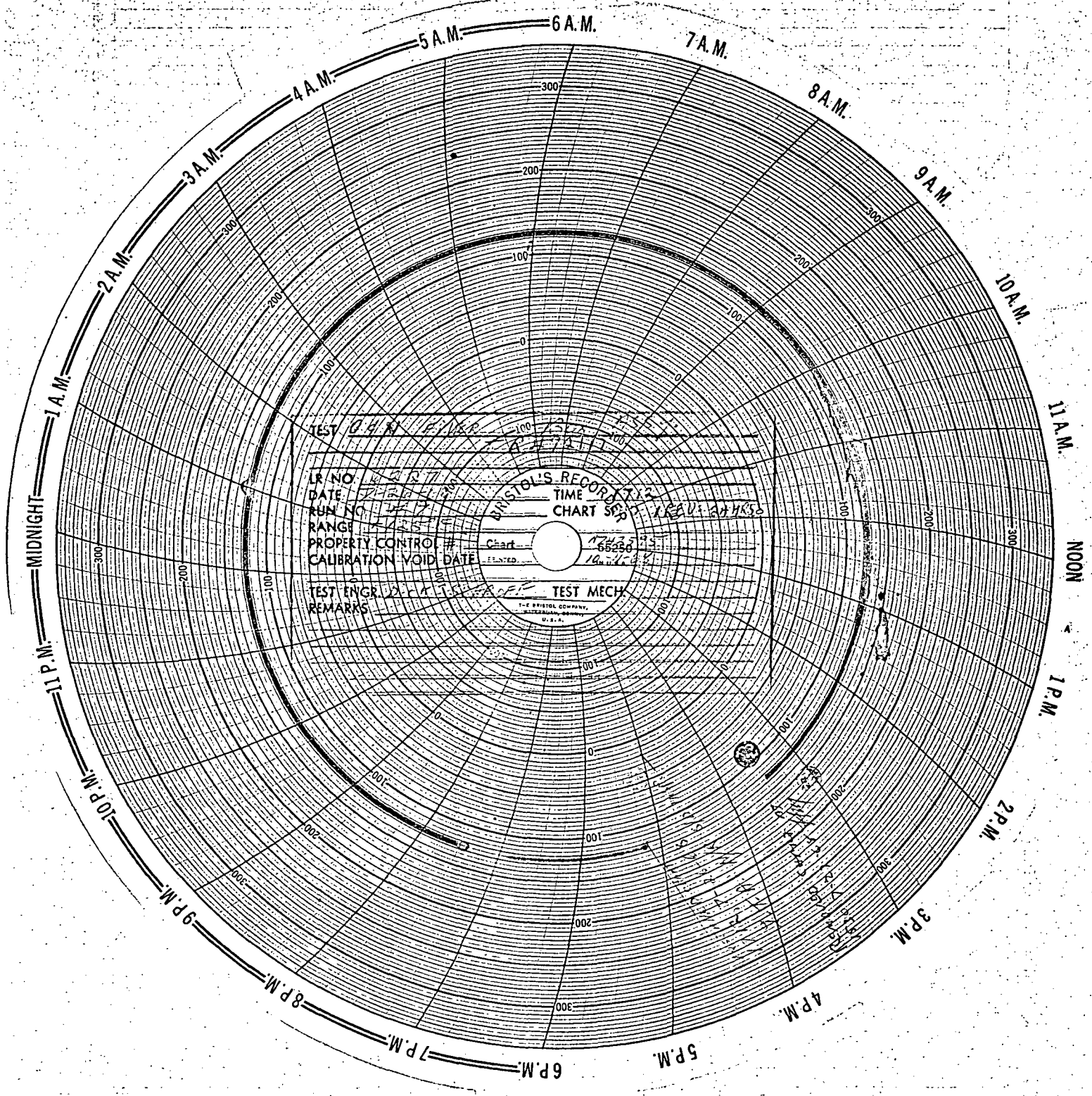
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PROPERTY CONTROL #
CALIBRATION VOID DATE
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REMARKS
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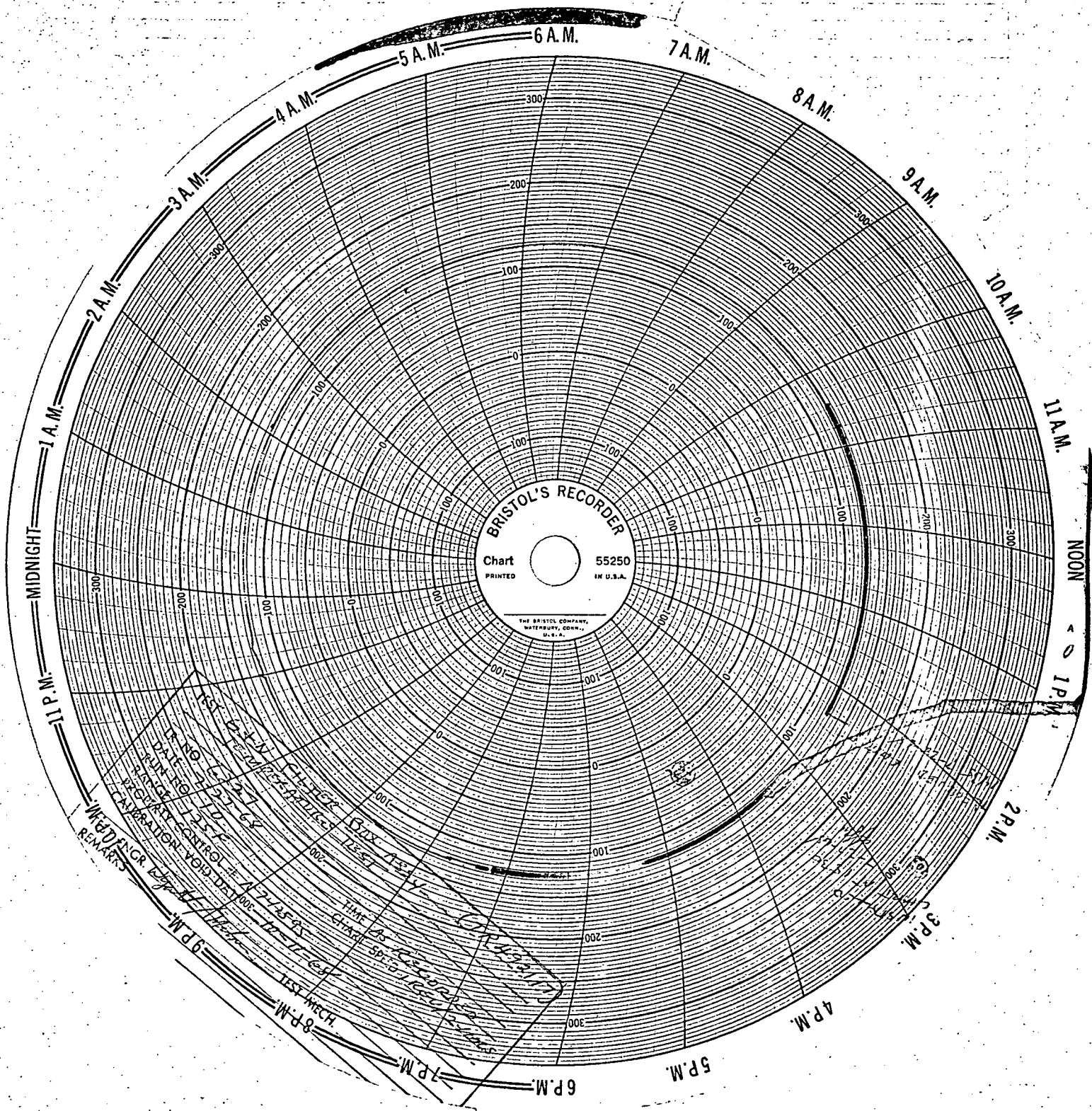
U.S.A.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THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.
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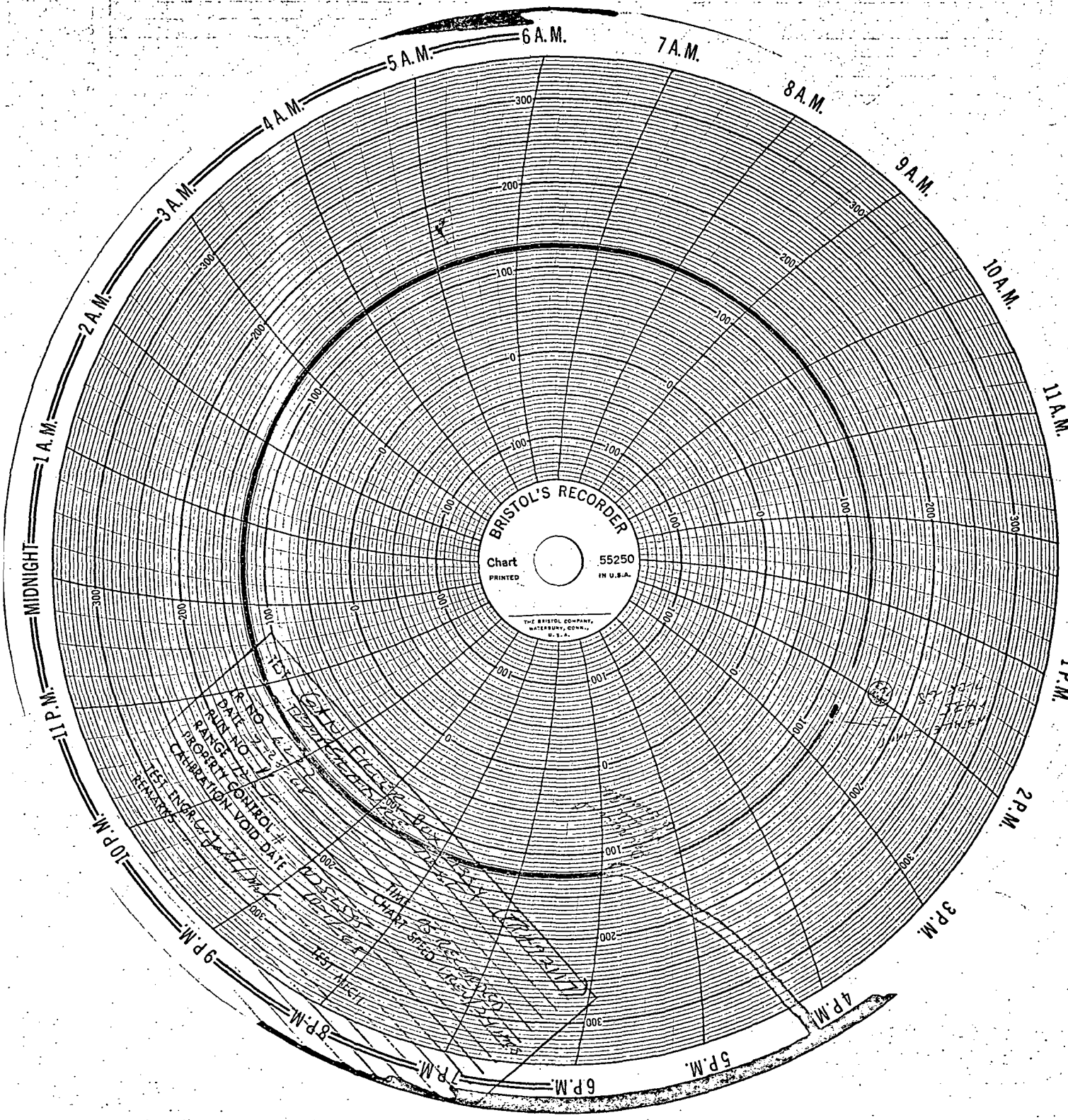
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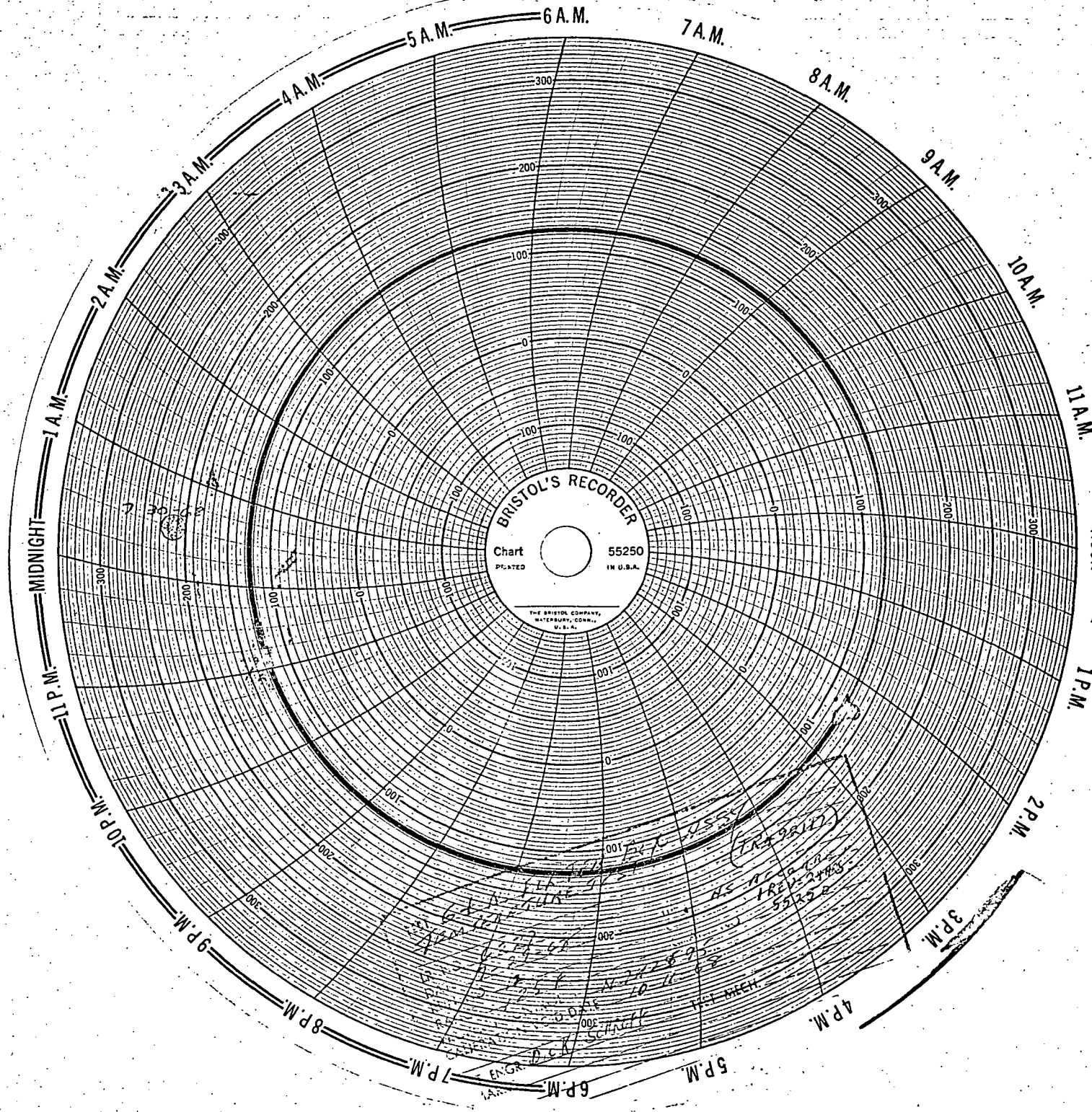
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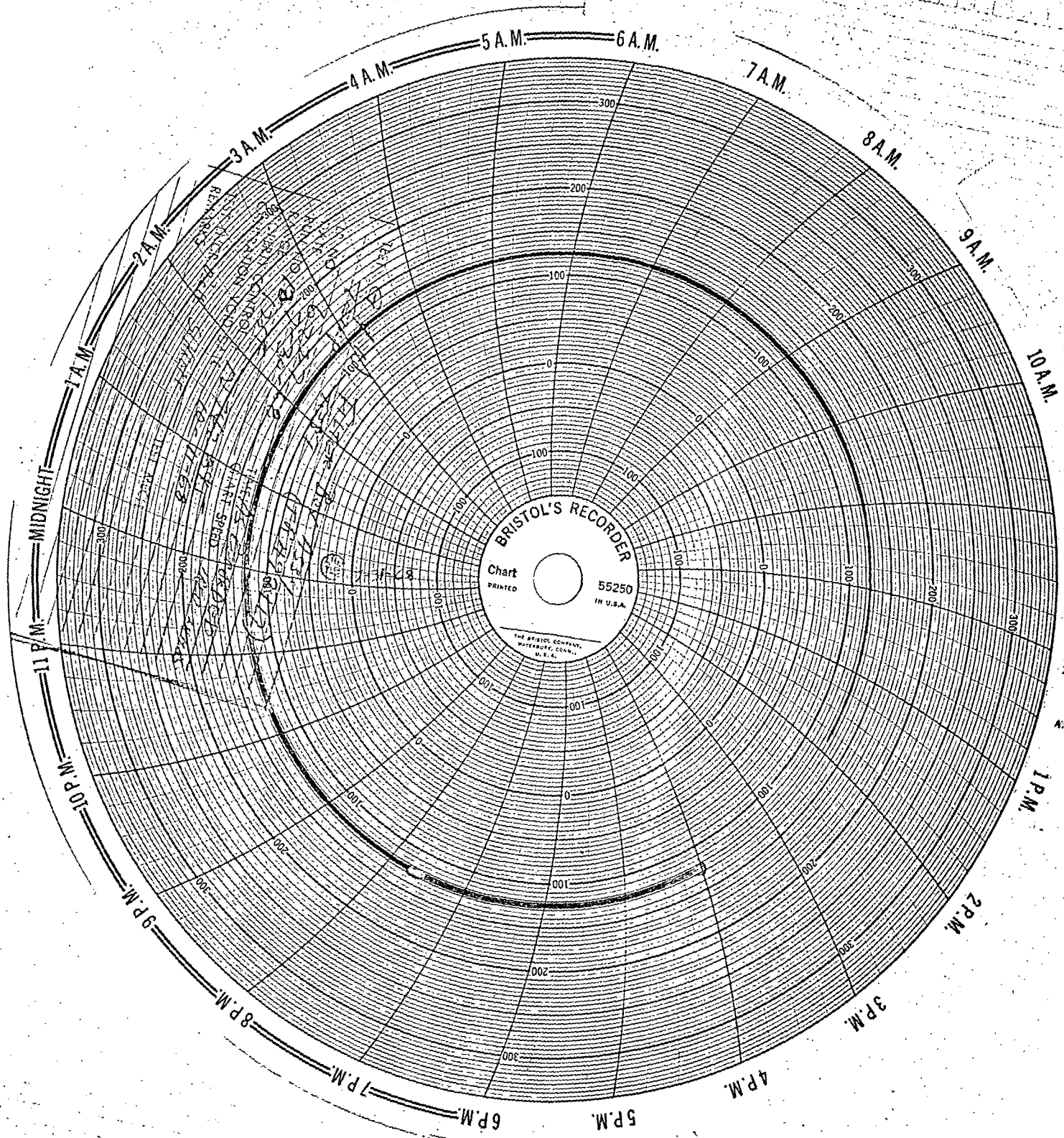
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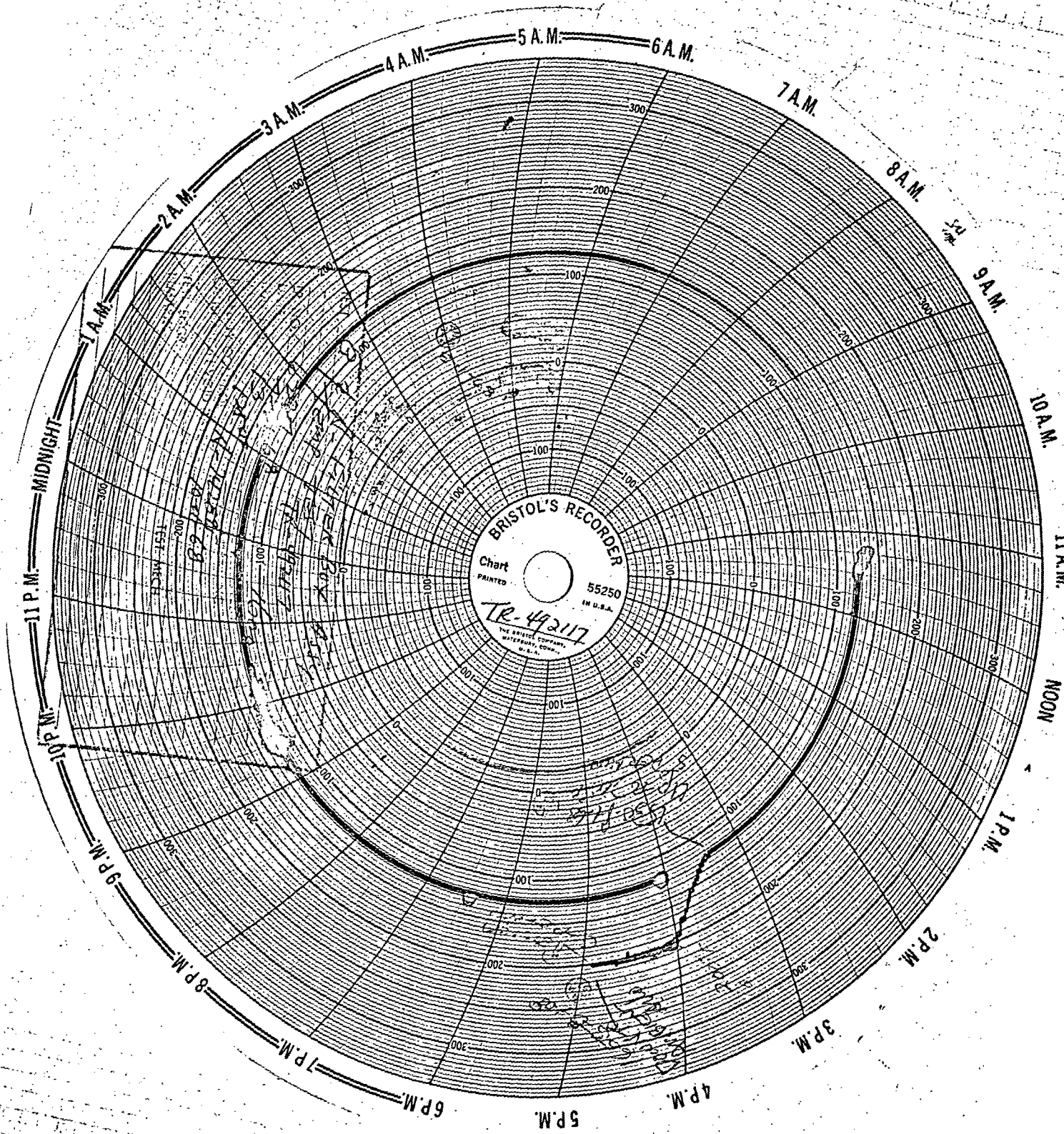
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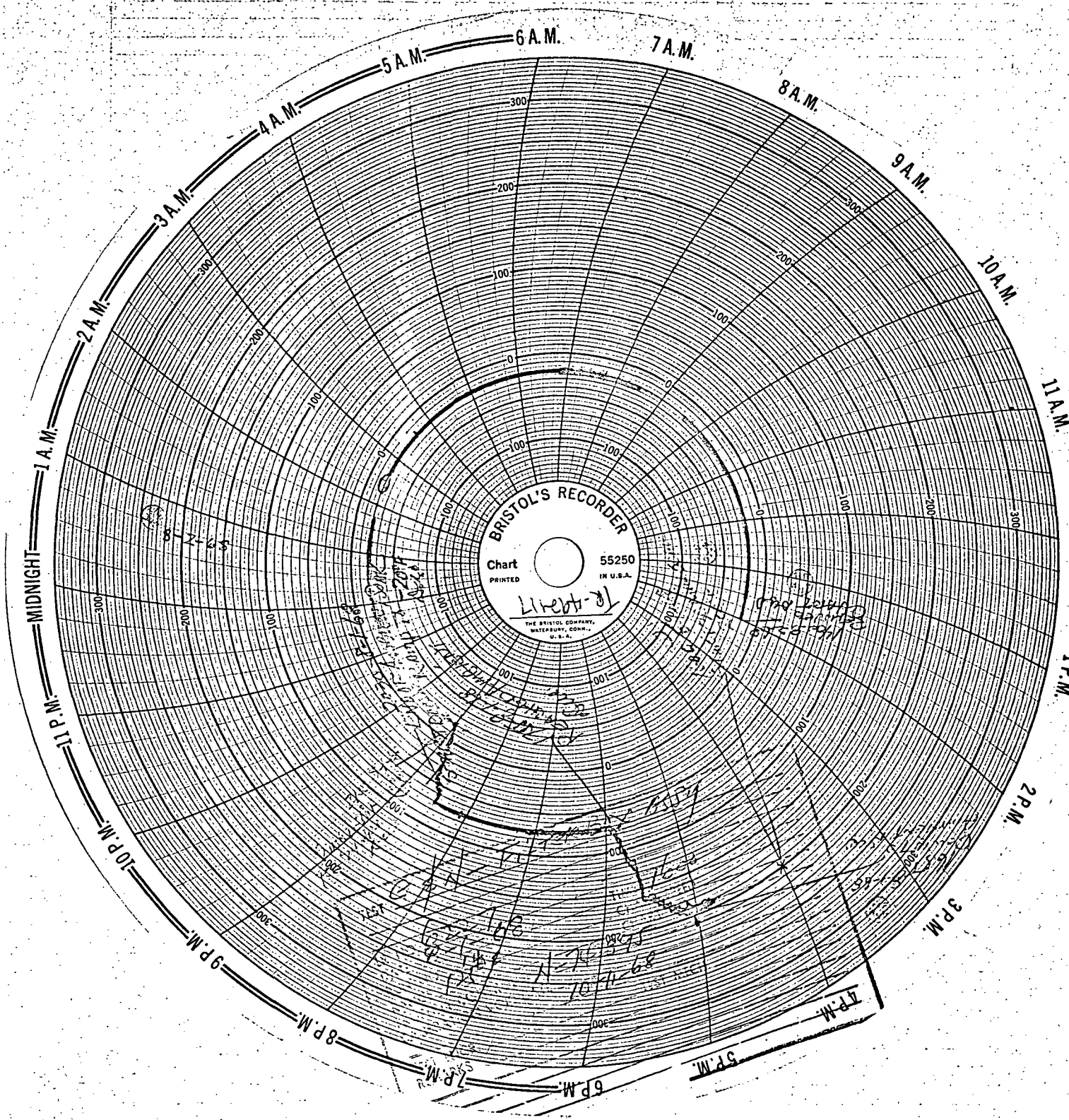
TR-42117
THE BRISTOL COMPANY, WATERBURY, CONN., U.S.A.


BRISTOL'S RECORDER
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IN U.S.A.
THE BRISTOL COMPANY,
WATERBURY, CONN.,
U.S.A.
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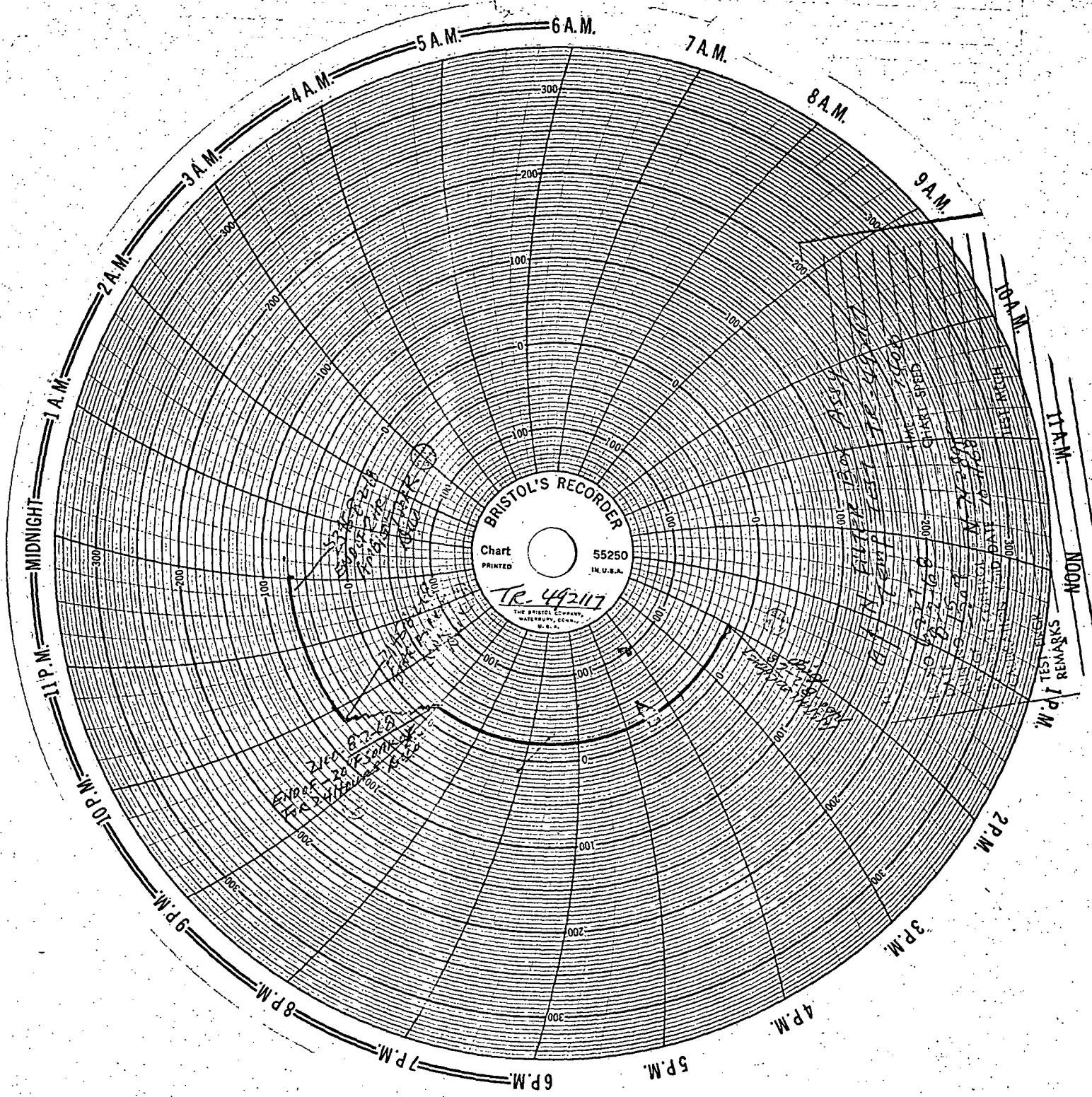
BRISTOL'S RECORDER
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IN U.S.A.
TR-49117
THE BRISTOL COMPANY
WATERBURY, CONN.
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REMARKS
TEST HIGH
TEST RIGHT
CHART SPEED
DATE

North American Aviation, Inc.

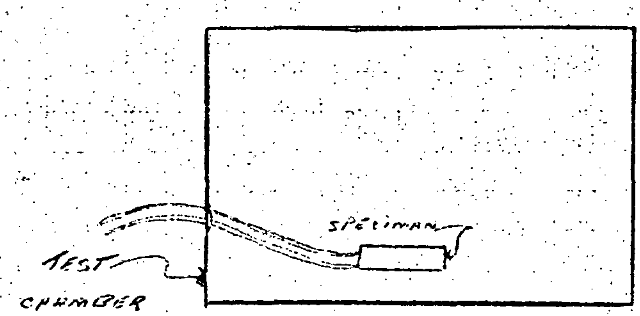
N 1997-40

DIVISION
SPACE

PROJECT NO:	CONTRACT NO.	DATE
LR6227	TR 492117	7-17-68

TEST PHASE: HIGH/LOW TEMPERATURE TEST
PARA. 3.4.3.-1 PAGE 7 OF L.R 6227 TR-492117

TEST SETUP SCHEMATIC;



HIGH/LOW TEMPERATURE TEST EQUIPMENT LIST

NOMENCLATURE	MANUFACTURE	PROP. NO	MFG. NO.	CALIB DUE.
INVIRONMENTAL CHAMBER	TENNEY	N 742595	03120	10-11-68
TEMPATURE RECORDER	BRISTOL		513094	11-68

7-17-68
THE SPECIMAN WAS PLACED IN THE CHAMBER AND THE DESIRED TEMP.
WAS REACHED AT ~~2305~~ 2313 EJB 7-17-68 (40°) EJB
RESTARTED TEST AT 1525 REACHED DESIRED TEMP. AT 1533 - 7-18-68 EJB

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: E J Bultell 7-17 1968

WITNESSED AND UNDERSTOOD: R. Lykos 7-17 1968

FORM A02-G REV. 7-66

North American Aviation, Inc. N 1997-41

DIVISION		
SPACE		
PROJECT NO: LR 6227	CONTRACT NO. TR 492117	DATE 7-17-68

CONTINUED FROM PAGE N1997-40

THE SPECIMEN IS EQUAL TO THAT DEFINED IN THE APPROVED TEST REQUEST (TR 492117) PARA. 3.4 AND THE TEST SETUP IS ADEQUATE TO MEET THE REQUIREMENTS OF THE HIGH/LOW TEMPERATURE TEST AS DEFINED IN THAT TEST REQUEST.

SIGNED R.G. Schrott 7-17-68

VERIFIED N.A

VERIFIED E. Immerheft 7-17-68

ALL TEMPERATURE DATA IS RECORDED ON TEMPERATURE CHARTS.

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM AOR-6 REV. 7-66

SIGNATURE: E.J. DeWall 7-17 1968

WITNESSED AND UNDERSTOOD: R. Lykes 7-17 1968

APPENDIX G

VACUUM

North American Aviation, Inc. N 2907-1

DIVISION		
41 SPACE DOWNEY		
PROJECT NO: 4R 6227	CONTRACT NO. NAS 49-2117 "A"	DATE August 3, 1968

TEST TITLE: GUIDANCE AND NAVIGATIONAL FILTER BOX ASSEMBLY QUALIFICATION TEST

RESPONSIBLE ENGINEER. MR. P.W. EDWARDS D/098-212 EXT 5715

APPLICABLE DOCUMENTS

NR/SD SPECIFICATIONS

MC999-0050C GENERAL TEST REQUIREMENTS FOR APOLLO SUB-CONTRACTORS AND SUPPLIERS

MAO 203-0622 SAFTY REQUIREMENTS

~~CTR 25492117 6010~~ WDM

NR/SD DRAWINGS

V36-442330 BOX ASSEMBLY - G&N FILTER (EO M672744)

V36-44401

V36-945072 SCHEMATIC DIAGRAM - G&N FILTER BOX (NO EO's)

SHOULD BE V36-44401 EO ELECTRICAL SYSTEMS INSTALLATION

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM 498-G REV. 7-66

SIGNATURE: W W McKee 8-3 1968

WITNESSED AND UNDERSTOOD: E. Tomechak 8-3 1968

North American Aviation, Inc. N 2907- 2

DIVISION		
41 SPACE Downey		
PROJECT NO: 2/R 6227	CONTRACT NO. ATR 492117 "A"	DATE August 3 1968

NR/SD TEST REQUEST
ATR 492117 "A" GUIDANCE AND NAVIGATIONAL FILTER BOX ASSEMBLY

LABORATORIES AND TEST DOCUMENTS.

1L-6227-801A

TEST INDEX.

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: J. R. Black 8/3 1968

WITNESSED AND UNDERSTOOD: R. Jamison 8-3 1968

______ 19__

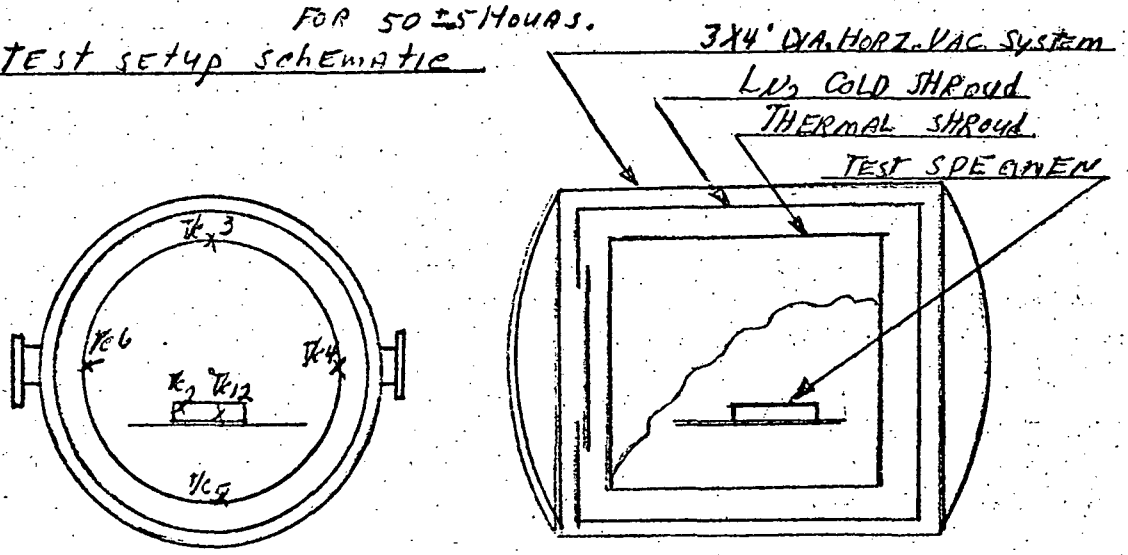
FORM AD3-G REV. 7-66

North American Aviation, Inc. N 2907- 3

DIVISION		
41- (DOWNEY) SPACE		
PROJECT NO: 4/R 6227	CONTRACT NO. AIR 49211 7 A	DATE August 3, 1968

TEST PHASE: VACUUM AT R 49211 7 A PAGE 8 PARA 3.5 OF AT LEAST 1×10^{-4} mm Hg AND CHAMBER WALL TEMP. OF 40 ± 5°F FOR 50 ± 5 HOURS AND 135 ± 5°F FOR 50 ± 5 HOURS.

TEST SETUP SCHEMATIC



THERMOCOUPLE LOCATION
TC 2 ON TOP SIDE OF SPECIMEN
TC 12 ON TOP SIDE OF SPECIMEN
TC 3, TC 4 TC 5 & TC 6 LOCATE IN EACH QUADRANT OF THE THERMAL SHROUD.

TEST EQUIPMENT LIST:

NOMENCLATURE	MFG	PROPERTY NUMBER	METROLOGY NUMBER	CALIBRATION DUE DATE
RECORDER TEMPERATURE	BARBER COLMAN	5020488	16053	11-24-68
RECORDER PRESSURE	BARBER COLMAN	5019866	24246	10-23-68
IONIZATION GAUGE CONTROL	HERRMANN ASSOC	5019097	07699	11-22-68
THERMAC TEMP CONTROLLER	RESEARCH INSTRUMENTS	N78294	24267	1-14-68
VACUUM SYSTEM	CONSOLIDATED VAC. CORP.	5013797	N/A	N/A

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: W D McKee 8-3 68

WITNESSED AND UNDERSTOOD: E. Hamabata 8-3 19 68

FORM A03-G REV. 7-66

North American Aviation, Inc. N 2907- 4

DIVISION		
41 SPACE DOWNEY		
PROJECT NO: 4R 6227	CONTRACT NO: AFR 492117 "A"	DATE August 31968

THE SPECIMEN IS EQUAL TO THAT DEFINED IN THE APPROVED test REQUEST (TR 492117 "A") AND THE TEST SET UP IS ADEQUATE TO MEET THE REQUIREMENTS OF THE TEST AS DEFINED IN THAT TEST REQUEST.

OK to test Paul W. Edwards
L&T RESPONSIBLE TEST ENGINEER

VERIFIED E. Tremblay 8-3-68
NAJSD INSPECTION DEPT.

THE GUIDANCE & NAVIGATIONAL FILTER BOX ASSEMALY WAS PLACED IN THE VACUUM SYSTEM AND THE INSTRUMENTATION WAS CONNECTED BY D/G98-212. TWO THERMO COUPLES WERE BONDED BY USING ALUMINUM ADHESIVE TO SECURE THE T/C IN PLACE. START A PRETEST FUNCTIONAL, PARA. 3.5.1 AS SPECIFIED IN PARA 2.5 AT ROOM AMBIENT CONDITION

0530 COMPLETED PRETEST FUNCTIONAL, CLOSED THE CHAMBER DOOR AND STARTED ROUGHING SYSTEM. 8-3-8

THE INSULATION RESISTANCE, CONTINUITY, CAPACITANCE TEST RESULTS ARE RECORDED AND NOTED IN LABORATORY NOTE BOOK N1997-34

0630 CHAMBER PRESSURE 140 MICRONS ALL T/C's 75°F ± 3

TEST DATA SEE PAGE N2907-5

FORM A93-G REV. 7-65

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: W D McKee 8-3 1968

WITNESSED AND UNDERSTOOD: E Tremblay 8-3 1968

North American Aviation, Inc. N 2907- 5

DIVISION: 41 SPACE Downey

PROJECT NO: 4R 6227 | CONTRACT NO. AtR 49 2117 A | DATE August 3 1968

Continued From Page N 2907-4

DATE OR TIME	DATA POINT	CHAMBER PRESSURE mm Hg	TEMPERATURES SPECIMEN T/C 2	T/C 12	THERMAL SHROUD T/C 3	T/C 4	T/C 5	T/C 6	REMARKS
0630	1	120 4	70	74	75	55	75	75	
0650	2	4.5×10^{-5}							Start LN_2
0700	3	3.9×10^{-6}	77	75	75	82	100	-300	Open Lead on T/C #6
0730	4	2.2×10^{-6}	64	58	45	55	89	59	8-2-8
0800	5	1.4×10^{-6}	43	44	35	35	72	39	
0900	6	1.0×10^{-6}	42	43	33	39	77	36	
10:00	7	6.9×10^{-7}	40	40	44	54	94	53	
11:00	8	6.2×10^{-7}	39	38	37	53	95	55	
12:00	9	6.0×10^{-7}	37	41	49	59	100	61	Functional at temp.
1300	10	6.0×10^{-7}	43	45	45	59	102	60	and vacuum per
1400	11	5.6×10^{-7}	43	43	47	57	96	58	para 3.5.2
1500	12	5.8×10^{-7}	40	43	47	58	100	58	
1600	13	5.7×10^{-7}	38	38	47	57	93	57	
1700	14	5.6×10^{-7}	38	38	46	57	98	58	
1800	15	5.3×10^{-7}	40	43	47	58	99	54	
1900	16	4.8×10^{-7}	43	43	48	57	100	59	
2000	17	4.8×10^{-7}	40	40	50	55	101	61	
2100	18	4.6×10^{-7}	41	42	48	58	100	64	
2200	19	4.5×10^{-7}	43	44	52	60	105	60	
2300	20	4.2×10^{-7}	40	40	43	58	98	54	
2359	21	4.1×10^{-7}	38	42	44	52	94	58	
00:58	22	4.0×10^{-7}	38	39	44	54	95	55	WDm
01:08	23	4.0×10^{-7}	42	42	50	61	101	~~61~~ 61	
02:58	24	4.0×10^{-7}	39	43	46	56	98	56	
03:57	25	3.9×10^{-7}	41	43	50	58	100	55	
0458	26	3.9×10^{-7}	41	44	50	55	100	56	
0559	27	3.9×10^{-7}	39	41	50	55	98	55	G-5
0659	28	4.0×10^{-7}	39	38	50	56	95	56	

Test Data Continued on Page N 2907-6

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: W. D. McKee 8/4 19 68

WITNESSED AND UNDERSTOOD: E. Tomechek 8-4 19 68

FORM A93-G REV. 7-66

North American Aviation, Inc. N 2907-6

DIVISION: 41 SPACE DOWNEY

PROJECT NO: R 6227-801 | CONTRACT NO.: AYN 492117 "A" | DATE: August 4 1968

Continued from page N2907-5

DATE OR TIME	DATA Point	CHAMBER PRESSURE torr	TEMPERATURES Specimen T/C 2	Specimen T/C 12	Thermpl T/C 3	Thermpl T/C 4	Shroud T/C 5	Shroud T/C 6	REMARKS
8-4-68 0802	29	4.0x10-7	43	40	44	55	97	55	
0901	30	3.8x10-7	38	39	43	54	96	56	
10:00	31	3.6x10-7	41	42	44	54	97	55	
Start repeat function test at 24 hours data obtained in laboratory/engineering notebook N1997-									
11:01	32	3.6x10-7	39	39	44	54	94	59	
12.00	33	3.7x10-7	41	43	44	54	88	57	
1300	34	3.8x10-7	37	40	42	51	94	53	
1402	35	3.9x10-7	36	37	41	51	94	52	
1500	36	4.1x10-7	36	37	43	51	95	54	
1601	37	3.9x10-7	37	37	43	53	95	54	
1700	38	4.0x10-7	40	38	45	55	100	55	
1800	39	3.9x10-7	39	40	46	58	99	56	
1900	40	3.6x10-7	41	40	50	56	100	56	
2001	41	3.7x10-7	39	36	43	56	103	55	
2100	42	3.7x10-7	39	38	45	54	101	53	
2206	43	3.7x10-7	43	43	48	60	103	61	
2302	44	3.6x10-7	43	39	44	55	101	55	
2359	45	3.5x10-7	41	43	46	54	99	60	
01:05	46	3.4x10-7	42	42	48	59	101	60	
01:59	47	3.4x10-7	42	42	49	59	103	62	8-5-68
03:02	48	3.3x10-7	42	42	45	54	94	56	
0400	49	3.3x10-7	42	41	50	57	100	68	
0600	50	3.3x10-7	43	40	50	60	100	68	
0700	51	3.3x10-7	40	39	45	54	96	55	
0802	52	3.2x10-7	42	40	46	54	100	57	
0830	Start repeat the functional test post 80 hours								
0905	53	3.2x10-7	39	39	46	50	96	52	

Test data continued on page N2907-7

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE W D McFa 8-5-68

WITNESSED AND UNDERSTOOD: ______ 19__ ; Harmelee 8/5 1968

FORM A93-G REV. 7-60

North American Aviation, Inc. N 2907- 7

DIVISION 41 SPACE DOWNEY

PROJECT NO: 4R 627 | CONTRACT NO. ATR 492117 "A" | DATE August 5, 1968

Test Data Continued From Page N 2907-6

Date or Time	Data Point	Chamber Press. Torr.	Temperatures Specimen T/C 2	T/C 12	T/C 3	Thermal Shroud T/C 4	T/C 5	T/C 6	Remarks
09.59	54	3.2×10^{-7}	42	39	39	54	93	57	
10:58		Start Transition From 40±5°F to 135±5°F							
60:50		Shut off LN_2 Cold Shroud.							
11:00	55	3.0×10^{-6}	52	55	69	72	125	79	
1200	56	1.0×10^{-4}	63	65	85	90	130	113	
1300	57	1.8×10^{-4}	127	130	165	178	195	174	
1330	58	7.8×10^{-5}	137	137	148	157	170	143	START 50 HRS. AT 135°F±5°
1400	59	3.3×10^{-5}	134 Cold.	135	120	125	137	118	AT 1330 HRS.
1501	60	3.8×10^{-5}	138	137	153	158	168	153	
1604	61	1.7×10^{-5}	140	137	137	141	145	125	Spec. to be Refined
1700	62	1.2×10^{-5}	128	137	123	136	140	127	to Read 135°F±10°
1800	63	1.2×10^{-5}	133	135	143	150	157	140	
1903	64	1.0×10^{-5}	140	135	146	147	160	140	
2000	65	8.7×10^{-6}	133	138	132	145	160	132	
2100	66	7.5×10^{-6}	135	135	133	145	154	134	
2200	67	7.4×10^{-6}	134	135	145	155	163	142	
2300	68	6.2×10^{-6}	139	142	137	144	154	131	
2359	69	5.5×10^{-6}	138	140	142	146	161	142	
00:59	70	5.4×10^{-6}	138	137	140	148	160	143	8-6-68.
01:58	71	4.9×10^{-6}	137	137	141	145	162	142	
03:00	72	4.6×10^{-6}	135	135	139	144	162	137	
03:58	73	4.4×10^{-6}	135	137	138	145	160	137	
05:00	74	3.8×10^{-6}	134	132	136	142	154	134	
05:59	75	4.4×10^{-6}	138	137	144	149	166	150	
07:00	76	3.8×10^{-6}	136	136	136	144 Dm	158	136	
07:58	77	3.7×10^{-6}	134	134	137	144	157	136	
09:00	78	3.7×10^{-6}	136	136	137	145	159	137	
10:02	79	3.5×10^{-6}	134	134	135	145	158	135	

Test Data Continued on Page N 2907-8

FORM A98-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE [signature] 8-6-68

WITNESSED AND UNDERSTOOD [signature] 8/6 19 68

North American Aviation, Inc. N 2907- 8

DIVISION 41 SPACE - DOWNEY

PROJECT NO. 4R 6227 | CONTRACT NO. AT(49)2117 "A" | DATE August 6 1968

TEST DATA CONTINUED FROM PAGE N2907-7

DATE OR TIME	DATA POINT	CHAMBER PRESSURE TORR	TEMPERATURES SPECIMEN T/C 2	T/C 12	THERMAL SHROUD T/C 3	T/C 4	T/C 5	T/C 6	REMARKS
11:00	80	3.7×10^{-6}	134	135	138	144	163	136	
1201	81	3.7×10^{-6}	135	138	137	144	157	136	
1300	82	3.7×10^{-6}	132	133	133	137	152	132	
1400	83	3.8×10^{-6}	131	131	133	139	151	134	
1500	84	3.8×10^{-6}	133	132	134	140	155	134	
1600	85	3.9×10^{-6}	132	136	135	140	153	134	
1700	86	3.8×10^{-6}	132	132	135	140	153	133	
1800	87	3.6×10^{-6}	132	132	135	139	153	134	
1902	88	3.4×10^{-6}	134	134	137	142	155	136	
2000	89	3.2×10^{-6}	135	139	138	144	156	137	
2104	90	3.0×10^{-6}	133	135	139	144	159	137	
2205	91	3.0×10^{-6}	138	138	143	149	162	142	
2301	92	2.8×10^{-6}	138	137	138	145	157	137	
23:57	93	2.7×10^{-6}	137	136	138	145	157	138	8-6-68.
00:02	94	2.7×10^{-6}	137	140	140	144	160	140	
02:00	95	2.5×10^{-6}	137	137	139	144	158	139	
02:59	96	2.4×10^{-6}	135	135	136	139	155	138	
03:35	NOTICED THAT THE RECORDER SO20488 (TEMPERATURE) HAD STOPPED PRINTING. THE CHART WAS PULLED AND MEASURED, (DISTANCE 22 INCHES CHART SPEED 1"/MIN) 22 MINUTES TOTAL TIME OF NO TEMPERATURE RECORD CHART MARKED AND STAMPED FOR 0324 STOPPED.								
04:00	97	2.5×10^{-6}	135	135	140	146	158	140	8-7-68
0500	98	2.4×10^{-6}	134	136	138	144	157	140	
06:01	99	2.4×10^{-6}	134	136	138	142	160	140	
0700	100	2.3×10^{-6}	133	136	136	140	160	140	
08:00	101	2.2×10^{-6}	132	135	136	140	160	135	
0900	102	2.2×10^{-6}	136	138	135	139	158	139	
	TEST DATA CONTINUED ON PAGE N2907-9								

FORM A93-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE W D McKee 8-7 1968

WITNESSED AND UNDERSTOOD _____ 19__

_____ 8/7 1968

North American Aviation, Inc. N 2907- 9

DIVISION: 41 SPACE DOWNEY

PROJECT NO: 4/R 6227 | CONTRACT NO.: ATR 492117 "A" | DATE: August 7 1968

DATA CONTINUED FROM PAGE N2907-8

DATE OR TIME	DATA POINT	CHAMBER PRESSURE TORR	TEMPERATURES SPECIMEN T/C 2	T/C 12	SHROUD T/C 3	T/C 4	T/C 5	T/C 6	REMARKS
10:02	103	2.1×10^{-6}	135	135	133	141	156	136	
11:00	104	2.1×10^{-6}	135	134	137	141	155	140	
1200	105	2.1×10^{-6}	131	131	133	137	152	132	
1300	106	2.0×10^{-6}	131	130	130	135	146	130	
1402	107	2.1×10^{-6}	130	130	132	139	152	133	
1500	108	2.3×10^{-6}	131	131	135	141	155	136	
~~1535~~ ~~1600~~	109	2.2×10^{-6}	130	132	131	136	150	130	END 50 HR. soak
1630	110	6.6×10^{-7}	84	86	19	25	83	23	at 1350F ± 10°
~~1735~~ ~~1635~~ 1735	111	1.3×10^{-6}	51	49	51	50	55	56	at 1535 HRS.
1750	112	1.0×10^{-6}	68	68	112	115	121	124	START 1 hr. soak
1825	113	1.0×10^{-6}	82	80	97	99	110	97	at ambient temp. at 1750 hrs.
1850	114	1.0×10^{-6}	84	84	88	89	97	89	~~1535 HRS.~~ (ANM 571) 8-7-68
1930	115	1.0×10^{-6}	81	80	82	86	~~84~~	84	END of Test.

(ANM 571)

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM AR3-G REV. 7-66

SIGNATURE: C K Claiborne 8-7 1968

WITNESSED AND UNDERSTOOD: _____ 19__

G B Rich (ANM 571) 8-7 1968

North American Aviation, Inc. N 2907-10

DIVISION		
41 SPACE DOWNEY		
PROJECT NO: L/R 6227	CONTRACT NO. AtR 492117 "A"	DATE August 8 1968

THE PRECEDING VACUUM & THERMAL TEST HAS BEEN CONDUCTED IN ACCORDANCE WITH THE TEST REQUEST (TR 492117 "A" change PARA 3.5) AND SUPPORTING DOCUMENTS. DATA SUPPORTING THIS TEST ARE NOTED OR REFERENCED HERE-IN AS NOTED IN LABORATORY/ENGINEERING NOTE BOOK N 2907- PAGES 5 THRU 9

SIGNED Paul W. Elwood
LABORATORY & TEST RESPONSIBLE TEST ENG.

[signature] (ANM 215) 8/8/68
VERIFIED N/R/SD INSPECTION

(ANM 215)

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: W. D. McKee 8/8 1968

WITNESSED AND UNDERSTOOD ________ 19__
[signature] (ANM 215) 8/8 1968

FORM A93-G REV. 7-66

APPENDIX H

ACCELERATION

North American Aviation, Inc. N 5778-28

DIVISION		
SPACE - DOWNEY		
PROJECT NO: LR6227	CONTRACT NO. ATR 492117	DATE 8-7-68

SUBJECT: QUALIFICATION TEST OF GUIDANCE AND NAVIGATIONAL FILTER BOX ASSEMBLY ACCELERATION TEST

P/N V36-442330 S/N 06362AAH3858

L&T RESPONSIBLE TEST ENGINEER P. W. EDWARDS ~~R.A. SCHROEDER~~

L&T RESPONSIBLE TASK ENGINEER P.W. SIMON

SD ENGINEERING REQUESTER L. LUERA

APPLICABLE DOCUMENTS:

ATR 492117 GUIDANCE AND NAVIGATIONAL FILTER BOX ASSY.

IL-6227-801 LABORATORIES AND TEST QUALIFICATION TEST PROCEDURE FOR GUIDANCE AND NAVIGATIONAL FILTER BOX ASSY V36-442330

EQUIPMENT LIST

DESCRIPTION	MFG	MODEL	NR/SO CONTROL NO.	CAL/REF DUE DATE
ACCELERATOR	GENISCO	5015 9	MET. # 3078	20 AUG. 1968
COUNTER	C/H	420R	" 1030	6 JAN. 1969

H-1

FORM 493-C REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P.W. Simon 8-7 19 68

WITNESSED AND UNDERSTOOD: R. Ty Rea 8-8 19 68

North American Aviation, Inc. N 5778-29

DIVISION		
SPACE DOWNEY		
PROJECT NO: LR 6227	CONTRACT NO. ATR 492 117	DATE 8-7-68

ILLUSTRATION:
REFER TO LABORATORY NOTEBOOK PAGE N 5778-17

PRE TEST VALIDATION FOR ACCELERATION:
THE TEST ITEM IS EQUAL TO THAT DEFINED IN THE APPROVED TEST REQUEST ATR 492 117A AND THE TEST SETUP IS ADEQUATE TO MEET THE REQUIREMENTS OF THE TEST AS DEFINED BY THE APPROVED TEST REQUEST.

L+T RESPONSIBLE TEST ENGINEER P. W. Edwards

NR/SD ENGINEERING DEPARTMENT L.S. Luera 8 Aug 68

NR/SD INSPECTION DEPARTMENT R. Lyles 8-8-68

RESULTS AND/OR CHRONOLOGICAL EVENTS LOG

8-8-68 1256	ACCELERATION, 5 MIN IN THE -Y DIRECTION @ 20g R = 38" (137 RPM)
8-8-68 1301	END OF ACCELERATION TEST IN -Y DIRECTION; NO MALFUNCTION
8-8-68 1312	ACCELERATION, -Z DIRECTION @ 20g (R = 38" RPM = 137), 5 MIN.
8-8-68 1317	END OF ACCELERATION TEST IN -Z DIRECTION. NO CHATTER.

INSTRUCTIONS
STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM A93-6 REV. 7-66

SIGNATURE: S. K. Simon 8-8 1968

WITNESSED AND UNDERSTOOD: R. Lyles 8-8 1968

North American Aviation, Inc. N 5778-30

DIVISION		
SPACE Downey (41)		
PROJECT NO: LR-6227	CONTRACT NO. AIR 492117	DATE 8-8-68

RESULTS AND/OR CHRONOLOGICAL EVENTS LOG.

8-8-68 1341	STARTED 5 MIN. ACCELERATION TEST IN +Y DIRECTION @ 20g's
8-8-68 1346	END OF 5 MIN. ACCELERATION TEST IN +Y DIRECTION; NO CHATTER
8-8-68 1353	STARTED 5 MIN. ACCELERATION TEST IN +Z DIRECTION @ 20g's
8-8-68 1358	END OF 5 MIN. ACCELERATION TEST IN +Z DIRECTION; NO CHATTER
8-8-68 1512	STARTED 5 MIN ACCELERATION TEST IN -X DIRECTION @ 20G's (R 43.5" RPM 128)
8-8-68 1517.5	END OF 5 MIN. ACCELERATION TEST IN -X DIRECTION; NO CHATTER
8-8-68 1537	STARTED 5 MIN. ACCELERATION TEST IN +X DIRECTION @ 20G's (R 35 RPM 142)
8-8-68 1542	~~STARTED~~ END OF 5 MIN. ACCELERATION TEST IN +X DIRECTION; NO CHATTER

CONCLUSION:

THE TEST SPECIMEN SUCCESSFULLY MET THE REQUIREMENTS OF THE TEST. THE PROCEEDING TEST PHASE HAS BEEN CONDUCTED IN ACCORDANCE WITH THE APPROVED TEST REQUEST TR492117, AND SUPPORTING DOCUMENTS.

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: P. N. Simon 8-8 1968

WITNESSED AND UNDERSTOOD: R. Sykes 8-8 1968

FORM 403-G REV. 7-66

APPENDIX I

SHOCK

North American Aviation, Inc. N 5778-31

DIVISION		
SPACE DIVISION		
PROJECT NO: L.R. 6227	CONTRACT NO. ATR 492117	DATE 8-8-68

SHOCK TEST OF G.N FILTER BOX ASSEMBLY PER PARAGRAPH 3.7, TR 492117A. P/N V36-442330 S/N 06362 MAH 3858

EQUIPMENT -

DESCRIPTION	MFG.	MODEL	NR/SD CONTROL NO.	CAL/SERVICE DUE DATE
SHOCK MACHINE	AVCO	020	N740739	1-26-69
ACC.	ENDEVCO	2246	JA16	10-3-68
CHARGE AMP	"	2713	5028787	8-9-68
CHARGEAMP RACK	"	2628	5011933	8-22-68
MEMO SCOPE	TEKTRONIX	564	F332961	9-17-68
DUAL TRACE AMP	"	3A1	002800	9-17-68
TIME BASE	"	3B3	000848	9-17-68

ILLUSTRATION: REFER TO LABORATORY NOTEBOOK PAGE N5778-17

PRE-TEST VALIDATION FOR SHOCK -

THE TEST ITEM IS EQUAL TO THAT DEFINED IN THE APPROVED TEST REQUEST ATR 492117A AND THE TEST SETUP IS ADEQUATE TO MEET THE REQUIREMENTS OF THE TEST AS DEFINED BY THE APPROVED TEST REQUEST. -

L&T RESPONSIBLE TEST ENGINEER P.W. Edwards 8-8-9

NR/SD INSPECTION DEPT. C.B. Rich (ANM 571) 8-8-68

I-1

FORM A03-G REV. 7-66

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R.A. Mullikin 8-8 1968

WITNESSED AND UNDERSTOOD: C.B. Rich (ANM 571) 8-8 1968

North American Aviation, Inc. N 5778-32

DIVISION: SPACE - DOWNEY

PROJECT NO: LR. 6227 | CONTRACT NO. A.F.R. 492117 | DATE 8-8-68

RESULTS AND CHRONOLOGICAL LOG.

		±Y AXIS
18:20	RUN #1	CALIBRATION - WITHOUT TEST
8-8-68	HEIGHT 26"	SPECIMEN - 14MSEC 35g
18:25	RUN #2	CALIBRATION - ±Y AXIS WITHOUT
8-8-68	HEIGHT 26"	TEST SPECIMEN - 14MSEC 35g
18:30	RUN #3	CALIBRATION - ±Y AXIS WITHOUT
8-8-68	HEIGHT 26"	TEST SPECIMEN - 14MSEC 35g
19:45	RUN #4	SHOCK TEST +Y AXIS - WITH
8-8-68	HEIGHT 26"	TEST SPECIMEN - SPECIMEN AND
NO SPECIMEN MALFUNCTION		PLATE WERE MOUNTED TO SCOOP FIXTURE. BOLT TORQUE 35ft lbs. 14MSEC 34g
19:55	RUN #5	SPECIMEN AND PLATE WERE
8-8-68	HEIGHT 26"	MOUNTED TO SCOOP FIXTURE
NO SPECIMEN MALFUNCTION		IN -Y AXIS. BOLT TORQUE 35ft lbs. SHOCK TEST - 14MSEC 34g
21:50	RUN #6	CALIBRATION - WITHOUT TEST
8-8-68	HEIGHT 16"	SPECIMEN - -X AXIS 15MSEC 20g.
21:53	RUN #7	CALIBRATION - WITHOUT TEST
8-8-68	HEIGHT 16"	SPECIMEN - -X AXIS 15MSEC 21g
21:58	RUN #8	CALIBRATION - WITHOUT TEST
8-8-68	HEIGHT 16"	SPECIMEN - -X AXIS 15MSEC 21g
22:15	RUN #9	SPECIMEN MOUNTED IN -X
8-8-68	HEIGHT 16"	AXIS IN BOX FIXTURE - BOLTS
NO SPECIMEN MALFUNCTION		TORQUED TO 35 ft lbs. FOR FIXTURE MOUNTING. SHOCK TEST - 15MSEC 20g
22:40	RUN #10	CALIBRATION - WITHOUT TEST
8-8-68	HEIGHT 55"	SPECIMEN - +X AXIS 12MSEC 78g
22:45	RUN #11	CALIBRATION - WITHOUT TEST
8-8-68	HEIGHT 55"	SPECIMEN - +X AXIS - 12MSEC 78g

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

FORM 493-G REV. 7-66

SIGNATURE: R.A. Mulford 8-8 1968

WITNESSED AND UNDERSTOOD: C.B. Rich 8-8 1968

North American Aviation, Inc. N 5778-33

DIVISION		
SPACE - DOWNEY		
PROJECT NO: 6227	CONTRACT NO. ATR 492117	DATE 8-8-68

RESULTS AND CHRONOLOGICAL LOG (CONT.)

22:46	RUN #12	CALIBRATION - WITHOUT TEST
8-8-68	HEIGHT 55"	SPECIMEN - + X AXIS - 80g
22:50	RUN #13	SPECIMEN MOUNTED IN +X
8-8-68	HEIGHT 55"	AXIS ON BOX FIXTURE -
NO SPECIMEN MALFUNCTION		MOUNTING BOLTS TORQUED TO 35 ft-lbs FOR FIXTURE SHOCK TEST -
23:22	RUN #14	CALIBRATION - ±Z AXIS -
8-8-68	HEIGHT 56"	WITHOUT TEST SPECIMEN - 72g 12ms
23:25	RUN #15	CALIBRATION - ±Z AXIS 72g
8-8-68	HEIGHT 56"	WITHOUT TEST SPECIMEN. 12ms
23:27	RUN #16	CALIBRATION - ±Z AXIS
8-8-68	HEIGHT 60"	WITHOUT TEST SPECIMEN 80g 12ms.
23:32	RUN #17	CALIBRATION - ±Z AXIS
8-8-68	HEIGHT 60"	WITHOUT TEST SPECIMEN 80g 12ms
23:34	RUN #18	CALIBRATION - ±Z AXIS
8-8-68	HEIGHT 60"	WITHOUT TEST SPECIMEN 80g 12ms
23:45	RUN #19	SPECIMEN MOUNTED IN -Z
8-8-68	HEIGHT 60"	AXIS - SPECIMEN BOLTED
NO SPECIMEN MALFUNCTION		TO FIXTURE - 30 in/lbs. FIXTURE BOLTED TO SCOOP 35 ft/lbs. 12 MSEC 79g
23:52	RUN # 20	SPECIMEN MOUNTED IN +Z
8-8-68	HEIGHT 60"	AXIS - SPECIMEN TORQUE 30 in/lbs
NO SPECIMEN MALFUNCTION		FIXTURE TORQUE 35 ft/lbs 12 MSEC 81g

CONCLUSION - THE TEST SPECIMEN SUCCESSFULLY MET THE REQUIREMENTS OF THE SHOCK TEST PER PARAGRAPH 3.7, A.T.R. 492117A. THE PRECEDING TEST HAS BEEN CONDUCTED IN ACCORTANCE TO THE ATR 492117A AND SUPPORTING DOCUMENTS. ALL DATA IS STATED OR REFERENCED HEREIN

INSTRUCTIONS

STATE OBJECT OF EXPERIMENT, TEST, DESIGN, OR INVENTION AND DESCRIBE IN SUFFICIENT DETAIL TO BE UNDERSTANDABLE AND REPRODUCIBLE BY ANOTHER ENGINEER. USE SKETCHES OR MAKE REFERENCE TO DRAWINGS OR PHOTOGRAPHS, IF ANY, BY NUMBER. ALL PAGES CONTAINING SUBJECT MATTER WHICH MAY BE INVENTIVE MUST BE WITNESSED.

SIGNATURE: R. A. Mallock E-8 19 68

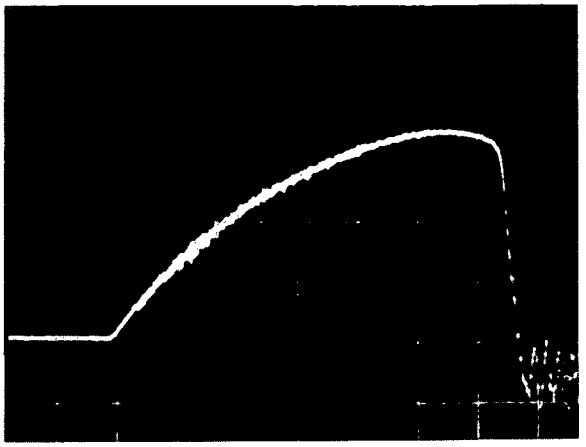
WITNESSED AND UNDERSTOOD: C B Rich 8-8- 19 68

FORM A03-G REV. 7-66

SHOCK IMPULSE DATA

Run No.	Calibration or Specimen	Axis	Volt (mv/cm)	Time (msec/cm)	Vertical Sensor (g/cm)	Duration (msec)	Rise Time (msec)	Decay Time (msec)	Acceleration (g)
1	Calibration	+Y	500	2	10	14	13	1	35
2	Calibration	+Y	500	2	10	14	13	1	35
3	Calibration	+Y	500	2	10	14	13	1	35
4	Specimen	+Y	500	2	10	14	13	1	34
5	Specimen	-Y	500	2	10	14	13	1	34
6	Calibration	-X	500	2	10	15	14	1	20
7	Calibration	-X	500	2	10	15	14	1	21
8	Calibration	-X	500	2	10	15	14	1	21
9	Specimen	-X	500	2	10	15	14	1	20
10	Calibration	+X	1000	2	20	13	12	1	78
11	Calibration	+X	1000	2	20	13	12	1	78
12	Calibration	+X	1000	2	20	13	12	1	80
13	Specimen	+X	1000	2	20	13	12	1	80
14	Calibration	±Z	1000	2	20	12	11	1	72
15	Calibration	±Z	1000	2	20	12	11	1	72
16	Calibration	±Z	1000	2	20	12	11	1	80
17	Calibration	±Z	1000	2	20	12	11	1	80
18	Calibration	±Z	1000	2	20	12	11	1	80
19	Specimen	-Z	1000	2	20	12	11	1	79
20	Specimen	+Z	1000	2	20	12	11	1	81

SHOCK IMPULSES



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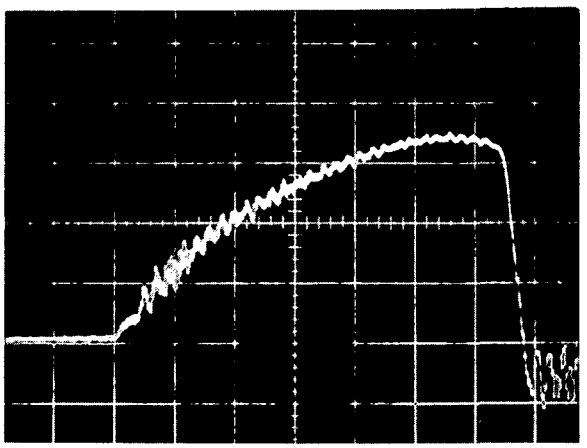

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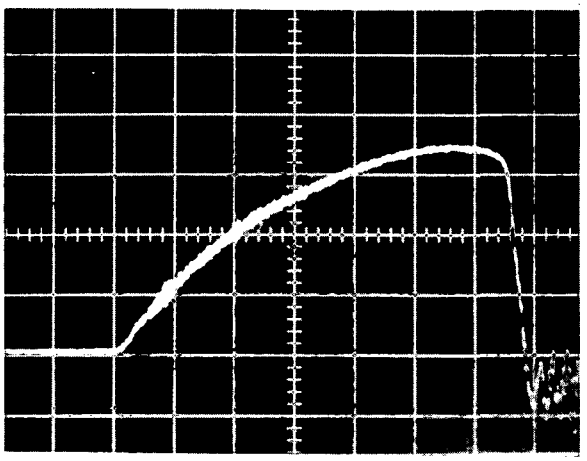

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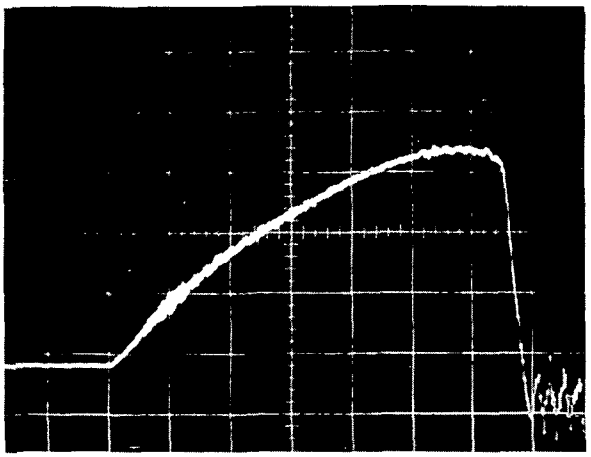

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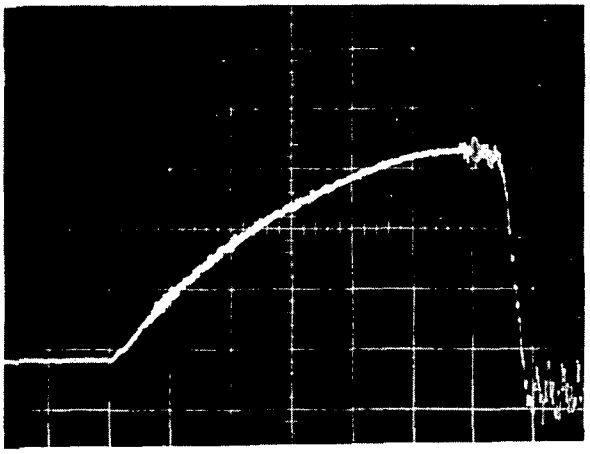

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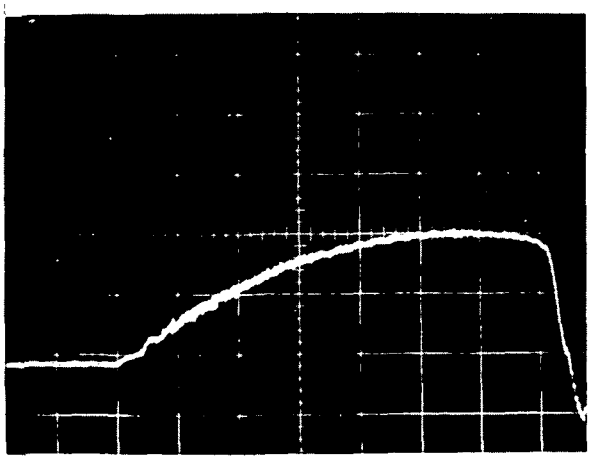

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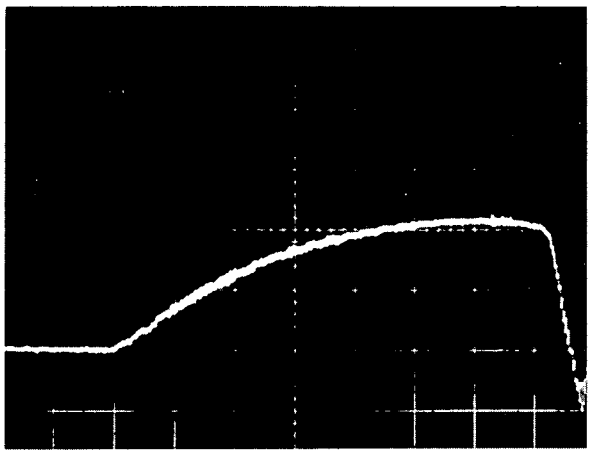

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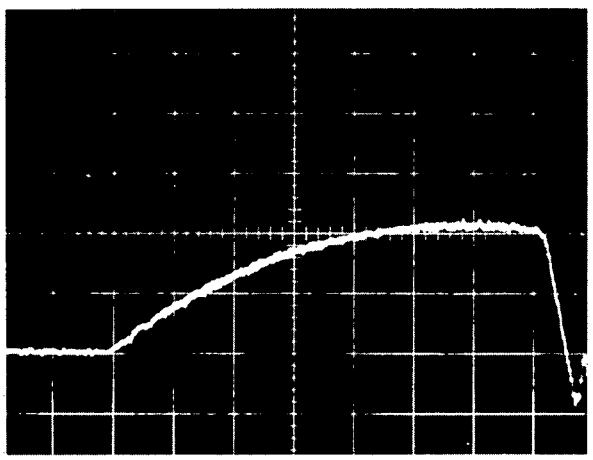

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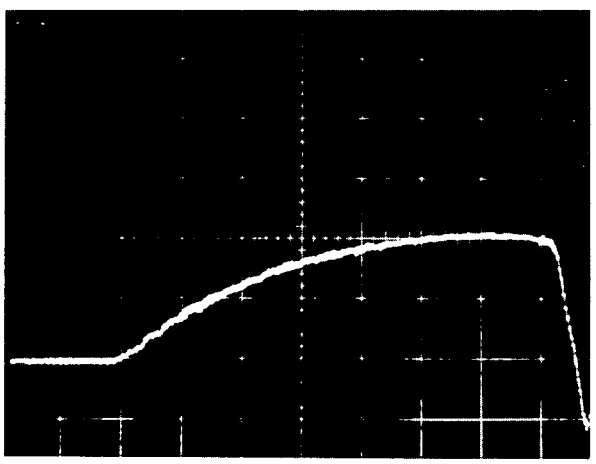

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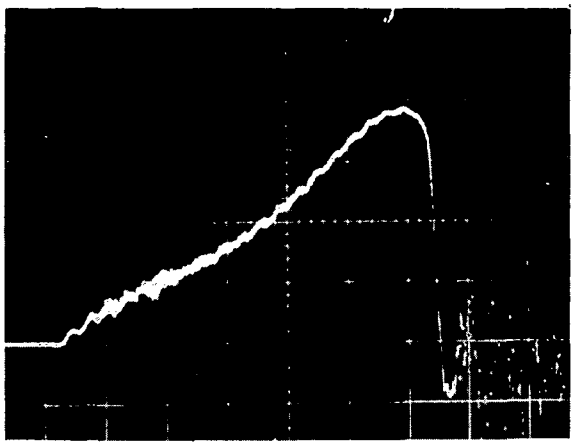

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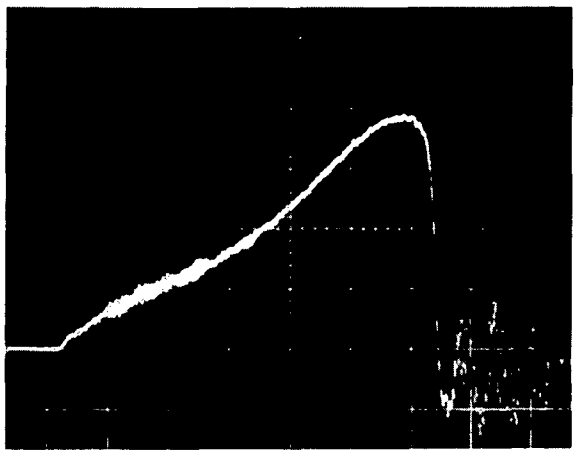

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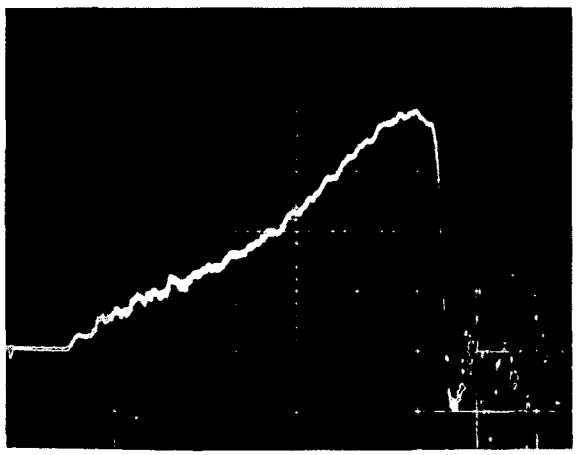

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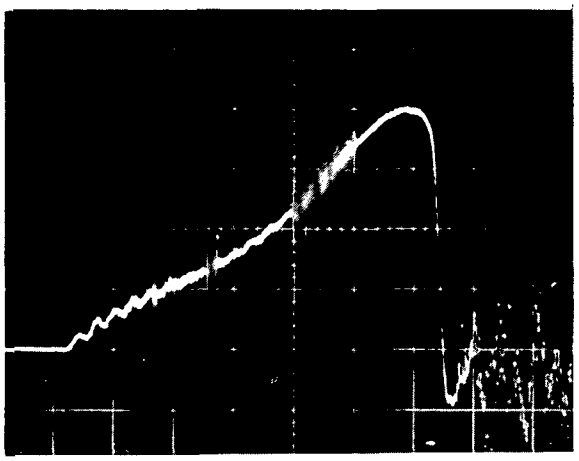

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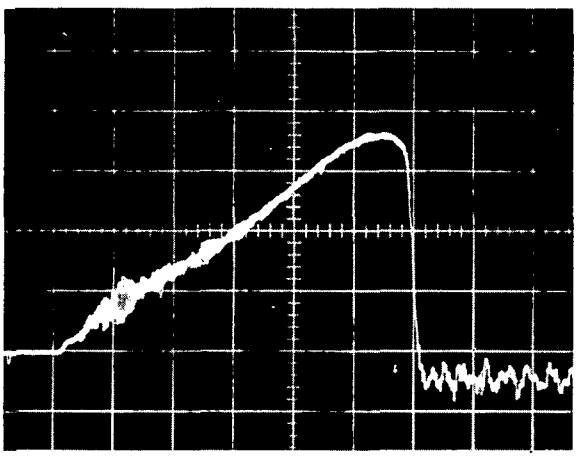

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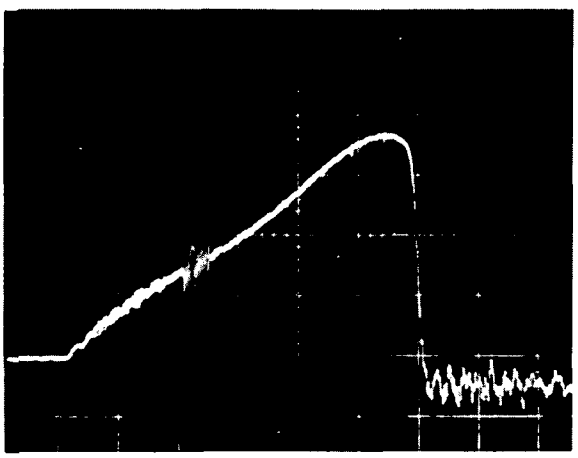

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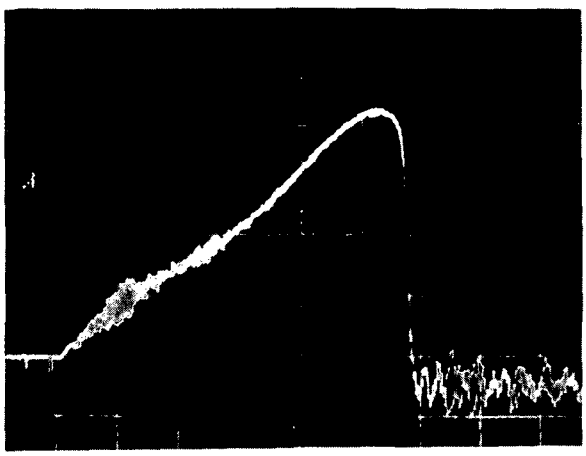

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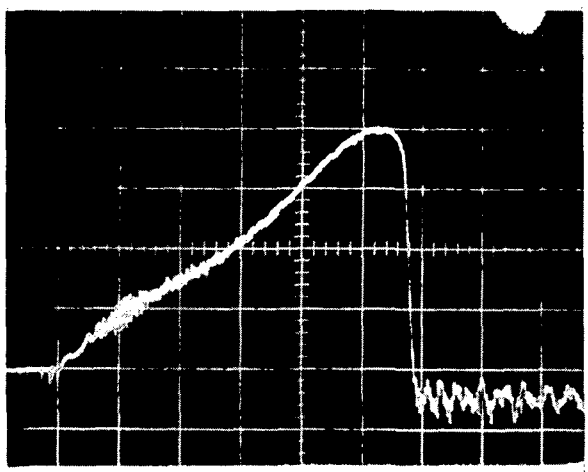

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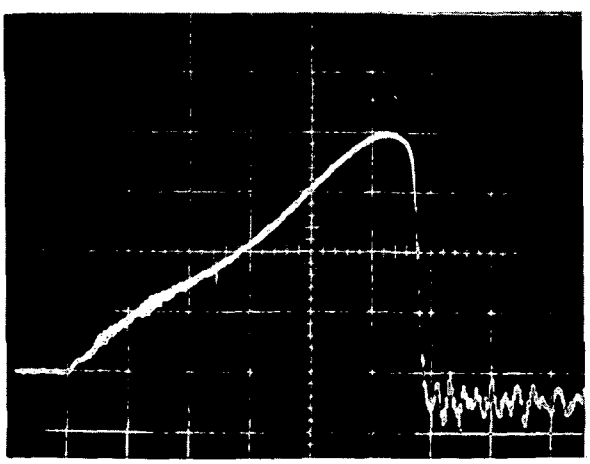

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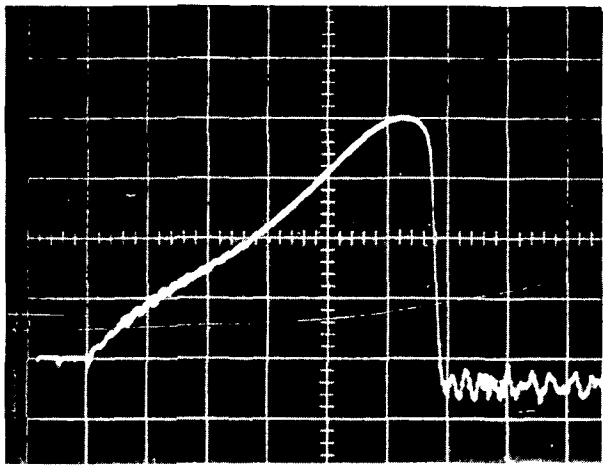

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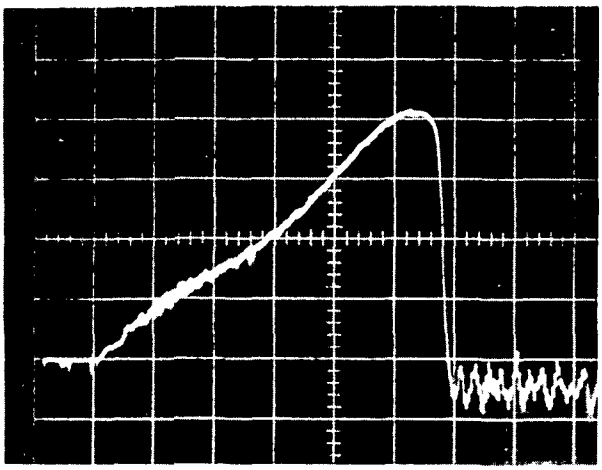

RUN 20

APPENDIX J

SUPPLEMENTARY DOCUMENTS

SPACE DIVISION
NORTH AMERICAN ROCKWELL CORPORATION
[illegible] LAKEWOOD BOULEVARD • DOWNEY, CALIFORNIA

IF THIS IS A CONTINUATION: A 96675 — CROSS OUT THIS NO. / IF THIS IS A CONTINUATION ENTER ORIGINAL D.R. NO.

PAGE 1 OF 1 PAGES

DISPOSITION RECORD

JR492117

PART NAME	PART NUMBER	SERIAL NUMBER	NEXT ASSY PART NUMBER
GUIDANCE & NAVIGATION FLIGHT BOX	V36-442330	06362-AAH 3858	QUAL TEST

SUPPLIER	END ITEM MODEL SERIAL	REF. DOC. NO.	TIME/CYCLES IN USE	CAUSE	CONDITION
N.R.	QUAL TEST	IL-6227-801			

DISPOSITION	ZONE	SYSTEM	OCC. DUR.	SYMPTOM	TYPE	UNIT/QTY
INSP.		GU.D. & NAVIG.	TEST			1

ITEM NO.	NONCONFORMANCE
2	REF. PARA. 6.4.3.1.1 OF IL-6227-801
7/18/8	14 OUT OF 54 CAPACITANCE TEST MEASUREMENTS WERE
	UNDER 5500 PICOFARADS, THE MINIMUM REQUIREMENT FOR THIS
	TEST. (REF. SPEC. MA0203-0622 N/C PARA. 4.1.3)
	NOTIFIED PAA AT 1450, MR. BLAINE, LOF NO. 6418

INITIATOR'S SIGNATURE	DEPT./SERIAL NO.	LOCATION	DATE
R. Ayres	146-A06302 (4680)	BLDG 288, D/097	7-18-8

DISPOSITION

MR ACTION REQ'D	PROCEDURES ANALYSIS REQ'D	CONTINUATION SHEET REQUIRED	PRR/SCRAP TAG NO.	REPLACEMENT PART NO.	SERIAL NO.
☐ YES ☑ NO	☐ YES ☑ NO	☐ YES ☑ NO			

SYSTEM RETEST REQUIRED	FAILURE ANALYSIS REQUIRED	OTHER SYSTEMS AFFECTED	RETEST ACCEPTED DATE	COMPANY	CUSTOMER
☑ YES ☐ NO	☐ YES ☑ NO		7-18-8	(stamp)	(stamp)

ITEM NO.	DISPOSITION	ITEM REWORK MECH AND/OR LEAD	ITEM ACCEPTANCE COMPANY INSPECT	CUST. INSPECT
2.1	SUSPECT MOISTURE IN MATING CONNECTORS – REMOVE AND CLEAN INTERNAL SURFACES AND PINS. INSTALL SEALING PLUGS WHERE REQUIRED. L.S. Luera 695-412 18 July 1968	402 / 400	(stamp) 7-18-8	(stamp)
2.2	CONDUCT CAPACITANCE TEST TO SPECIFIED REQUIREMENTS AND RECORD ON DATA SHEETS. L.S. Luera 695-412 18 July 1968	402 / 400	(stamp) 7-18-8	
2.3	IF READINGS ARE WITHIN THE SPECIFIED TOLERANCE OF 5500 PICOFARADS MINIMUM, CONTINUE WITH THE HIGH/LOW TEMPERATURE TEST STARTING WITH TIME ZERO. L.S. Luera 695-412 18 July 1968	402 / 400	(stamp) 7-18-8	

APPROVALS ☐ MATERIAL REVIEW ☐ TEST CONDUCT ☑ ENG'R DISPOSITION — FINAL ACCEPTANCE

COMPANY	ORG'N/DATE	COMPANY	ORG'N/DATE	CUSTOMER	ORG'N/DATE	FINAL ACCEPTANCE
R. Ayres	7-18-8	L.S. Luera	695-412 18 July 1968	W Allen	7/18/8	402 / 400 (stamp) 7-18-8

FORM 39 [illegible] REV. [illegible] 68 — ORIGINAL

A 96675

SPACE DIVISION
NORTH AMERICAN ROCKWELL CORPORATION
4514 LAKEWOOD BOULEVARD • DOWNEY, CALIFORNIA

IF THIS IS A CONTINUATION A110406 CROSS OUT THIS NO.

PAGE 1 OF 1 PAGES

DISPOSITION RECORD

TR-49211-7

IF THIS IS A CONTINUATION ENTER ORIGINAL D.R. NO.

PART NAME (N) DANCE &	PART NUMBER	SERIAL NUMBER	NEXT ASSY PART NUMBER
NAVIGATION FILTER BOX	V36-442330	0636 - AAH 3850	QUAL. TEST

SUPPLIER	END ITEM MODEL/SERIAL	REF. DOC. NO.	TIME/CYCLES IN USE	CAUSE	CONDITION
N.R.	QUAL. TEST	IL-6227-801			

DISPOSITION	ZONE	SYSTEM (W/D & NAVIG.	OCC. DUR. TEST	SYMPTOM	TYPE	UNIT/QTY
INSP.						

ITEM NO.	NONCONFORMANCE
3	REF. PARA. 6.4.3.1.1 OF IL-6227-801: (RETEST
	OUT OF 24 CAPACITANCE TEST MEASUREMENTS WERE
	UNDER 5500 PICOFARADS, THE MINIMUM REQUIREMENT FOR
	THIS TEST. (REF. SPEC. MAD203-0622 W/C PARA. 4.1.3)
	NOTIFIED PAA AT 1545, MR. HAAS, 205 NO. 6462

INITIATOR'S SIGNATURE/DEPT./SERIAL NO.	LOCATION	DATE
R. Fujita, 146-406302	BLDG. 288, D/098	7-19-68

DISPOSITION

MR ACTION REQ'D	PROCEDURES ANALYSIS REQ'D	CONTINUATION SHEET REQUIRED	PRE-SCRAP TAG NO.	REPLACEMENT PART NO.	SERIAL NO.
☐ YES ☑ NO	☐ YES ☑ NO	☐ YES ☑ NO			

SYSTEM RETEST REQUIRED	FAILURE ANALYSIS REQUIRED	OTHER SYSTEMS AFFECTED	RETEST ACCEPTED DATE	COMPANY	CUSTOMER
☐ YES ☑ NO	☐ YES ☑ NO				

ITEM NO.	DISPOSITION	ITEM REWORK MECH AND/OR LEAD	ITEM ACCEPTANCE COMPANY INSPECT	ITEM ACCEPTANCE CUST. INSPECT
3.1	CONTINUE TESTING - ANALYSIS TO BE	N/R (ANM RES) 7-19	(ANM RES) 7-19	(ANM RES)
	CARRIED OUT AT COMPLETION OF TESTS AND			
	RECORDING OF DATA.			
	L.V. McKeever, 685-412, 7/19/68			
	E. Johnson 685-115 (Reliability 7/19/68.			

APPROVALS ☐ MATERIAL REVIEW ☐ TEST CONDUCT ☐ ENGR DISPOSITION FINAL ACCEPTANCE

COMPANY	ORGN/DATE	COMPANY	ORGN/DATE	CUSTOMER	ORGN/DATE			
R. Fujita	7-19-68	L.V. McKeever 685-412	7/19/68	E. Johnson	7-19-68	N/R 7-19	7-19	7-19

FORM 3950 REV. 4-68 ORIGINAL A110406

SPACE DIVISION
NORTH AMERICAN ROCKWELL CORPORATION
12214 LAKEWOOD BOULEVARD • DOWNEY, CALIFORNIA

IF THIS IS A CONTINUATION
A110403
CROSS OUT THIS NO.

PAGE 1 OF ___ PAGES

DISPOSITION RECORD

PART NAME	PART NUMBER	SERIAL NUMBER	NEXT ASSY PART NUMBER
Navigation Pilot Box	V36-442330	[illegible] 3858	Qual Test

SUPPLIER	END ITEM MODEL/SERIAL	REF. DOC. NO.	TIME/CYCLES IN USE	CAUSE	CONDITION
N/R	Qual Test	ATR 492117	N/R	N/R	N/R

DISPOSITION	ZONE	SYSTEM	OCC. DUR.	SYMPTOM	TYPE	UNIT QTY
Insp		N/R	Test	N/R		1

NONCONFORMANCE

ITEM NO.	
1	Para. 3.3.2.3.4 Requires A Chamber Temp. of 60±10°F After Cycle #4 To Complete 120 Hours Min. Test Time. The Chamber Temp Has Been Elevated To 120°F & 5 Cycles Have Been Completed Ref Para 3.3.2.3.1 Thru 3.3.2.4 of ATR 492117
	PAR: Blaine Page 6326

INITIATOR'S SIGNATURE/DEPT./SERIAL NO.	LOCATION	DATE
[signature] 146 202230	D/098 B/288	7/10/68

DISPOSITION

MR ACTION REQ'D ☐ YES ☒ NO — PROCEDURES ANALYSIS REQ'D ☐ YES ☐ NO — CONTINUATION SHEET REQUIRED ☐ YES ☒ NO — PRR/SCRAP TAG NO. — REPLACEMENT PART NO. — SERIAL NO.

SYSTEM RETEST REQUIRED ☐ YES ☒ NO — FAILURE ANALYSIS REQUIRED ☐ YES ☒ NO — OTHER SYSTEMS AFFECTED — RETEST ACCEPTED: DATE / COMPANY / CUSTOMER

ITEM NO.	DISPOSITION	ITEM REWORK MECH AND/OR LEAD	ITEM ACCEPTANCE COMPANY INSPECT	CUST. INSPECT
1	OK as is - No TEST ANOMALY OCCURRED [signature] 695-412 [signature] 695-115 7/17/68		[stamp] 7-17-68	N/R

APPROVALS ☐ MATERIAL REVIEW ☐ TEST CONDUCT ☐ ENG'R DISPOSITION — FINAL ACCEPTANCE

COMPANY	ORG'N/DATE	COMPANY	ORG'N/DATE	CUSTOMER	ORG'N/DATE	FINAL ACCEPTANCE
N/R	7-17-68	N/R	7-17-68	N/R	7-17-68	N/R 7-17-68

FORM 3950 REV. 1-68

ORIGINAL

A110403

SD/AD/68-055

INTERNAL LETTER
North American Aviation, Inc.

Date · August 16, 1968

TO Address · N. R. Sanders
D/098-212
41 AE93

FROM Address · J. R. West, Jr.
D/099-220
41 AB95

Phone · 6771, 2, 3

Subject · Qualification Test of G&N Filter Box Assembly (P/N V36-442330, S/N 06362AAH3858)

Reference: Test Request No. 492117

Because of the simple, rigid construction of the vibration fixture, which was used for G&N filter box assy. qualification test, the fixture need not be subjected to the evaluation specified by specification MC999-0050C.

Response accelerometers on the filter assembly are not required. Input accelerometers (monitoring the vibration input to the assy.) will be sufficient to demonstrate the assy. can successfully sustain the specified vibration environment.

J. R. West, Jr.
Supervisor
Apollo CSM Dynamics

AEC:sal

cc: R. F. Nicholas 695-570 AB97
S. V. McKeever 695-412 FB72

Form 131-R Rev. 2-65