[redacted]

RECEIVED

OCT 1 1962

CENTRAL RECORD FILE

CENTRAL RECORD FILE
ACCOUNTING CARD BB
FILE No. Mk 43 3-2

SEP 28 1962

File: TX-43, 3-2
T-18434
Date Completed: 8-1-62

upgraded to Cfrd per auth. Memo 3422 NA(5045) dtd July 8, 1963 BB 7/18/63

MR. E. R. FRYE -1112

Attn: Mr. H. O. Pierson

Re: Static Test of Filament Wound MK-43 Center Bomb Subassembly

Summary of Test

A MK-43 Center Bomb Subassembly made of wound fiberglass was subjected to eight different test conditions to obtain data which might be compared to data previously obtained from similar tests on aluminum subassemblies. This fiberglass case was designated as 50-50 filament wound meaning 50 percent circular windings and 50 percent helical windings.

In the first test, axial and lateral loads on the spike tip were taken to 200 percent of limit load with no indication of failure anywhere in the unit.

In the second test, axial tension, lateral shear and longitudinal bending moment loads at the clamp band (sta. 104) resulted in failure of the clamp band bolts at 145 percent of limit load. There was no indication of failure in the fiberglass case.

The third and fourth tests were on the forward and aft lugs, respectively. The test of the forward lug resulted in a failure of the lug itself at 198 percent of limit load. The aft lug was loaded to 200 percent of limit load. Neither test resulted in any apparent damage to the fiberglass case.

In tests five, six, seven and eight, a single swaybrace load was applied to different locations on the case. In tests five and seven, the load was taken to 200 percent of limit load, but inspection of the case after removal of the load revealed some slight cracking around the edge of the loaded area.

In the eighth test, the swaybrace load was taken to 200 percent of limit load with no signs of cracking or damage to the case.

In the sixth test, the swaybrace loading was stopped at 160 percent of limit load due to severe cracking taking place around the loading pad.

Object of Test

0795

The object of the test was to subject a MK-43 Center Bomb Subassembly made of wound fiberglass to static loads to obtain data which might be compared with data previously obtain from similar tests on aluminum subassemblies. This fiberglass case was designated as 50-50 filament wound meaning 50 percent circular windings and 50 percent helical windings.

UNCLASSIFIED

[redacted]

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP

| | |
|---|---|
| CLASSIFICATION CHANGED TO: U | AUTHORITY: W.C. Layne |
| Emelda Selph 6/30/98 | |
| PERSON CHANGING MARKING & DATE | RECORD ID: 98SN2547 |
| W-C Layne 7/1/98 | |
| PERSON VERIFYING MARKING & DATE | DATED: 6/18/98 |

Authorization for Test

The test was performed in accordance with an Environmental Test Order dated February 8, 1962. Mr. H. O. Pierson, 1112-1, was the consultant for the test.

Test Equipment and Instrumentation

The following equipment was used during the test:

1 - Calibrated Tension Link, 20,000 lb. Capacity, #2
1 - Calibrated Tension Link, 250,000 lb. Capacity, #2A
1 - Calibrated Tension Link, 100,000 lb. Capacity, #F
1 - Calibrated Tension Link, 80,000 lb. Capacity, #3
1 - SR4 Load Cell, 100,000 lb. Capacity, No. 8879
4 - SR4 Strain Indicators, Serial Nos. 900730, 900743, 175441, 391905
4 - Hydraulic Rams
4 - Hydraulic Hand Pumps

The following instrumentation was used during the test:

120 - SR4 Strain Gages, Type FABR-12-12
Gage Factor 2.13, Resistance 121 ohms.
1 - B & F Automatic Strain Gage Readout System

Procedure

Test No. 1

The test unit was instrumented around the threaded steel insert in the nose with eight strain gage rosettes as shown in Figures 1 through 5. The unit was then mounted in the static jig and loads arranged as shown in Figure 6. Load P1 was a longitudinal load applied through the steel spike which was screwed into the steel insert in the nose of the unit. Load P2 was a lateral load applied at the tip of the spike. Both loads were applied incrementally and the strain gages were read at each increment of load.

Test No. 2

For this test, the fiberglass case was instrumented with fourteen strain gage rosettes. These rosettes were located on the fiberglass near the clamp ring at the aft of the case as shown in Figures 7 through 10. The unit was mounted in the static jig and the loads were arranged as shown in Figure 11. Load P1 was a longitudinal load applied to the aft section of the clamp-band (sta. 104) through the parachute attaching lugs in the test fixture. Loads P2 and P3 were applied as a longitudinal bending moment through the test fixture and load P4 was applied through the test fixture as a lateral shear load. The shear load and the bending moment was reacted partially by a cradle support located just forward of the steel sleeve insert in the aft part of the fiberglass section. The loads were applied in increments and the strain gages were read at each increment.

Test No. 3

In this test a single load was applied to the forward lug of the case section. Nine strain gage rosettes were located on the fiberglass around the lug insert as shown in Figure 12. The unit was mounted as shown in Figure 13 and the load was applied in increments. The strain gages were read at each increment of load. The single load in this test represented the resultant of a vertical load and a longitudinal load and was applied at an angle of approximately 9° from the vertical.

Test No. 4

In this test a single load representing the resultant of a vertical load and a longitudinal load was applied to the aft lug. This load was applied at an angle of approximately 62° from the vertical. Nine strain gage rosettes were mounted on the fiberglass around the lug insert as shown in Figure 14. The unit was mounted as shown in Figure 15 and the load was applied in increments. The strain gages were read at each increment of load.

Test No. 5, 6, 7, and 8

These four tests represented four different swaybrace loadings. A single load was applied through a circular steel loading pad as shown in Figure 16. In all four tests, the load was applied in increments and the strain gages were read at each increment.

Test No. 5 represented the load from an Aero 7A rack applied at sta. 64.5 and 25° radially from the top centerline through a 2-1/2 inch diameter pad. Six strain gage rosettes were located around the pad as shown in Figure 17.

Test No. 6 represented the load from an Aero 7A rack applied at sta. 84.5 and 25° radially from the top centerline through a 2-1/4 inch diameter pad. No strain gages were used in this test. Figure 18 shows the point of application of this load.

Test No. 7 represented the load from an F 100 aircraft applied at sta. 93.3 and 26° radially from the top centerline through a 1-1/2 inch diameter pad. Six strain gage rosettes were mounted around the pad as shown in Figure 18.

Test No. 8 represented the load from an MAU-9/A rack applied through a 1-1/2 inch diameter and located at sta. 90.8 and 23° radially from the top centerline. Figure 18 shows the point of application of this load. No strain gages were used in this test.

Results

Test No. 1

Limit loads for this test were as follows: P1, 8040 pounds tension forward; P2, 6500 pounds lateral at sta. 22.6 (See Figure 6). The loads were taken to 200 percent of limit load with no indication of failure in the unit. The maximum strain measured in the fiberglass at this load was 5800 micro-inches per inch compression at gage number 16 (See Figure 3). Table I lists the strains recorded during this test.

Note: Stresses were not computed for any of the tests due to the nature of the material upon which the strain gages were mounted. The modulus of elasticity "E" and Poisson's Ratio "U" are dependent upon the orientation of the fibers and these values are not available for use in calculations.

Test No. 2

Limit loads for this test were as follows: P1, 110,000 pounds tension aft; P2, 25,800 pounds tension aft; P3, 25,800 pounds compression forward (Note: P2 and P3 were applied as a couple 30 inches apart); P4, 13,500 pounds lateral. See Figure 11 for the locations of these loads.

The loads were taken to 145 percent at which point the bolts in the aft clamp band failed and the clamp rings on the unit and the test fixture were damaged. Figures 19 and 20 show this failure. The loads at failure were as follows: P1, 159,000 pounds; P2 and P3, 37,400 pounds each; P4, 19,600 pounds. There was no indication of failure in the fiberglass portion of the unit.

The maximum strain measured at 140 percent limit load was 7500 micro-inches per inch tension at gage Number 1 in Rosette No. 1 (See Figure 9). Table III lists the strains recorded during this test.

Test No. 3

Limit load for this test was 42,500 pounds applied to the lug at an angle of approximately 9° from the vertical. The lug failed at 198 percent of limit load (84,000 pounds). Figure 13 shows the application of this load and Figure 21 shows the lug after failure. The maximum strain measured on the fiberglass during this test was 13,100 micro-inches per inch tension at gage Number 9 in Rosette No. 3 (See Figure 12). This strain was measured at 160 percent limit load and the gage became inactive after this increment of load. There was no indication of failure in the fiberglass portion of the unit. Table III lists the strains recorded during this test.

Test No. 4

Limit load for this test was 21,300 pounds applied to the aft lug at an angle of approximately 62° from the vertical. The load was taken to 200 percent of limit load with no indication of failure in the unit. Figure 15 shows the application of this load. The maximum strain measured on the fiberglass during this test was 16,500 micro-inches per inch tension at gage Number 9 in Rosette No. 3 (See Figure 14). This strain was measured at 190 percent of limit load and the gage became inactive after this increment of load. Table IV lists the strains recorded during this test.

Test No. 5

Limit load for this test was 34,000 pounds applied at sta. 64.5 and 25° radially from the top centerline (See Figure 17). The unit was loaded through a 2-1/4 inch diameter loading pad to 200 percent limit load (68,000 pounds). After removal of the load, some cracking of the case surface around the edge of the loading pad was observed. Figure 22 is a close-up of this area. The maximum strain measured during this test was 12,200 micro-inches per inch compression at gage Number 7 in Rosette No. 3 (See Figure 22). Table V lists the strains recorded during this test.

Test No. 6

Limit load for this test was 25,300 pounds applied at sta. 84.5 and 25° radially from the top centerline (See Figure 18). The unit was loaded through a 2-1/2 inch diameter loading pad to 160 percent limit load (40,480 pounds) at which point the fiberglass began cracking along the line of the filament wrappings as shown in Figure No. 23. There were no strain gages used in this test.

Test No. 7

Limit load for this test was 22,600 pounds applied at sta. 93.3 and 26° radially from the top centerline (See Figure 18). The unit was loaded through a 1-1/2 inch diameter loading pad to 200 percent of limit load. After removal of the load, some cracking of the case surface around the loading pad was observed. Figure 24 is a close-up of this area. The maximum strain measured during this test was 13,800 micro-inches per inch compression at gage Number 18 in Rosette No. 6 (See Figure 24). This strain was recorded at 190 percent limit load and the gage was inactive after this increment of load. Table VI lists the strains measured during this test.

Test No. 8

Limit load for this test was 19,400 pounds applied at sta. 90.8 and 23° radially from the top centerline. (See Figure 18). The unit was loaded through a 1-1/2 inch diameter loading pad to 200 percent of limit load. There was no indication of cracking around the pad and there were no strain gages used during the test.

[redacted]

UNCLASSIFIED



H. W. HUTEZ - 7322-1

TEST PROJECT ENGINEER R. P. MAY - 7321-5

APPROVED BY: R. S. HOOPER - 7321-5

EWN:7322-1:cm

Enc. Figures 1 through 24
Tables I through VI

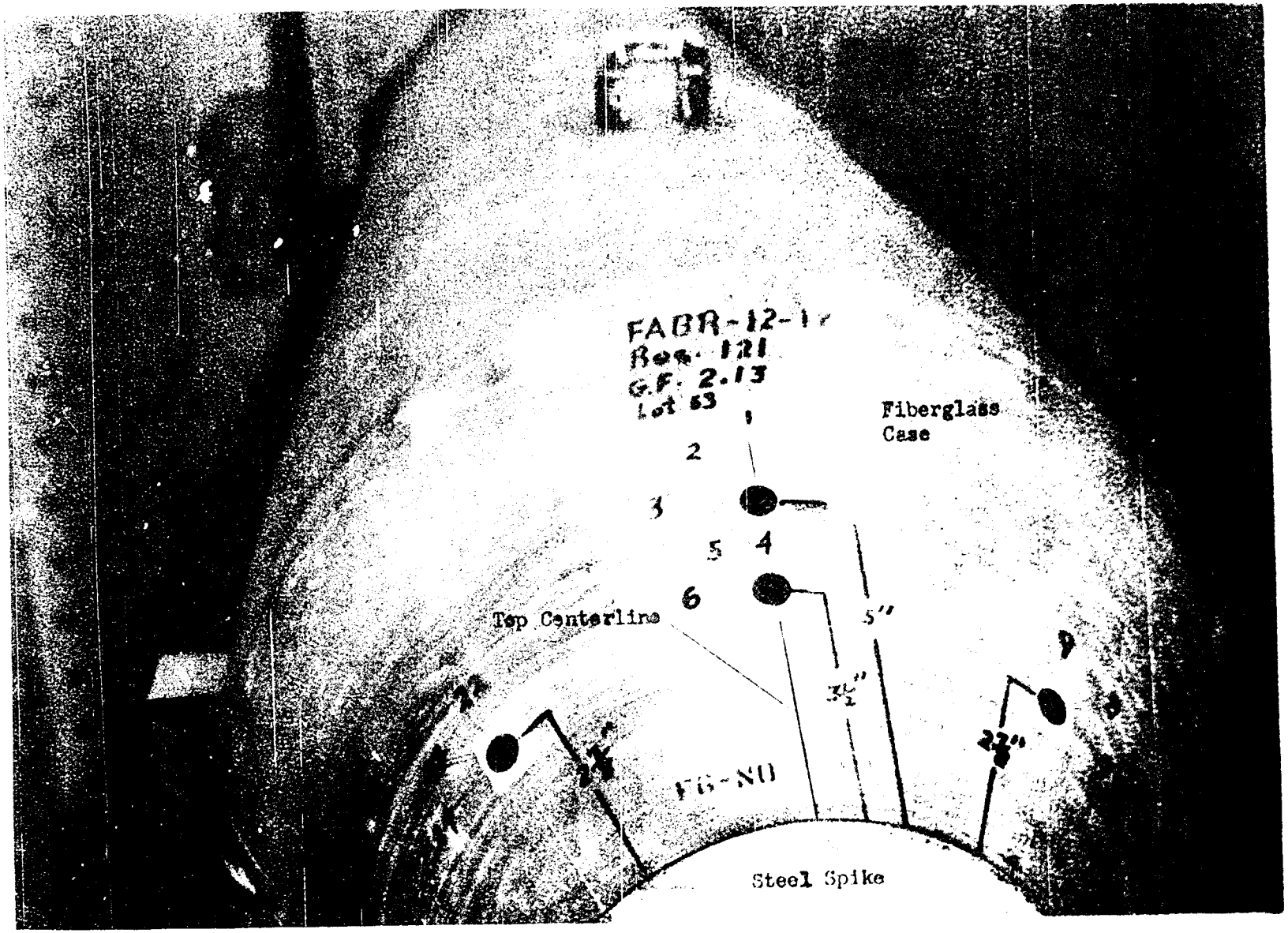
Copy to:
J. M. Wiesen, 1442
D. S. Bliss, 7321
L. A. Dunn, 7122
D. M. Bruce, 7182
E. H. Copeland, 7321
C. L. Johnson, 7523
Central Records File, 3421-3

UNCLASSIFIED

[redacted]

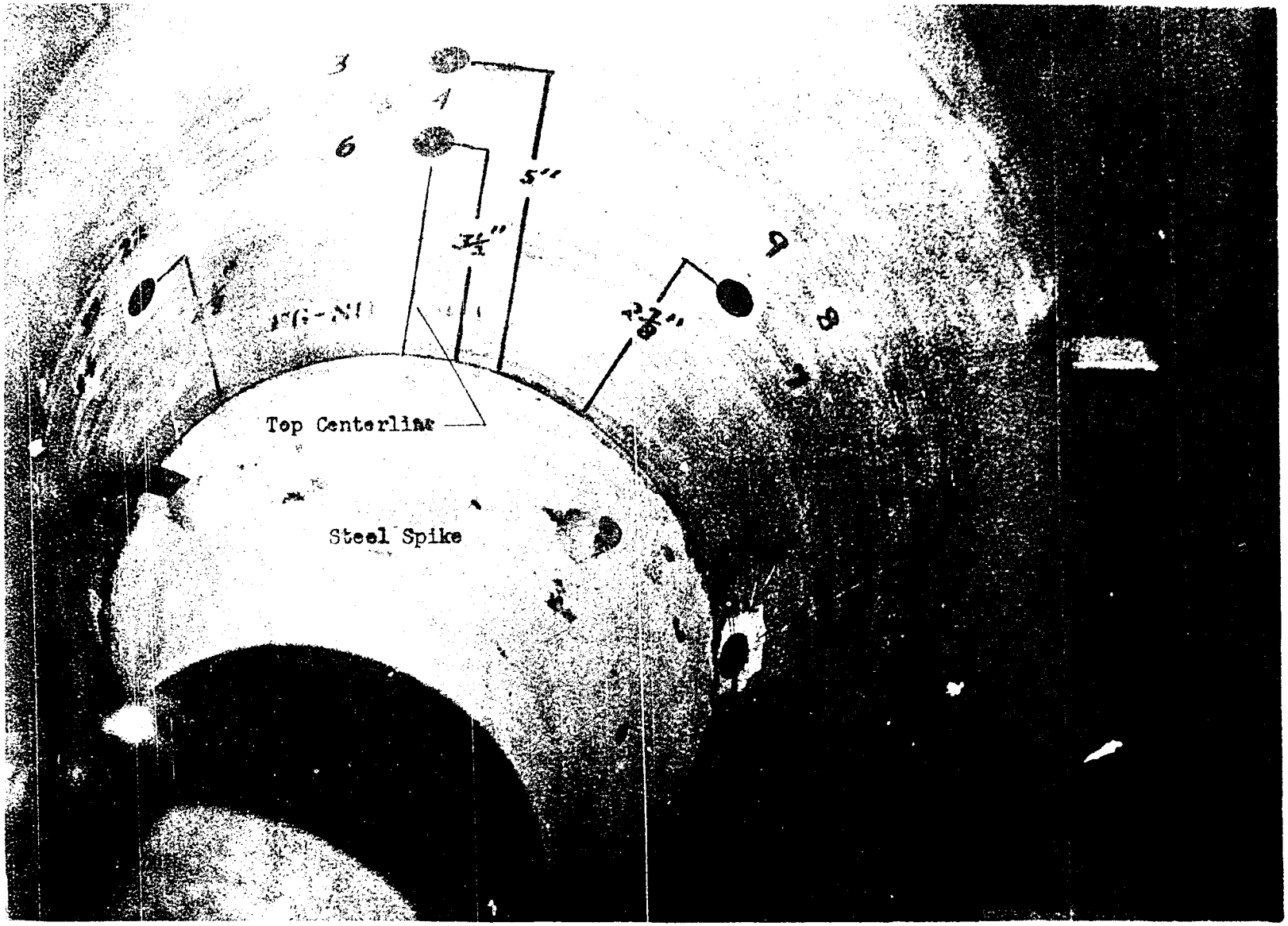
[redacted]

UNCLASSIFIED

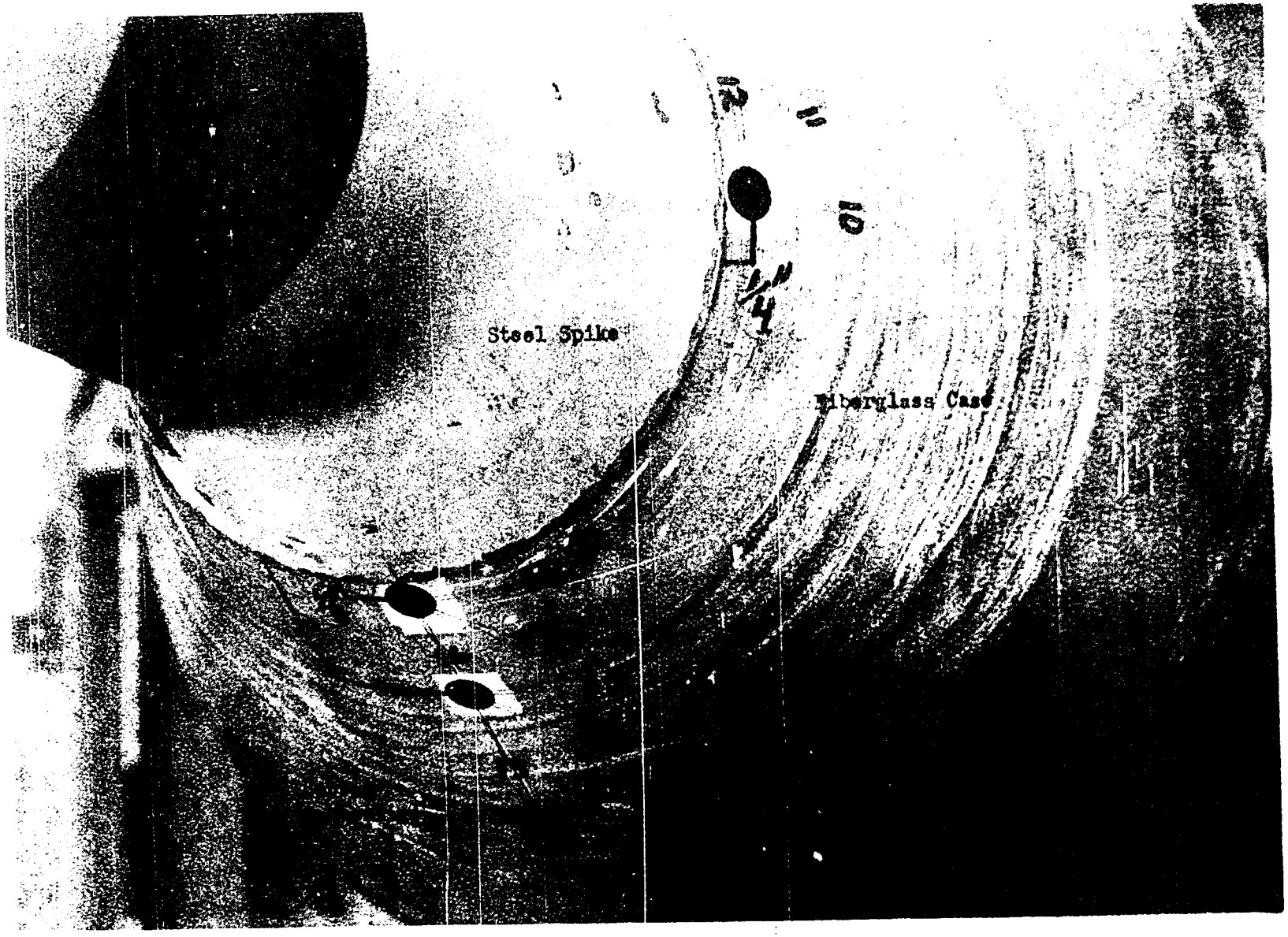



[redacted]

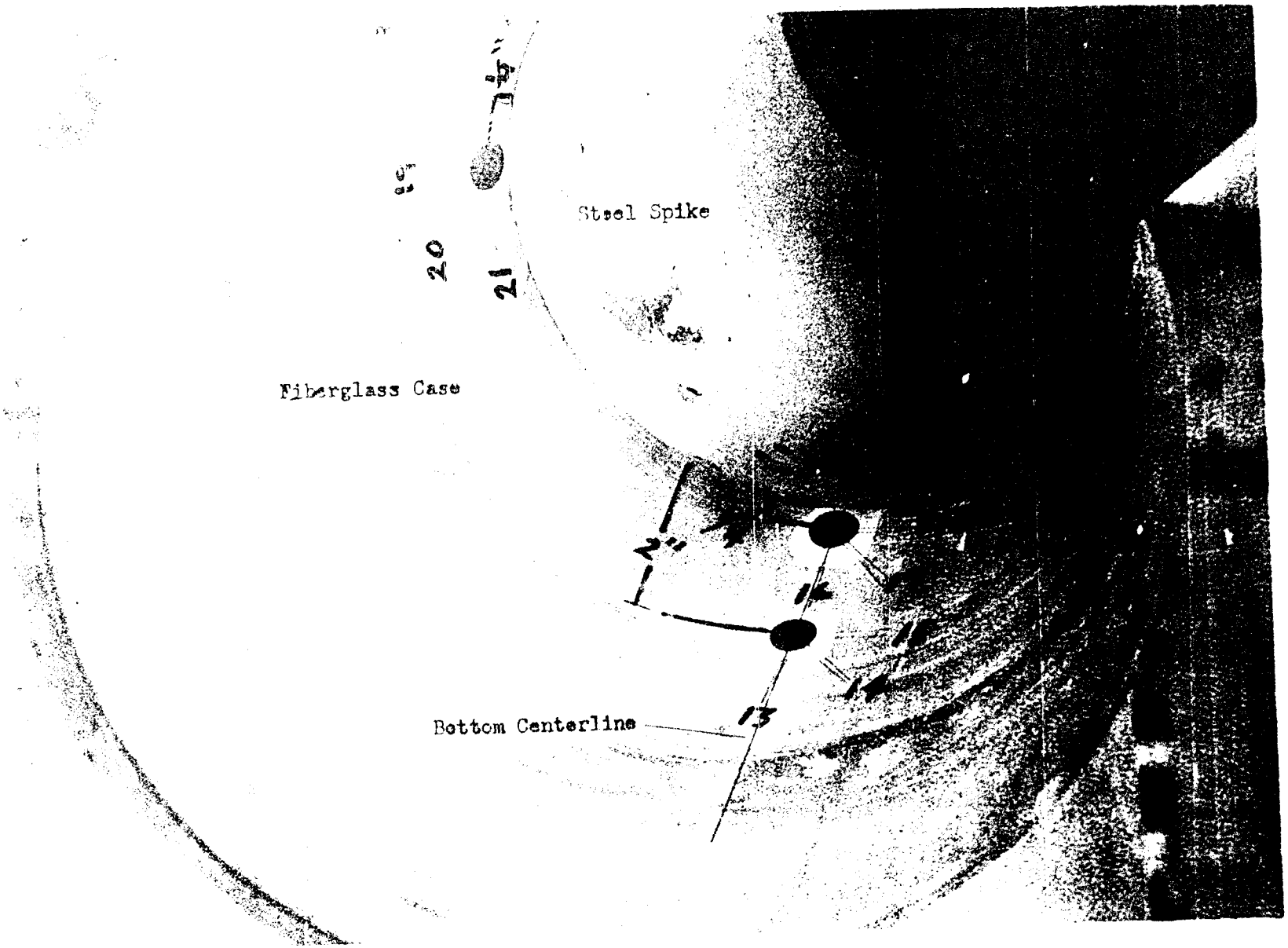
UNCLASSIFIED




[illegible] Strain Gage [illegible]


Steel Spike
Fiberglass Case
1/4"

[redacted] UNCLASSIFIED

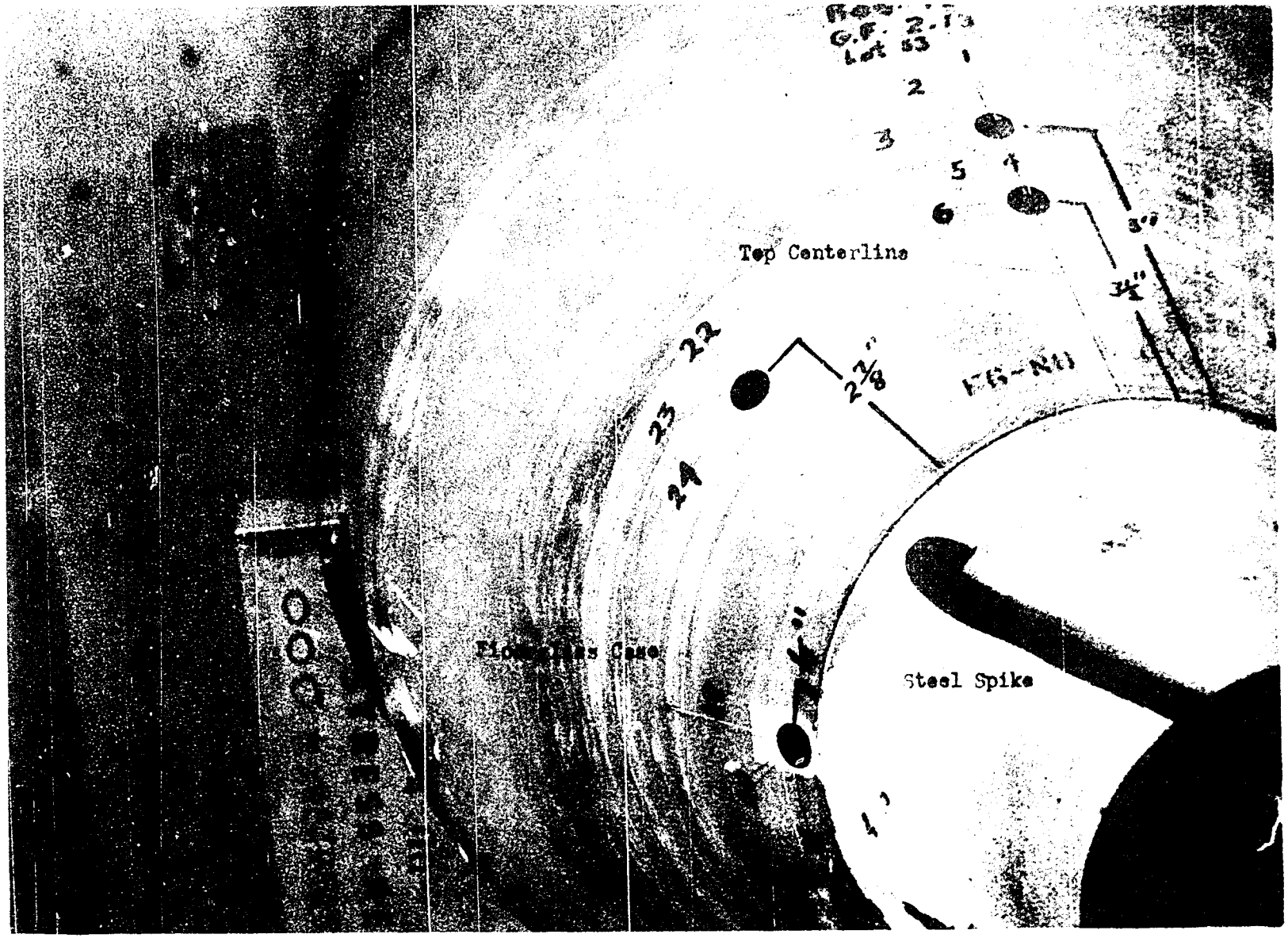



[illegible] Test No. 1 - [illegible]
[illegible] Center [illegible]

[redacted]

UNCLASSIFIED

[redacted] UNCLASSIFIED




[illegible] -- Location of Strain Gages for Test No. 1 - [illegible] Test of [illegible] [illegible] Center [illegible] Subassembly.

UNCLASSIFIED [redacted]

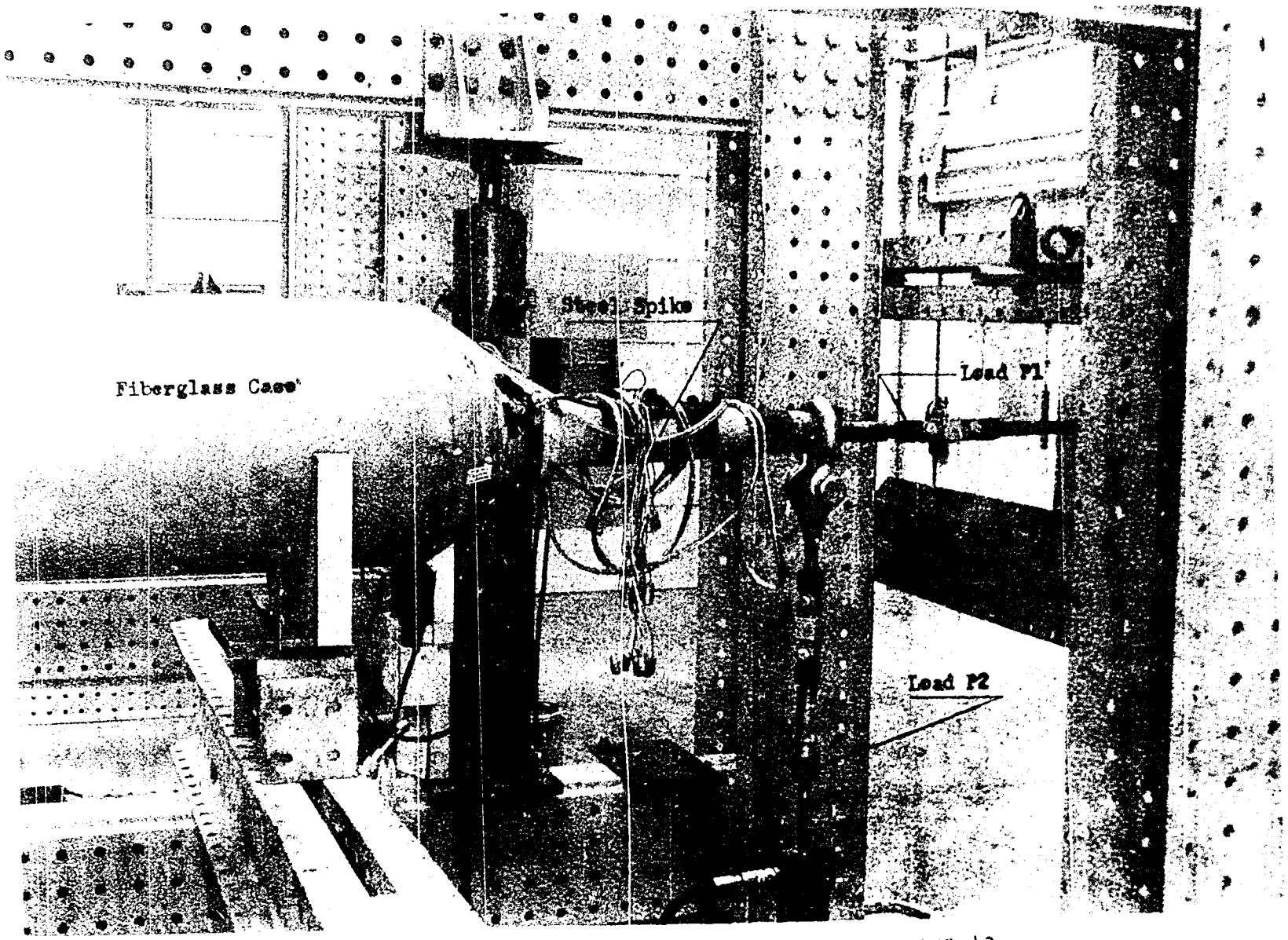



Figure 6 -- Test Setup for Test No. 1 - Static Test of Filament Wound Mk-43 Center Bomb Subassembly.

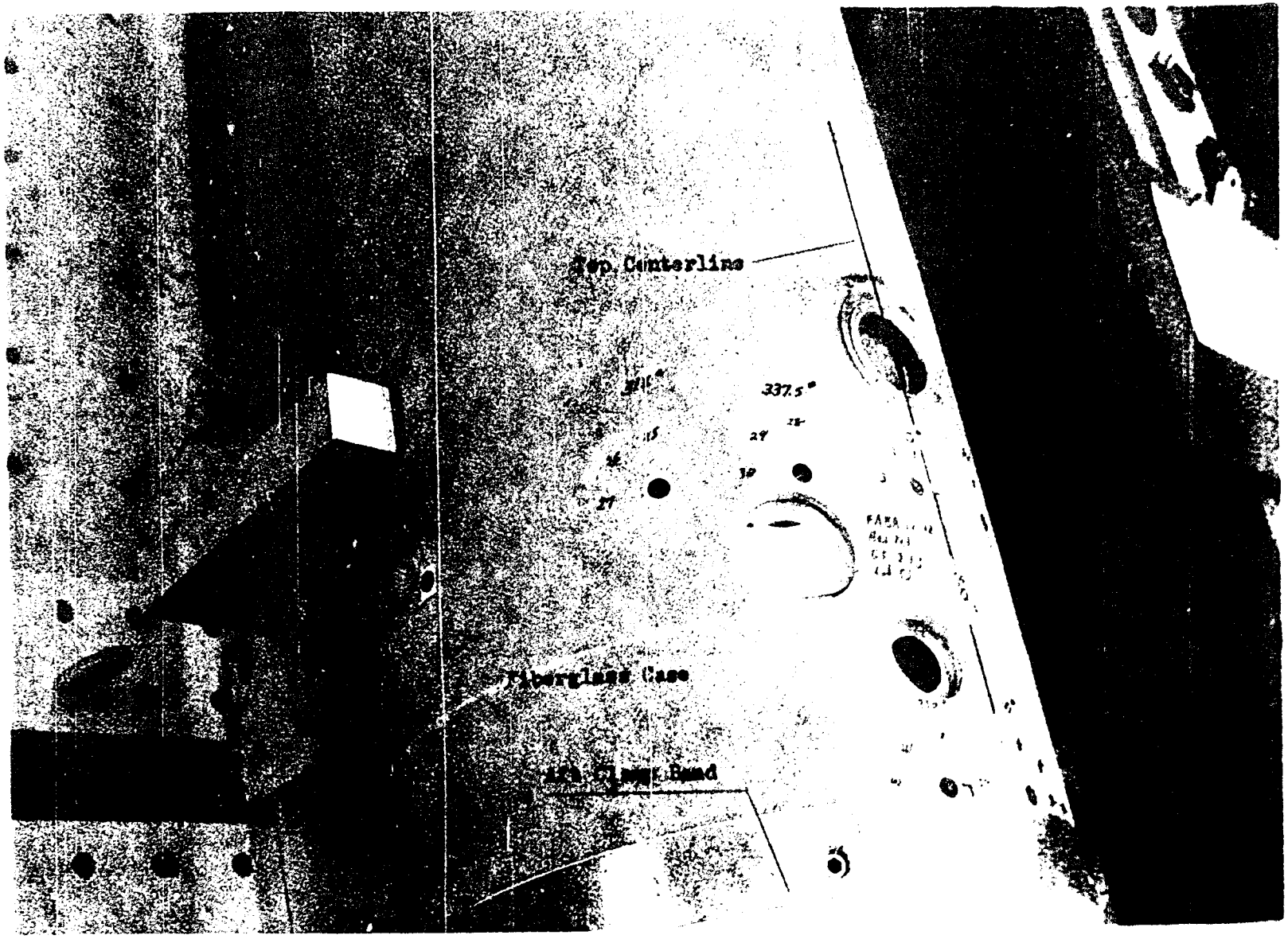



Figure 7 -- Strain Gage Locations for Test No. 2 - Static Test of Filament Wound Weld Center Bomb Subassembly.

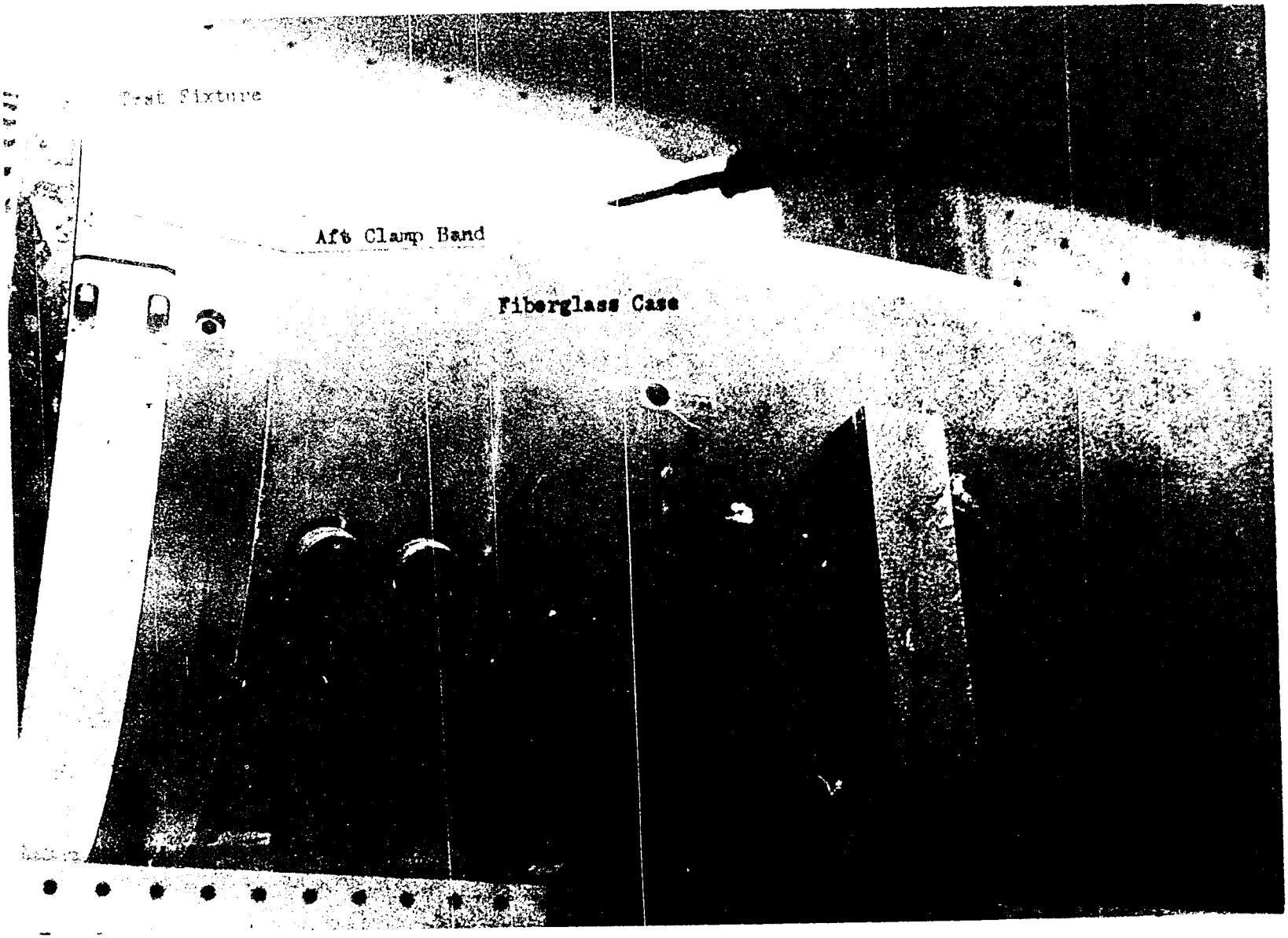
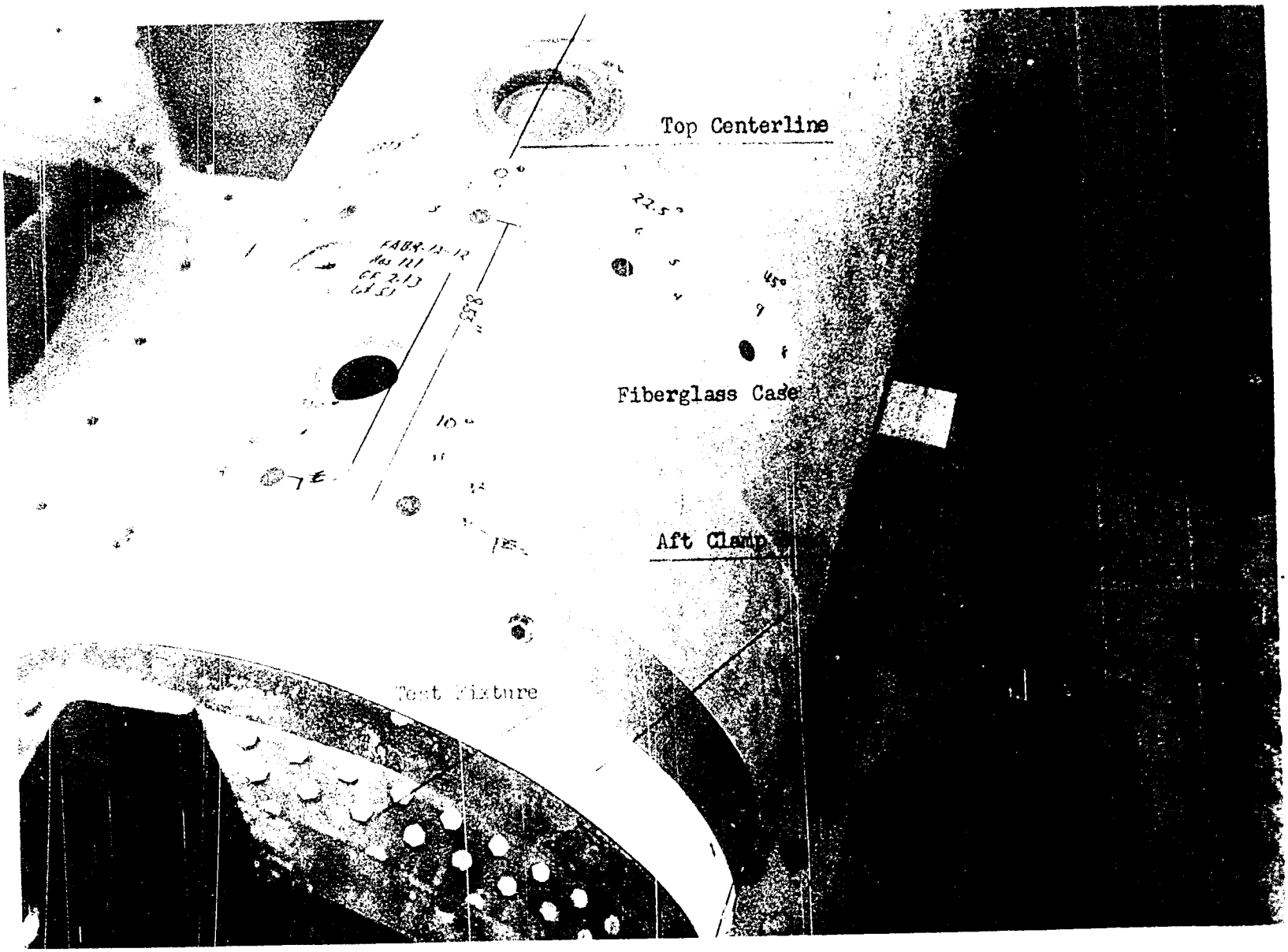



Figure 9 -- Strain Gage Locations For Test No. 2 - Static Test of Filament Wound
M-43 Center Bomb Subassembly

[redacted]

UNCLASSIFIED




-- Strain Gage Locations for Test No. 2 - Static Test of Filament Wound
[illegible]-13 Center Bomb Subassembly.

[redacted]

UNCLASSIFIED

[redacted] UNCLASSIFIED

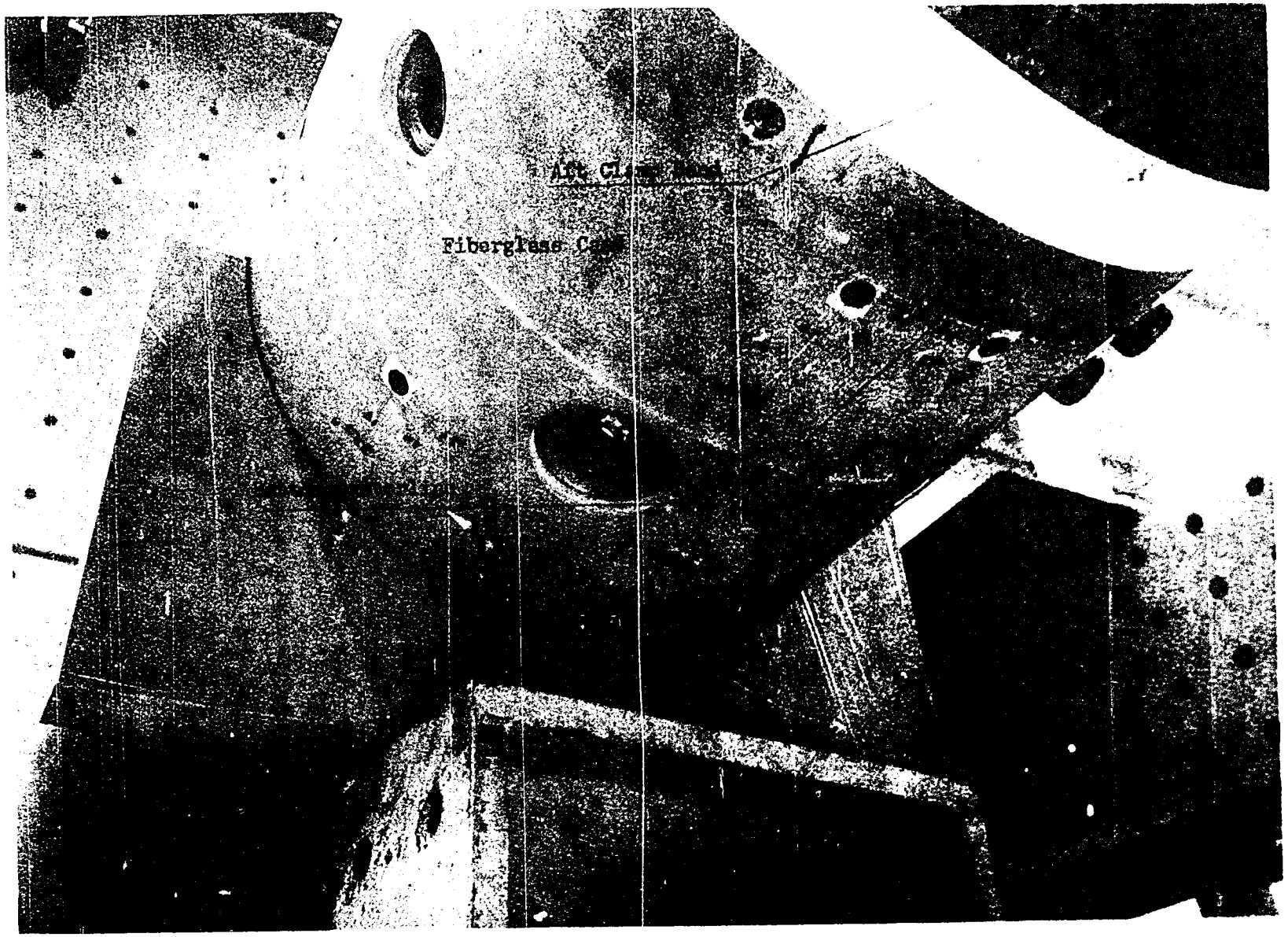
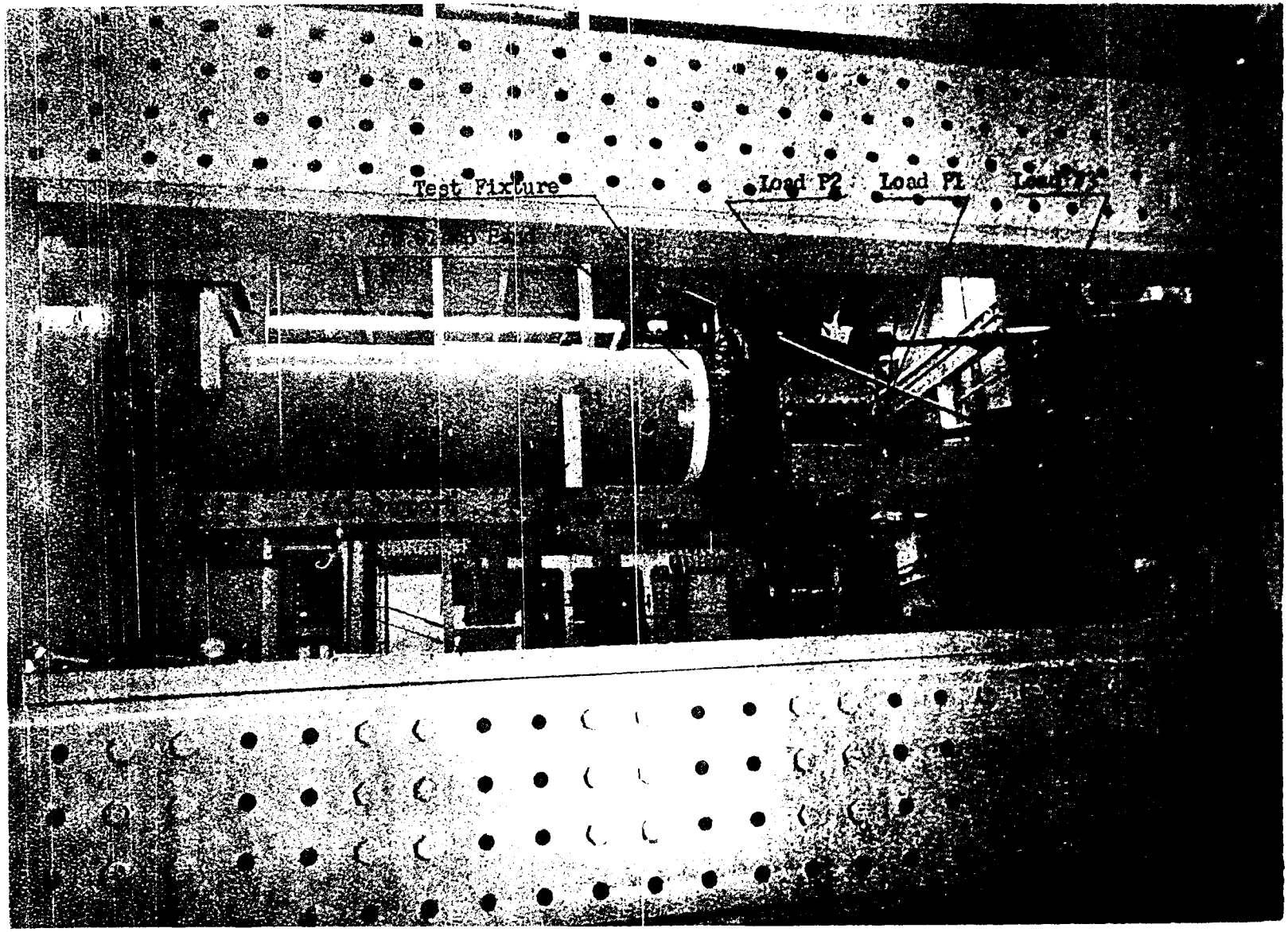
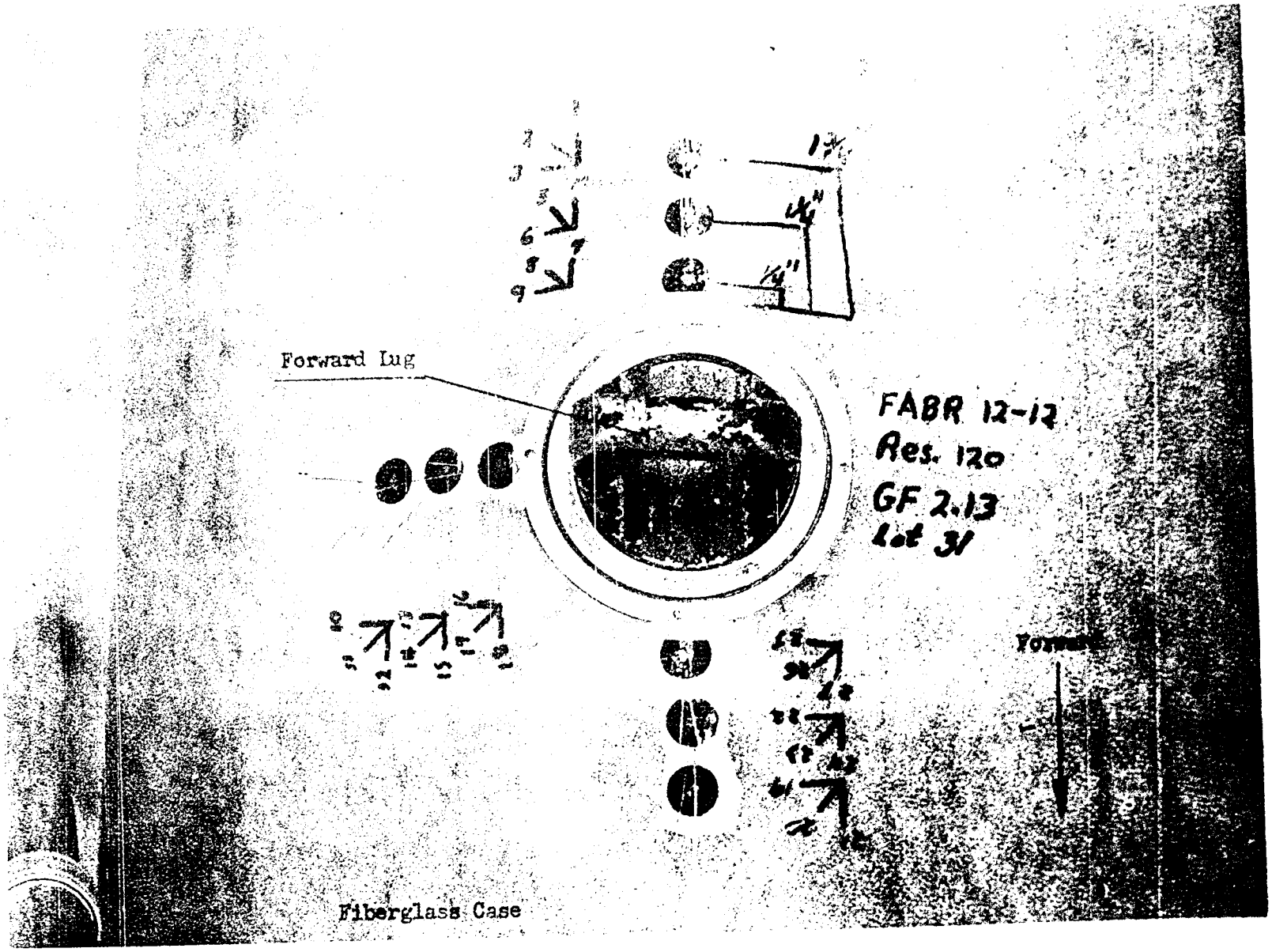



Fig. 1 -- Strain Gage Locations for Test No. 2 - Static Test of Filament Wound [illegible] Center Bank Subassembly.

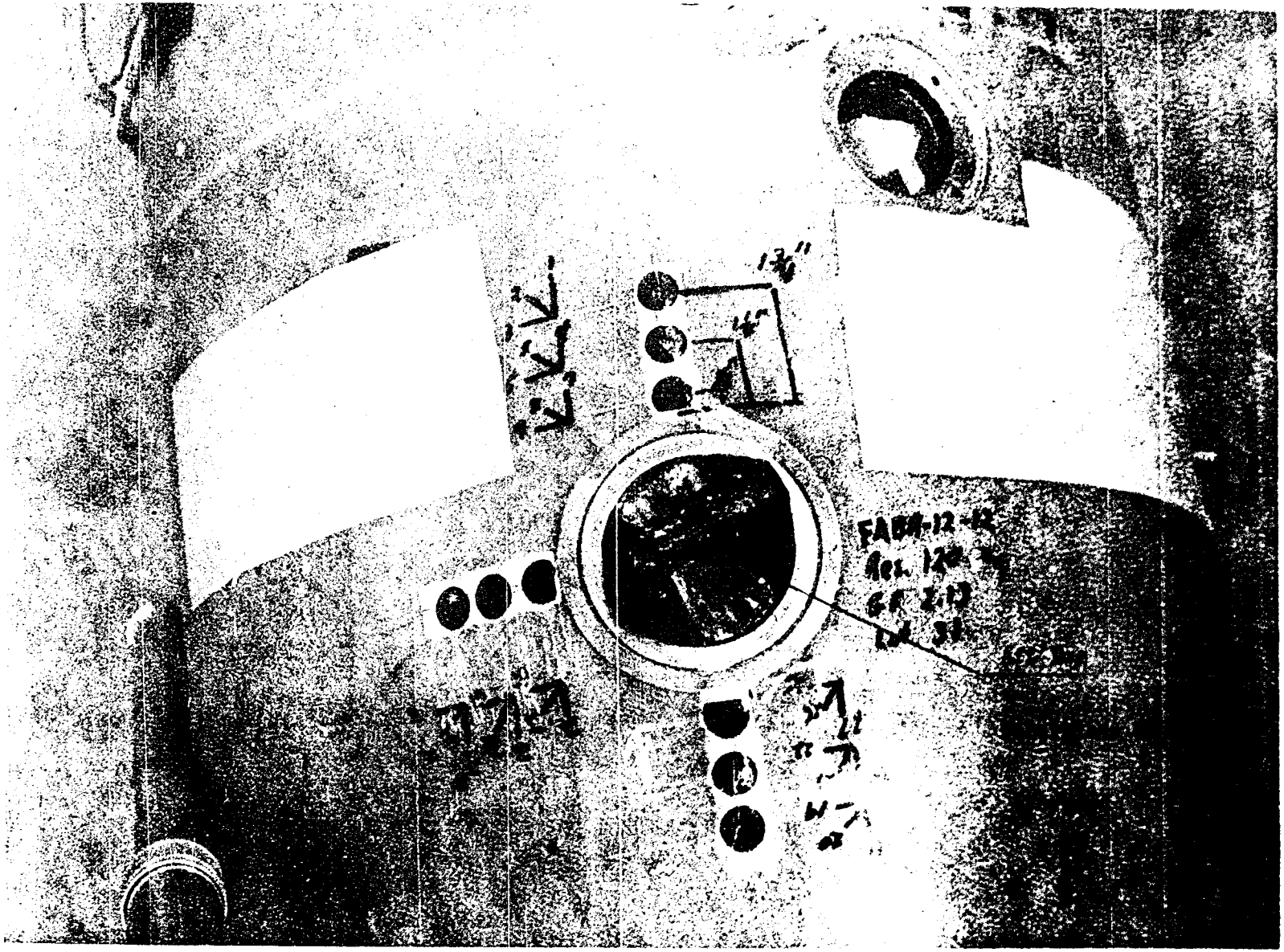
UNCLASSIFIED [redacted]


Test Fixture
Load P2
Load P1


Forward Lug
FABR 12-12
Res. 120
GF 2.13
Lot 31
Forward
Fiberglass Case

[redacted]

UNCLASSIFIED

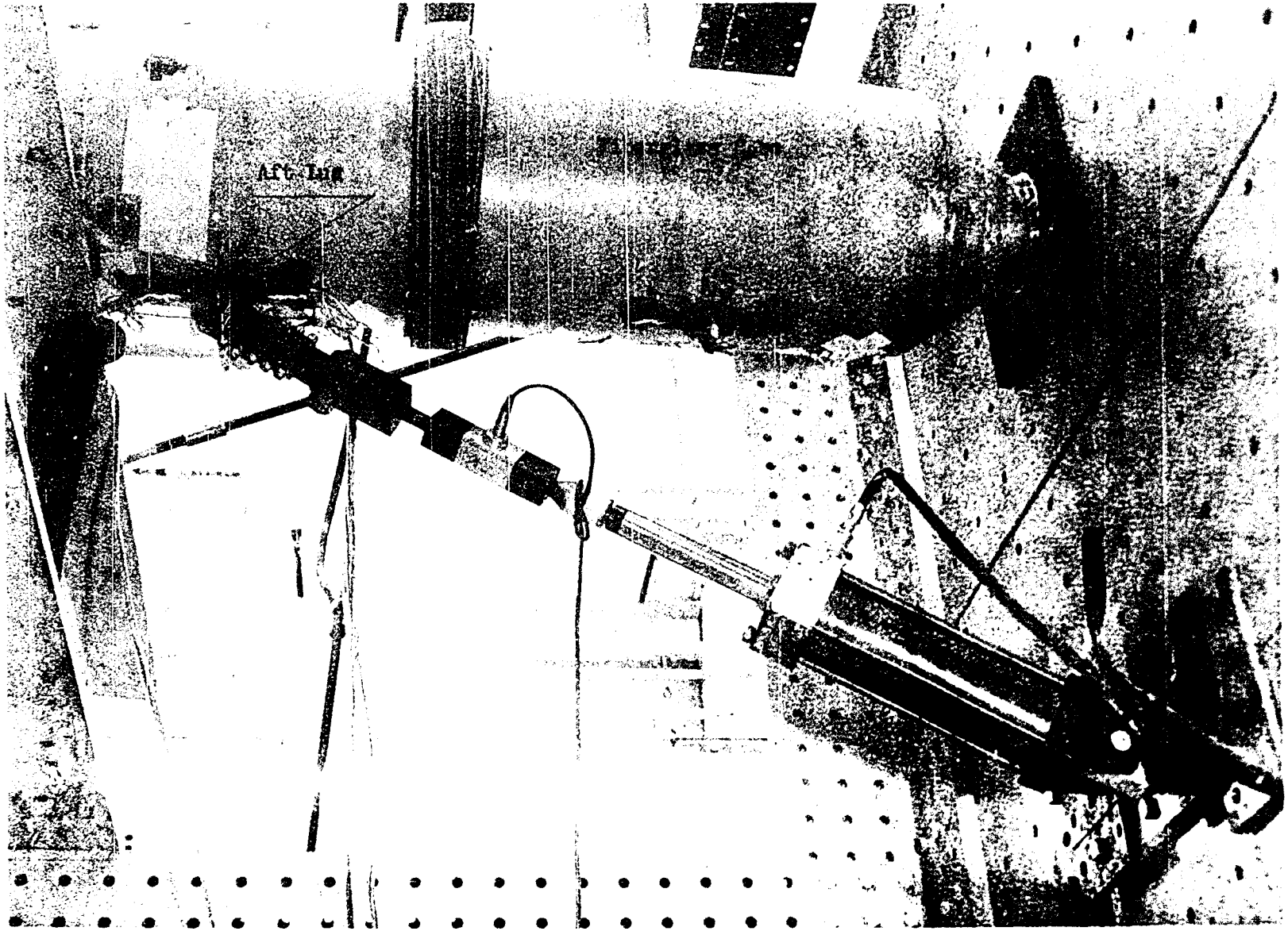



[illegible] -- Strain [illegible] Locations for Test No. [illegible] - Static [illegible]
[illegible] Center Bomb Subassembly.

UNCLASSIFIED

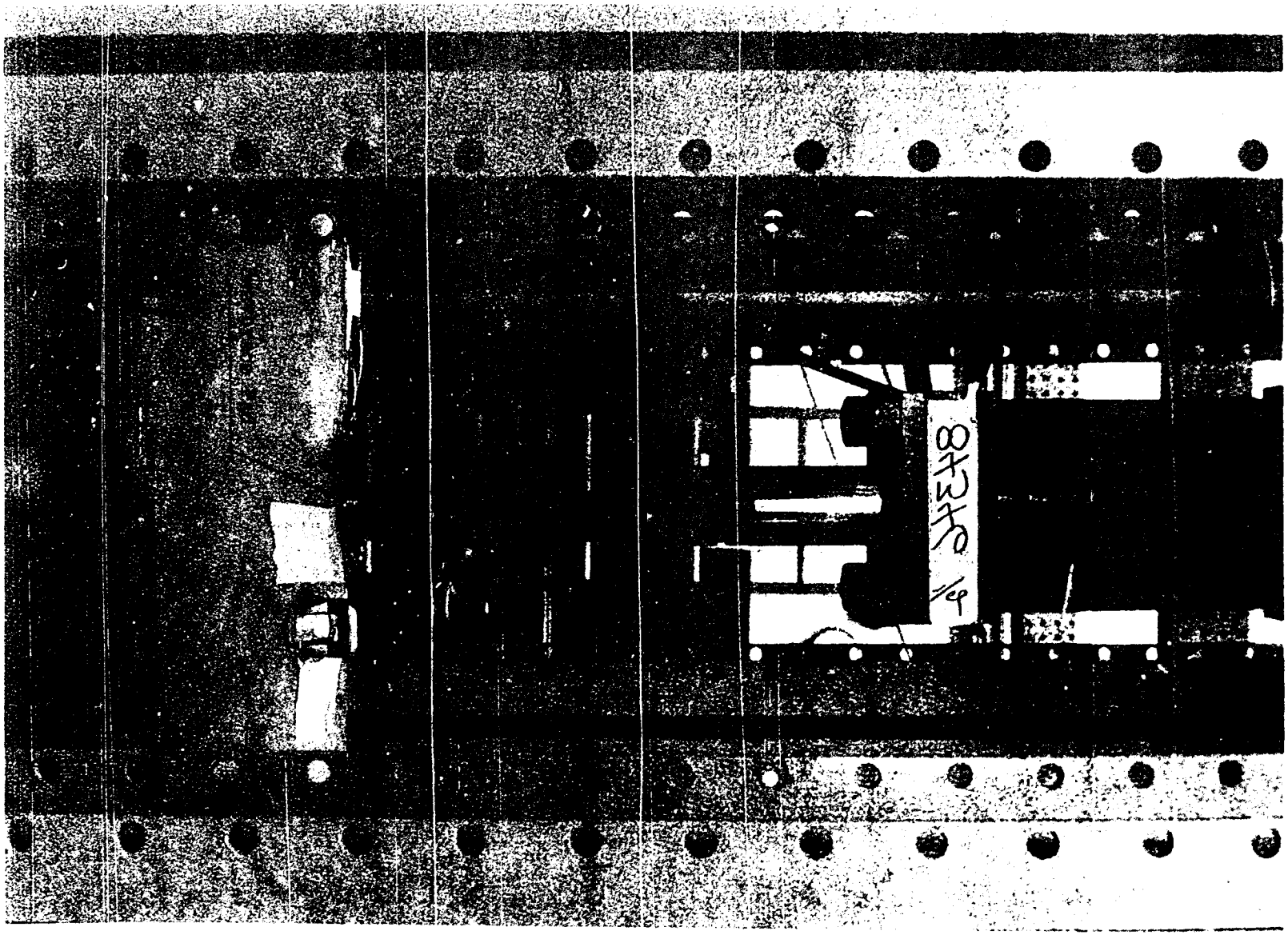
[redacted]

[redacted] UNCLASSIFIED




UNCLASSIFIED [redacted]

[redacted] UNCLASSIFIED

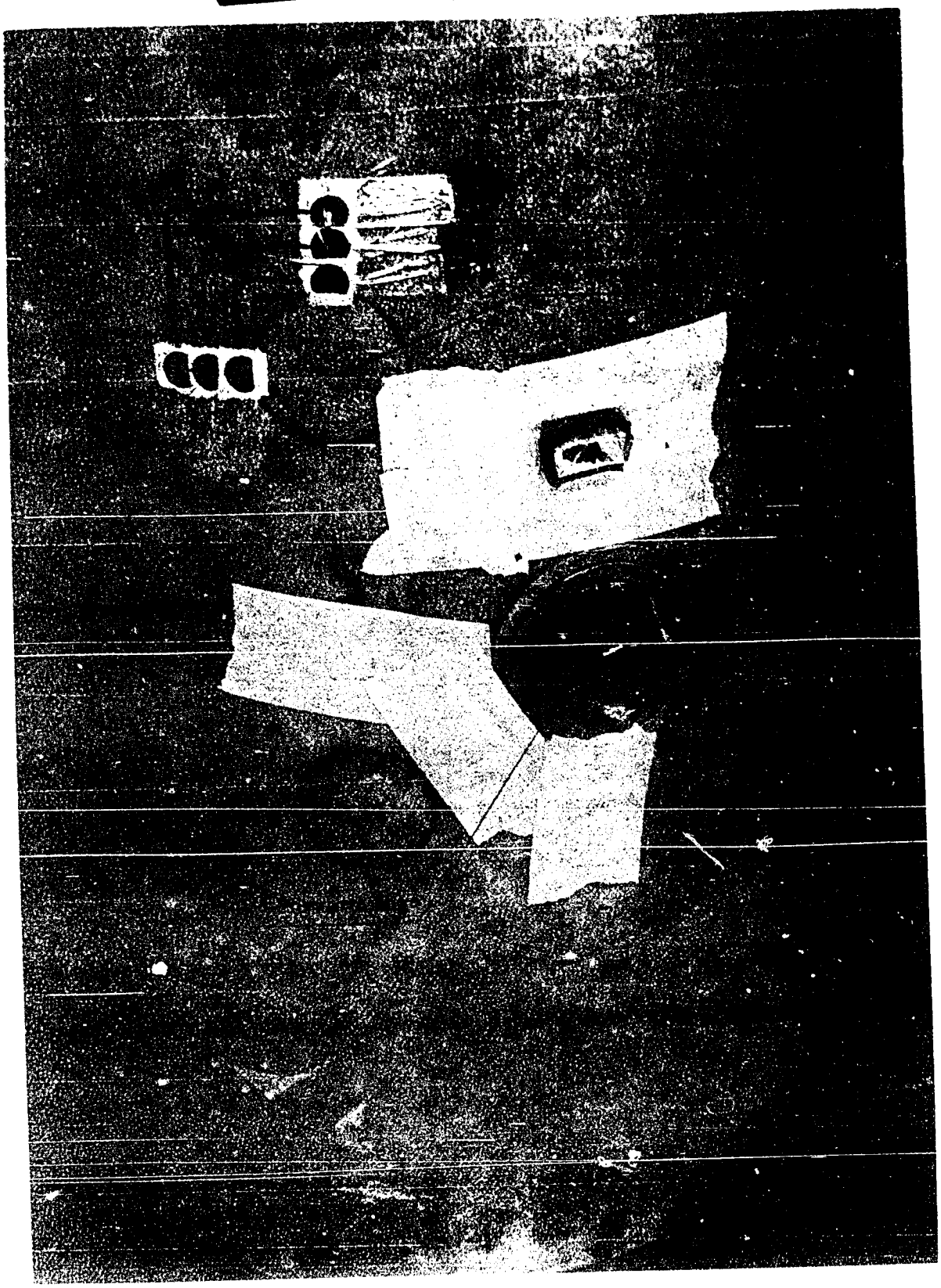



[redacted]

UNCLASSIFIED

[redacted]

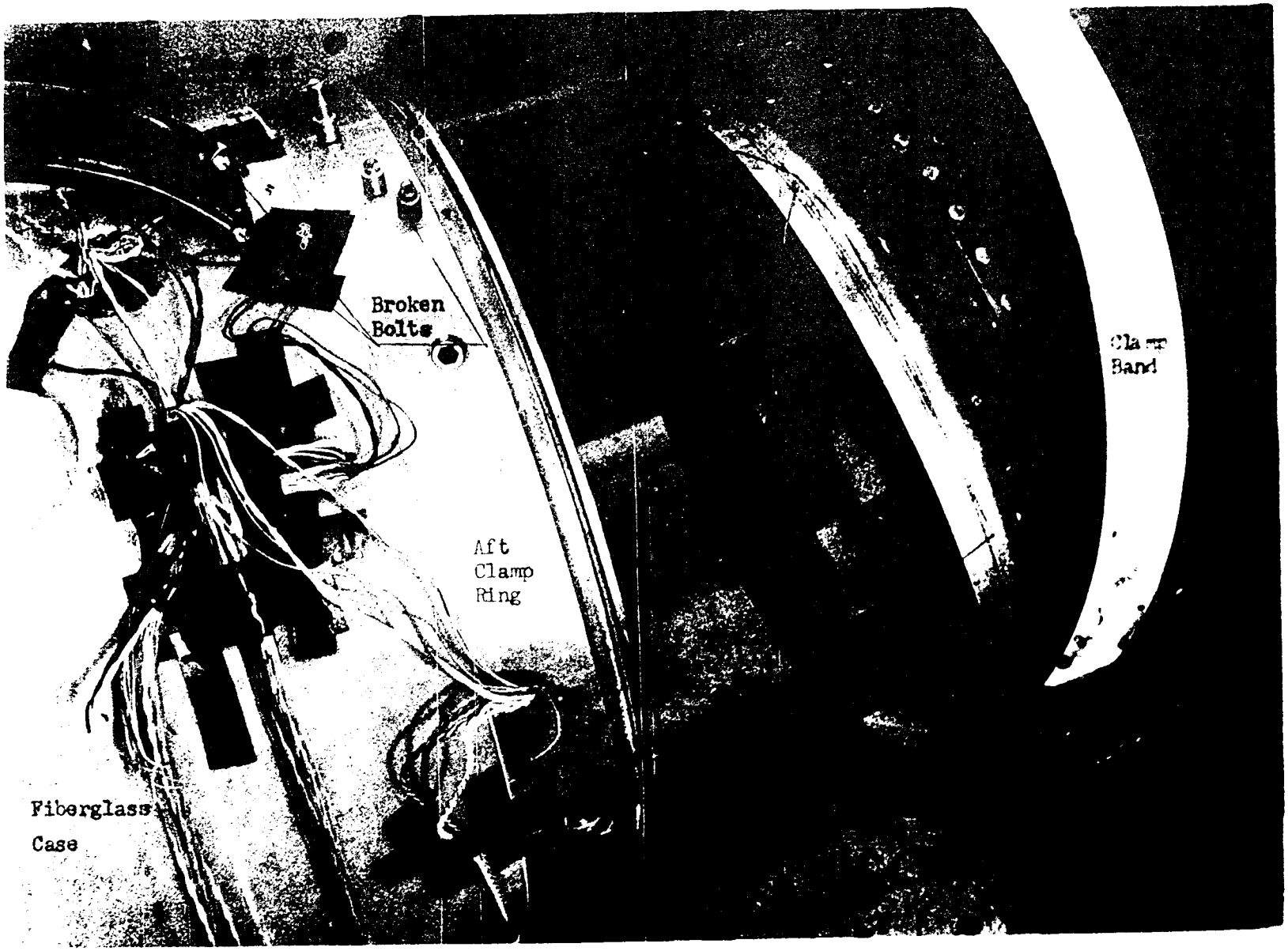
UNCLASSIFIED



UNCLASSIFIED

Location
for Test
Location
for Test
Aft Ing
Location

[redacted] UNCLASSIFIED




[illegible] Clamp Band Bolts During Test No. 2 - Static Test [illegible]

UNCLASSIFIED [redacted]

[redacted] UNCLASSIFIED

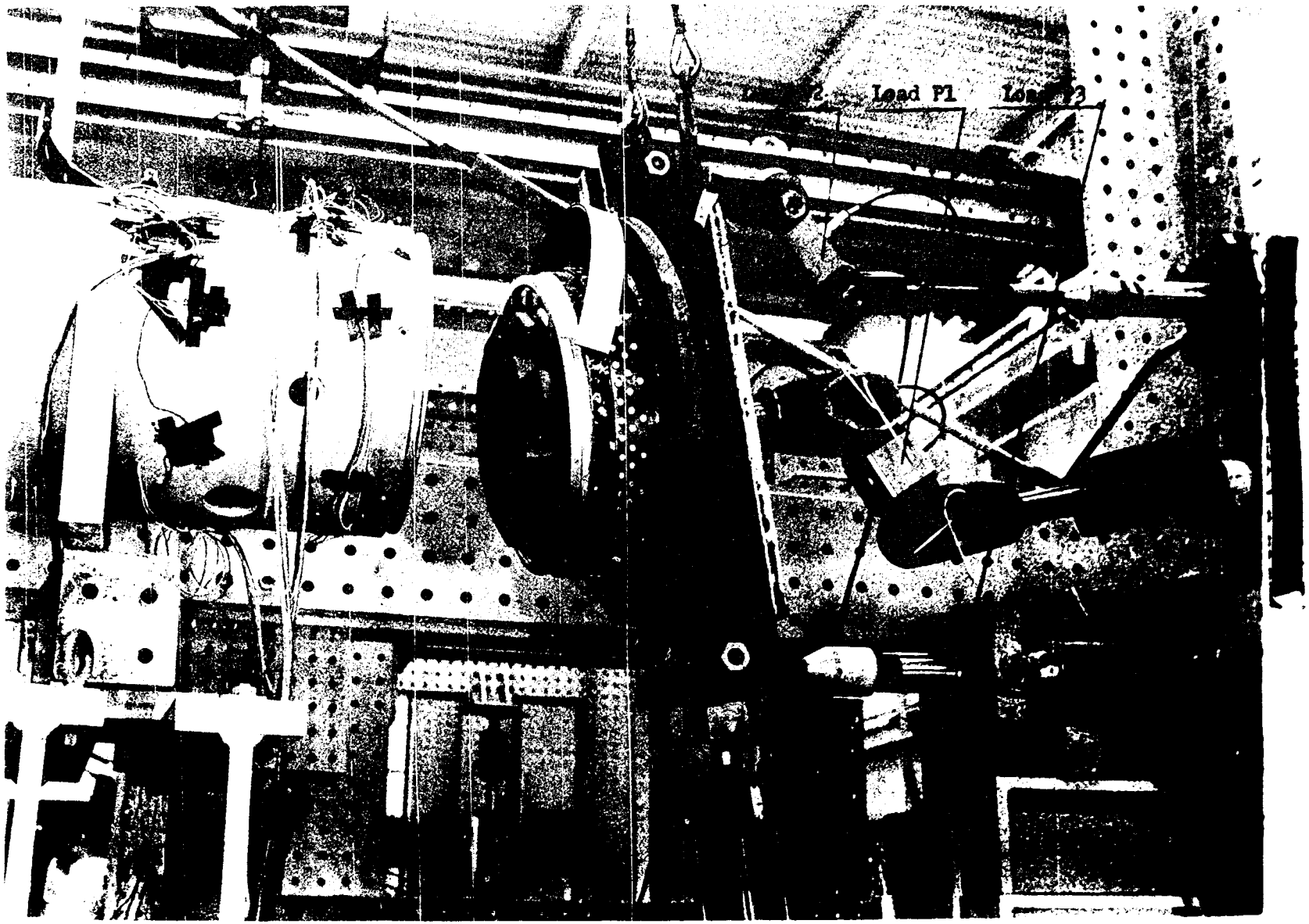



Figure 2[illegible] -- Failure During Test No. 2 - Static Test of Filament Wound MK-43 Center Bomb Subassembly.

[redacted]

UNCLASSIFIED

T-1[illegible]434

[redacted] UNCLASSIFIED

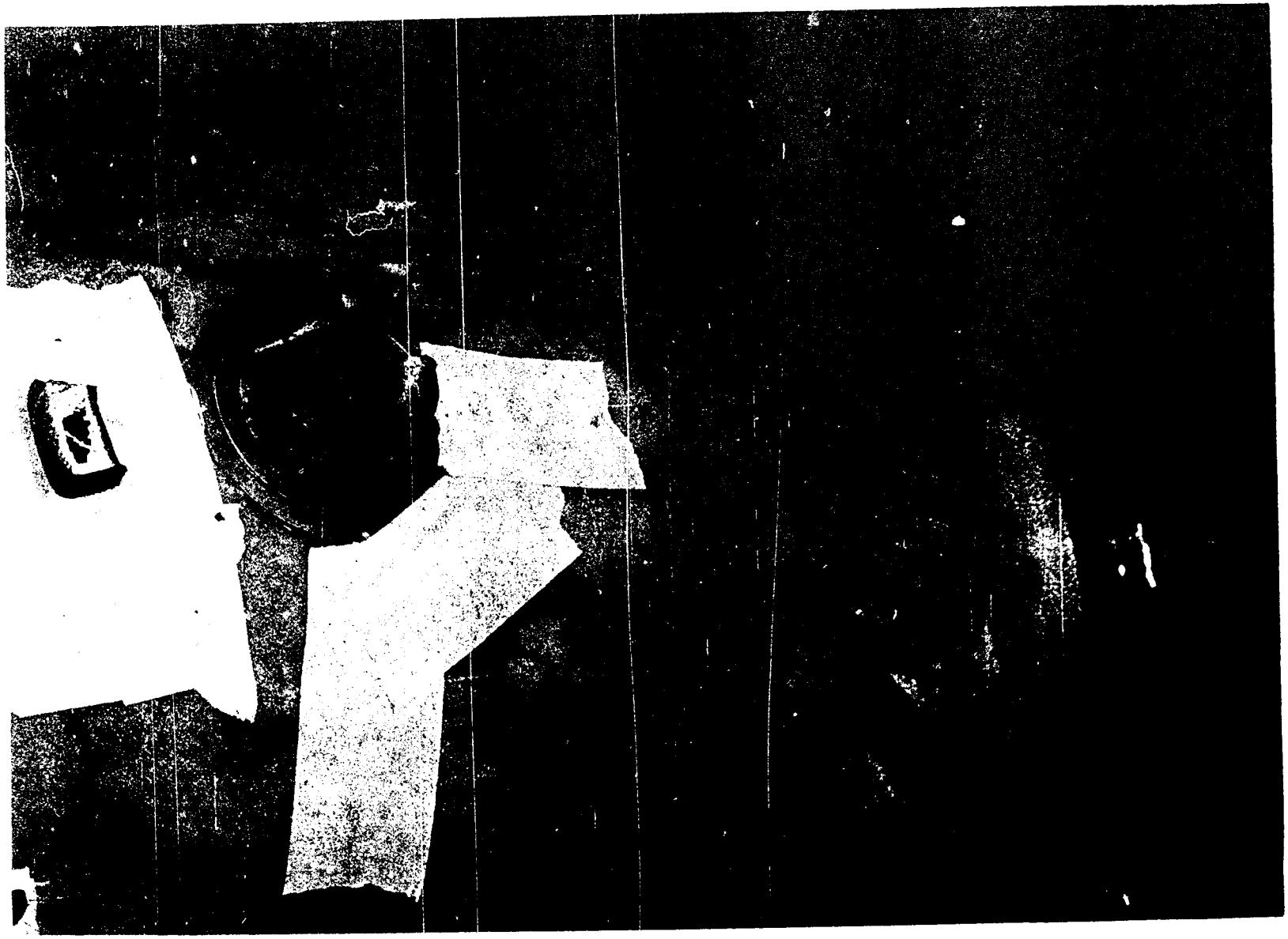


Figure 21 -- Showing The Forward Ing After Failure During Test No. 3 - Static Test of Filament Wound [illegible] Center Bomb Subassembly.

T-1[illegible]

[redacted] UNCLASSIFIED

UNCLASSIFIED

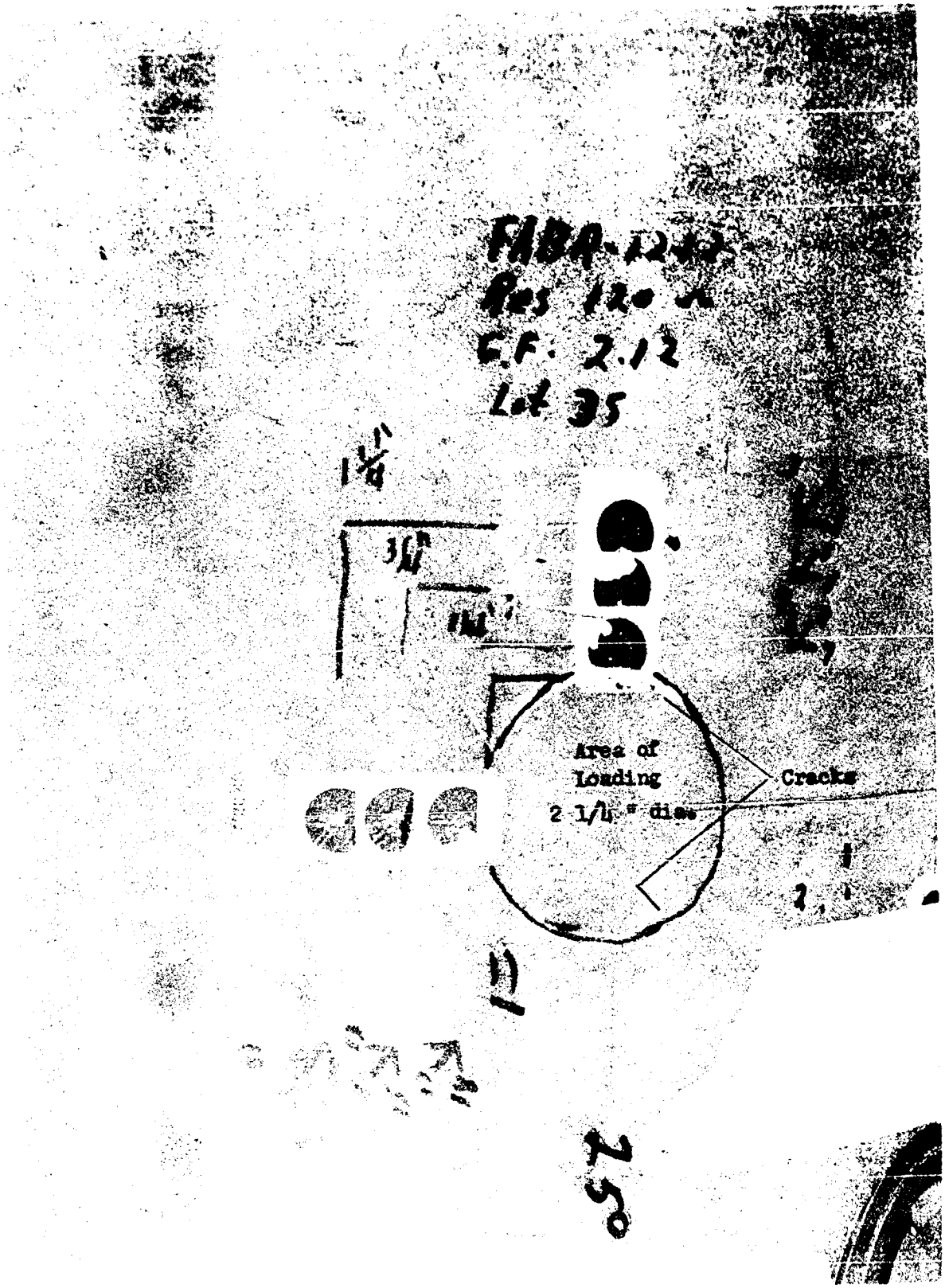



Figure 22 -- Close-up of Loaded Area During Test No. 5 - Static Test of Filament Wound W-43 Center Bomb Subassembly.

T-18434

UNCLASSIFIED

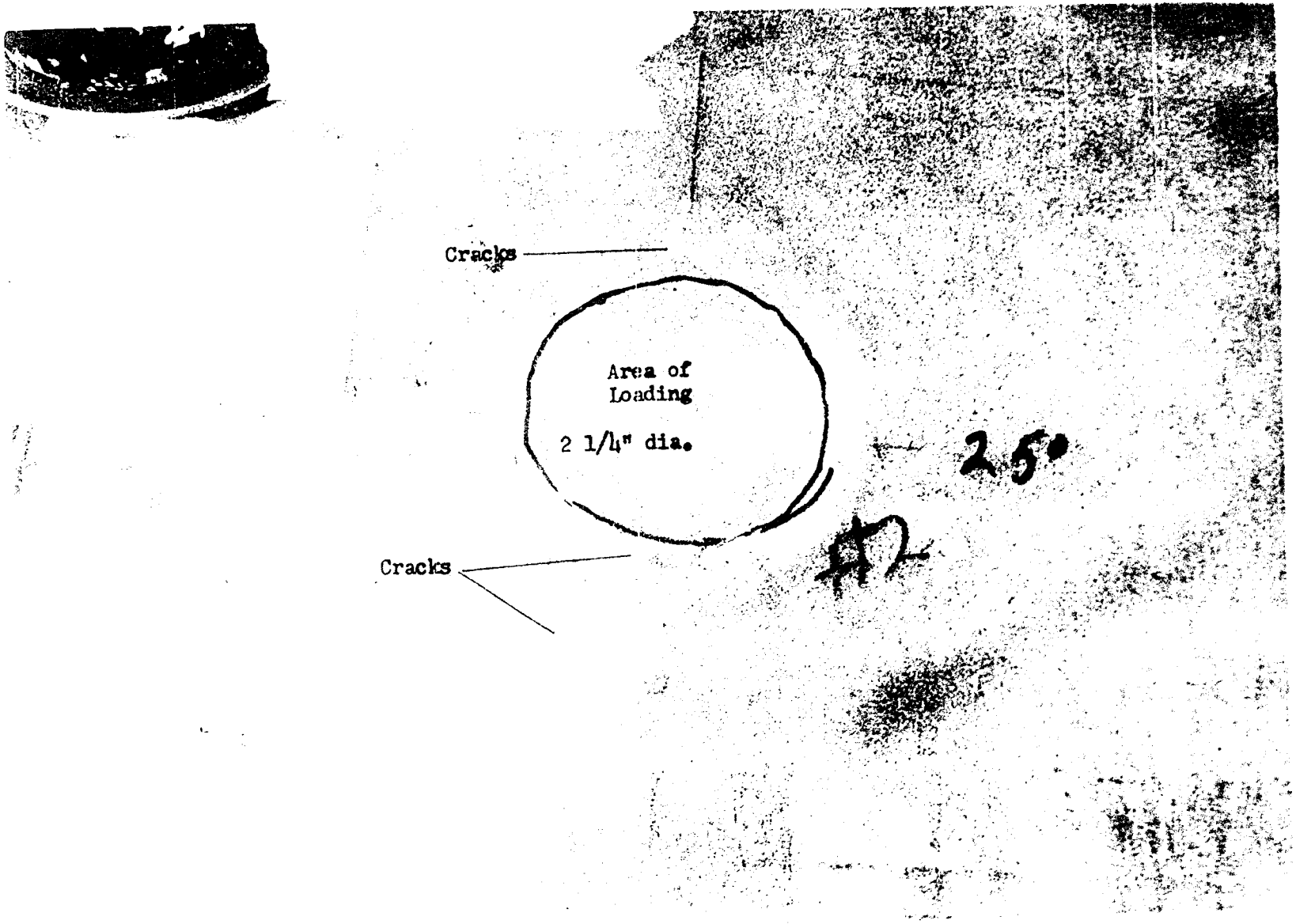



Figure 23 -- Showing the Cracks Developed During Test No. 6 - Static Test of Filament Wound MK-43 Center Bomb Subassembly.

T-1444

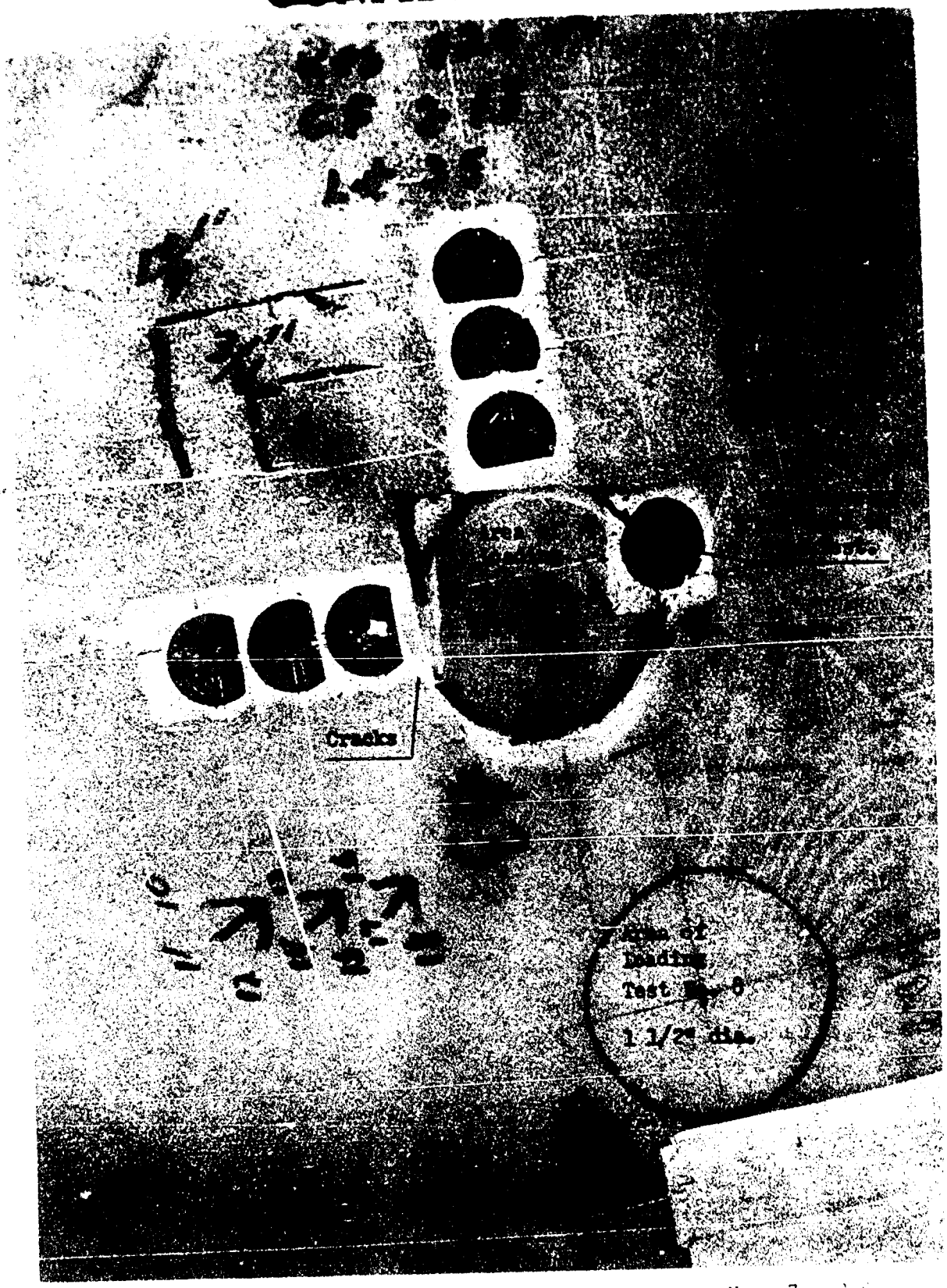



Figure 24 -- Close-up of the Areas Loaded During Test Nos. 7 and 8 - Static Test of Filament Wound MK-43 Center Bomb Subassembly.

**Strains Measured on the Fiberglass Case During Test No. 1**
**Static Test of Filament Wound MK-43 Center Bomb Subassembly.**

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 1 CH 1 | CH 2 | CH 3 | ROSETTE 2 CH 4 | CH 5 | CH 6 | ROSETTE 3 CH 7 | CH 8 | CH 9 | ROSETTE 4 CH 10 | CH 11 | CH 12 | ROSETTE 5 CH 13 | CH 14 | CH 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 10 | 10 | 20 | 10 | | | 10 | | 10 | 20 | | | | | |
| 010 | 30 | 1 | -10 | 1 | 1 | -1 | -1 | -1 | 1 | -20 | -20 | -20 | -40 | -40 | -20 |
| 020 | 80 | 50 | -30 | 50 | 50 | 10 | 10 | 30 | 60 | -20 | -10 | -10 | -110 | -50 | -20 |
| 030 | 130 | 70 | -40 | 80 | 70 | 20 | 40 | 50 | 90 | -1 | -1 | -10 | -210 | -80 | -10 |
| 040 | 190 | 90 | -50 | 130 | 130 | 40 | 60 | 80 | 120 | 10 | 30 | -1 | -340 | -150 | 30 |
| 050 | 250 | 130 | -50 | 190 | 160 | 60 | 80 | 90 | 130 | 20 | 50 | 1 | -520 | -200 | 60 |
| 060 | 320 | 170 | -50 | 240 | 200 | 80 | 110 | 110 | 150 | 30 | 60 | 1 | -660 | -260 | 80 |
| 070 | 370 | 190 | -60 | 290 | 250 | 120 | 120 | 130 | 170 | 30 | 80 | 10 | -850 | -310 | 110 |
| 080 | 430 | 220 | -60 | 350 | 300 | 120 | 140 | 160 | 200 | 30 | 110 | 1 | -1010 | -380 | 140 |
| 090 | 490 | 260 | -60 | 410 | 340 | 160 | 170 | 200 | 240 | 40 | 130 | 10 | -1180 | -440 | 190 |
| 100 | 550 | 290 | -80 | 460 | 390 | 170 | 180 | 210 | 250 | 50 | 160 | 10 | -1390 | -520 | 220 |
| 000 | 20 | | -10 | 10 | -10 | -10 | -10 | -10 | 10 | 10 | | | | -10 | -10 |
| 050 | 250 | 130 | -60 | 210 | 170 | 60 | 80 | 90 | 120 | 20 | 50 | -1 | -500 | -210 | 70 |
| 100 | 540 | 280 | -90 | 460 | 380 | 170 | 190 | 200 | 250 | 40 | 150 | 10 | -1380 | -510 | 220 |
| 110 | 600 | 320 | -100 | 520 | 430 | 200 | 210 | 230 | 280 | 50 | 170 | 10 | -1560 | -600 | 260 |
| 000 | | -10 | -20 | -10 | -20 | -20 | -20 | -20 | | | -20 | -20 | -20 | -20 | -30 |
| 050 | 250 | 130 | -60 | 200 | 160 | 70 | 70 | 80 | 120 | 10 | 30 | -1 | -530 | -220 | 60 |
| 100 | 540 | 280 | -80 | 460 | 390 | 170 | 180 | 200 | 260 | 4 | 130 | 1 | -1370 | -510 | 220 |
| 110 | 590 | 320 | -100 | 520 | 420 | 200 | 200 | 230 | 280 | 50 | 170 | 10 | -1550 | -580 | 250 |
| 120 | 650 | 360 | -100 | 570 | 470 | 230 | 230 | 250 | 320 | 50 | 200 | 10 | -1710 | -670 | 290 |
| 130 | 710 | 390 | -100 | 610 | 520 | 240 | 260 | 270 | 340 | 50 | 210 | 10 | -1900 | -740 | 320 |
| 140 | 750 | 420 | -100 | 670 | 570 | 270 | 280 | 290 | 370 | 60 | 230 | 20 | -2110 | -830 | 360 |
| 150 | 820 | 450 | -100 | 730 | 610 | 290 | 310 | 320 | 390 | 70 | 250 | 20 | -2300 | -930 | 390 |
| 000 | 20 | | -10 | 50 | | -10 | | | 30 | 10 | | | -10 | -10 | -10 |
| 050 | 290 | 140 | -50 | 250 | 190 | 70 | 90 | 100 | 140 | 40 | 50 | 10 | -570 | -210 | 90 |
| 100 | 600 | 320 | -80 | 530 | 430 | 190 | 200 | 220 | 270 | 50 | 160 | 10 | -1480 | -550 | 260 |
| 150 | 820 | 450 | -100 | 730 | 600 | 280 | 300 | 310 | 390 | 70 | 250 | 20 | -2310 | -930 | 390 |
| 160 | 840 | 440 | -110 | 760 | 600 | 320 | 350 | 280 | 280 | 70 | 290 | 20 | -2530 | -1010 | 420 |
| 170 | 890 | 470 | -120 | 460 | 460 | 470 | 450 | 210 | 110 | 90 | 510 | -10 | -2830 | -1140 | 480 |
| 180 | 570 | 250 | -130 | 380 | 480 | 520 | 500 | 210 | 90 | 110 | 540 | -30 | -3100 | -1260 | 530 |
| 190 | 590 | 250 | -140 | 390 | 510 | 550 | 520 | 210 | 90 | 100 | 570 | -40 | -3320 | -1340 | 560 |
| 200 | 610 | 260 | -160 | 410 | 550 | 580 | 560 | 230 | 70 | 100 | 590 | -50 | -3580 | -1460 | 590 |
| 000 | -130 | -120 | -20 | -120 | -60 | 50 | 40 | -70 | -150 | 20 | 40 | | -80 | -50 | -10 |

Unsigned Numbers Signify Tension
Numbers Signed (-) Signify Compression.

0825

Limit Loads: P1 = 8040 pounds
P2 = 6500 pounds

(See Figure 6)

[redacted] UNCLASSIFIED

TABLE I Contd.

T-18434

**Strains Measured on the Fiberglass Case During Test No. 1 Static Test of Filament Wound MK-43 Center Bomb Subassembly.**

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 6 CH 16 | CH 17 | CH 18 | ROSETTE 7 CH 19 | CH 20 | CH 21 | ROSETTE 8 CH 22 | CH 23 | CH 24 | ROSETTE 9 CH 0 | CH 0 | CH 0 | ROSETTE 10 CH 0 | CH 0 | CH 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | | | | 10 | | -10 | | 10 | | | | | | |
| 010 | -150 | -30 | -20 | -110 | -70 | -10 | -1 | -1 | -1 | | | | | | |
| 020 | -370 | -70 | 1 | -190 | -130 | -1 | 50 | 50 | 30 | | | | | | |
| 030 | -750 | -210 | 80 | -200 | -130 | -1 | 90 | 90 | 50 | | | | | | |
| 040 | -1200 | -360 | 210 | -180 | -140 | -1 | 170 | 130 | 70 | | | | | | |
| 050 | -1480 | -500 | 330 | -180 | -140 | -10 | 220 | 160 | 100 | | | | | | |
| 060 | -1900 | -690 | 410 | -170 | -150 | -10 | 210 | 150 | 120 | | | | | | |
| 070 | -2200 | -830 | 480 | -150 | -150 | -10 | 220 | 170 | 150 | | | | | | |
| 080 | -2430 | -980 | 530 | -140 | -140 | -20 | 240 | 190 | 180 | | | | | | |
| 090 | -2870 | -1260 | 610 | -140 | -170 | -20 | 270 | 210 | 200 | | | | | | |
| 100 | -3230 | -1510 | 680 | -120 | -170 | -20 | 300 | 240 | 230 | | | | | | |
| 000 | -90 | -50 | | | | -10 | -20 | -10 | | | | | | | |
| 050 | -1120 | -370 | 280 | -100 | -100 | -20 | 130 | 120 | 110 | | | | | | |
| 100 | -3030 | -1400 | 660 | -120 | -170 | -30 | 290 | 220 | 220 | | | | | | |
| 110 | -3430 | -1630 | 730 | -120 | -180 | -30 | 320 | 250 | 250 | | | | | | |
| 000 | -110 | -70 | -20 | -10 | -10 | -20 | -30 | -20 | -10 | | | | | | |
| 050 | -970 | -330 | 270 | -70 | -100 | -30 | 120 | 110 | 110 | | | | | | |
| 100 | -2930 | -1370 | 670 | -100 | -160 | -30 | 280 | 220 | 220 | | | | | | |
| 110 | -3280 | -1560 | 720 | -100 | -160 | -30 | 320 | 250 | 250 | | | | | | |
| 120 | -3640 | -1750 | 800 | -100 | -170 | -20 | 350 | 270 | 270 | | | | | | |
| 130 | -3980 | -1920 | 860 | -100 | -170 | -10 | 390 | 290 | 300 | | | | | | |
| 140 | -4330 | -2120 | 950 | -80 | -170 | -10 | 430 | 320 | 320 | | | | | | |
| 150 | -4640 | -2290 | 1010 | -70 | -180 | -10 | 460 | 350 | 360 | | | | | | |
| 000 | -180 | -120 | | 10 | | -10 | -10 | | 10 | | | | | | |
| 050 | -1020 | -360 | 340 | -10 | -60 | -20 | 140 | 130 | 130 | | | | | | |
| 100 | -3080 | -1500 | 720 | -30 | -130 | -30 | 300 | 230 | 240 | | | | | | |
| 150 | -4550 | -2240 | 1000 | -50 | -170 | -20 | 450 | 340 | 350 | | | | | | |
| 160 | -4880 | -2410 | 1070 | -30 | -180 | -20 | 480 | 360 | 390 | | | | | | |
| 170 | -4800 | -2580 | 1150 | 140 | -470 | -170 | 360 | 200 | 540 | | | | | | |
| 180 | -5200 | -2760 | 1220 | 160 | -550 | -200 | 310 | 180 | 590 | | | | | | |
| 190 | -5400 | -2880 | 1270 | 170 | -600 | -230 | 300 | 180 | 620 | | | | | | |
| 200 | -5800 | -3050 | 1320 | 190 | -600 | -230 | 270 | 200 | 680 | | | | | | |
| 000 | -340 | -250 | | 40 | -80 | -30 | -130 | -60 | 80 | | | | | | |

0826

[redacted]

Strains Measured On The Fiberglass Case During Test No. 2 - Static Test of Filament Wound MK-43 Cluster Bomb Subassembly.

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 1 CH 1 | CH 2 | CH 3 | ROSETTE 2 CH 4 | CH 5 | CH 6 | ROSETTE 3 CH 7 | CH 8 | CH 9 | ROSETTE 4 CH 10 | CH 11 | CH 12 | ROSETTE 5 CH 13 | CH 14 | CH 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | | -10 | | | | -20 | -20 | -10 | -20 | | | | | |
| 010 | 250 | 100 | -50 | -50 | 50 | 210 | -50 | 20 | 180 | -60 | -10 | 70 | -20 | -50 | -80 |
| 020 | 450 | 270 | -80 | -130 | 160 | 420 | -80 | 140 | 390 | -80 | 30 | 230 | -10 | -130 | -100 |
| 030 | 540 | 440 | 120 | -170 | 440 | 840 | -170 | 270 | 740 | -100 | 40 | 300 | 20 | -130 | -200 |
| 040 | 750 | 660 | 190 | -210 | 590 | 1120 | -190 | 400 | 1020 | -140 | 60 | 450 | 50 | -120 | -190 |
| 050 | 950 | 840 | 240 | -270 | 720 | 1340 | -220 | 530 | 1280 | -170 | 90 | 570 | 60 | -170 | -230 |
| 060 | 1240 | 1100 | 270 | -320 | 890 | 1650 | -240 | 670 | 1580 | -190 | 110 | 690 | 80 | -160 | -230 |
| 070 | 2030 | 1800 | 290 | -410 | 1140 | 2050 | -300 | 820 | 1930 | -240 | 120 | 820 | 100 | -180 | -280 |
| 080 | 2490 | 2100 | 220 | -460 | 1350 | 2440 | -320 | 1020 | 2230 | -300 | 150 | 1010 | 130 | -210 | -300 |
| 000 | 290 | 210 | -20 | | 120 | 50 | -30 | | 90 | -50 | -20 | 40 | -20 | -10 | -30 |
| 040 | 1390 | 1130 | 90 | -240 | 720 | 1310 | -190 | 550 | 1240 | -160 | 30 | 540 | 90 | -130 | -220 |
| 080 | 3090 | 2020 | -220 | -480 | 1400 | 2550 | -310 | 1110 | 2390 | -300 | 100 | 1010 | 120 | -240 | -330 |
| 090 | 3640 | 2310 | -290 | -570 | 1770 | 3170 | -380 | 1180 | 2600 | -340 | 160 | 1200 | 140 | -270 | -360 |
| 100 | 4390 | 2760 | -330 | -630 | 2030 | 3580 | -450 | 1240 | 2780 | -380 | 190 | 1350 | 160 | -280 | -380 |
| 000 | 540 | 480 | 80 | 20 | 230 | 290 | -20 | | 100 | -50 | -10 | 90 | -10 | -20 | -30 |
| 050 | 2370 | 1570 | -110 | -300 | 1120 | 1930 | -250 | 670 | 1490 | -220 | 90 | 720 | 110 | -160 | -270 |
| 100 | 4520 | 2830 | -390 | -640 | 2060 | 3580 | -450 | 1260 | 2810 | -370 | 220 | 1390 | 160 | -290 | -400 |
| 110 | 5800 | 3180 | -450 | -670 | 2320 | 3960 | -570 | 1320 | 3080 | -400 | 300 | 1590 | 180 | -300 | -430 |
| 120 | 6600 | 3640 | -500 | -690 | 2690 | 5600 | -740 | 1460 | 3470 | -430 | 420 | 1890 | 190 | -330 | -470 |
| 130 | 6900 | 3970 | -540 | -730 | 2940 | 6000 | -870 | 1670 | 3890 | -500 | 540 | 2140 | 200 | -320 | -470 |
| 140 | 7400 | 4340 | -500 | -890 | 3220 | 6400 | -1070 | 1850 | 4440 | -460 | 670 | 2420 | 720 | -170 | -620 |
| 000 | 610 | 550 | 120 | 10 | 340 | 550 | -140 | 60 | 320 | -110 | 120 | 240 | 40 | | -30 |
| 050 | 2740 | 1840 | -110 | -340 | 1360 | 2320 | -470 | 720 | 1830 | -280 | 220 | 1010 | 310 | -180 | -370 |
| 100 | 5700 | 3320 | -340 | -700 | 2530 | 4290 | -910 | 1420 | 3420 | -450 | 440 | 1770 | 640 | -210 | -610 |
| 000 | 600 | 540 | 100 | | 340 | 560 | -150 | 70 | 330 | -120 | 90 | 220 | 30 | | -110 |
| 050 | 2760 | 1860 | -140 | -340 | 1390 | 2320 | -490 | 760 | 1870 | -300 | 260 | 1000 | 340 | -140 | -350 |
| 100 | 5700 | 3200 | -370 | -690 | 2540 | 4310 | -900 | 1440 | 3430 | -440 | 430 | 1750 | 650 | -190 | -600 |
| 140 | 7500 | 4580 | -210 | -1130 | 3750 | 6800 | -1490 | 2090 | 5500 | -440 | 680 | 2560 | 1120 | -360 | -1090 |
| 000 | 480 | 450 | 150 | -30 | 340 | 660 | -170 | 40 | 280 | -110 | 200 | 300 | 70 | 40 | -100 |

Unsigned Numbers Signify Tension
Numbers Signed (-) Signify Compression

Limit Loads: P1 = 110,000 pounds
P2 = 25,800 pounds
P3 = 25,800 pounds
P4 = 13,500 pounds

(See Figure 11)

0807

[redacted] UNCLASSIFIED

[redacted]

TABLE II (Contd) T-18434

Strains Measured on the Fiberglass Case During Test No. 2 -

Static Test of Filament Wound MK-43 Center Bomb Subassembly.

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD O/O | ROSETTE 6 CH 16 | CH 17 | CH 18 | ROSETTE 7 CH 19 | CH 20 | CH 21 | ROSETTE 8 CH 22 | CH 23 | CH 24 | ROSETTE 9 CH 25 | CH 26 | CH 27 | ROSETTE 10 CH 28 | CH 29 | CH 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | | | -10 | 10 | | | | 10 | | | | 20 | | |
| 010 | -150 | -120 | -70 | -70 | -50 | -30 | 90 | 1 | -60 | 190 | 70 | -20 | 40 | 60 | -10 |
| 020 | -290 | -180 | -120 | -110 | -60 | -30 | 250 | 60 | -70 | 470 | 200 | -30 | 140 | 220 | 50 |
| 030 | -470 | -260 | -110 | -180 | -110 | -10 | 370 | 110 | -100 | 780 | 340 | -40 | 320 | 550 | 120 |
| 040 | -520 | -270 | -120 | -170 | -110 | -1 | 520 | 170 | -120 | 1110 | 460 | -60 | 380 | 770 | 200 |
| 050 | -650 | -320 | -110 | -190 | -120 | 1 | 620 | 190 | -140 | 1400 | 580 | -100 | 470 | 990 | 310 |
| 060 | -760 | -340 | -100 | -210 | -140 | 10 | 740 | 210 | -170 | 1790 | 740 | -140 | 600 | 1280 | 420 |
| 070 | -910 | -400 | -100 | -230 | -160 | 40 | 1050 | 270 | -220 | 2810 | 1100 | -400 | 880 | 2080 | 720 |
| 080 | -1040 | -440 | -100 | -260 | -170 | 60 | 1220 | 320 | -260 | 3370 | 1330 | -540 | 1030 | 2530 | 890 |
| 000 | -80 | -80 | -70 | -70 | -20 | -10 | 140 | 40 | -30 | 210 | 70 | | 40 | 170 | 100 |
| 040 | -650 | -320 | -100 | -210 | -140 | 10 | 740 | 210 | -140 | 1840 | 710 | -320 | 580 | 1360 | 500 |
| 080 | -1100 | -450 | -90 | -300 | -200 | 60 | 1240 | 280 | -300 | 3540 | 1310 | -570 | 1020 | 2610 | 1100 |
| 090 | -1250 | -500 | -80 | -310 | -230 | 70 | 1430 | 370 | -320 | 4100 | 1500 | -680 | 1130 | 2950 | 1300 |
| 100 | -1350 | -540 | -80 | -330 | -240 | 90 | 1590 | 420 | -360 | 4570 | 1560 | -760 | 1300 | 3350 | 1480 |
| 000 | -100 | -80 | -50 | -90 | -30 | -20 | 230 | 100 | -20 | 320 | 120 | 40 | 60 | 190 | 180 |
| 050 | -820 | -360 | -90 | -230 | -160 | 30 | 990 | 320 | -200 | 2470 | 870 | -380 | 720 | 1780 | 790 |
| 100 | -1400 | -540 | -60 | -330 | -250 | 90 | 1630 | 450 | -370 | 4580 | 1460 | -820 | 1310 | 3390 | 1510 |
| 110 | -1570 | -600 | -50 | -350 | -270 | 120 | 1860 | 510 | -420 | 4990 | 1590 | -890 | 1430 | 3740 | 1700 |
| 120 | -1790 | -680 | -40 | -380 | -300 | 120 | 2170 | 650 | -440 | 5900 | 1660 | -950 | 1570 | 4090 | 1920 |
| 130 | -1960 | -760 | -40 | -400 | -300 | 150 | 2530 | 770 | -430 | 6500 | 1780 | -1050 | 1680 | 4330 | 2030 |
| 140 | -2470 | -330 | 990 | -840 | -650 | 170 | 2860 | 920 | -370 | 7100 | 1880 | -1150 | 1770 | 4550 | 2160 |
| 000 | -210 | -20 | 110 | -160 | -100 | -40 | 440 | 240 | | 470 | 180 | 20 | 50 | 170 | 190 |
| 050 | -1280 | -220 | 380 | -500 | -400 | 1 | 1250 | 420 | -280 | 2690 | 870 | -540 | 730 | 1820 | 850 |
| 100 | -2170 | -300 | 810 | -830 | -640 | 90 | 2070 | 610 | -440 | 5000 | 1350 | -980 | 1370 | 3450 | 1590 |
| 000 | -260 | -40 | 80 | -190 | -150 | -80 | 440 | 210 | -70 | 470 | 120 | -100 | 50 | 150 | 140 |
| 050 | -1250 | -200 | 410 | -500 | -390 | 1 | 1300 | 450 | -250 | 2710 | 890 | -520 | 740 | 1810 | 870 |
| 100 | -2140 | -290 | 810 | -810 | -630 | 90 | 2060 | 610 | -410 | 5100 | 1340 | -970 | 1370 | 3450 | 1590 |
| 140 | -3190 | -460 | 1370 | -1010 | -1190 | -220 | 3170 | 930 | -500 | 6900 | 2020 | -1360 | 1790 | 4640 | 2200 |
| 000 | -320 | -100 | 80 | -70 | -130 | -110 | 510 | 270 | -30 | 320 | 90 | -30 | 10 | 30 | 50 |

0828

[redacted] UNCLASSIFIED

[redacted] T-18436

Strains Measured on the Fiberglass Case During Test No. 2 -

Static Test of Filament Wound MX-43 Center Bomb Subassembly. UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD D/D | ROSETTE 11 CH 31 | CH 32 | CH 33 | ROSETTE 12 CH 34 | CH 35 | CH 36 | ROSETTE 13 CH 37 | CH 38 | CH 39 | ROSETTE 14 CH 40 | CH 41 | CH 42 | ROSETTE 15 CH 0 | CH 0 | CH 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 10 | | -10 | | -10 | 10 | 30 | | | | -10 | | | | |
| 010 | -20 | -10 | 20 | -30 | -50 | -20 | -40 | -40 | -30 | -10 | -20 | -20 | | | |
| 020 | -20 | -1 | 50 | -10 | -30 | -20 | -40 | -40 | -40 | 1 | -1 | -10 | | | |
| 030 | -20 | 20 | 80 | -1 | -20 | -20 | -20 | -20 | -20 | 40 | 50 | 10 | | | |
| 040 | -30 | 40 | 170 | 20 | -10 | -20 | -60 | -40 | -40 | 60 | 60 | 10 | | | |
| 050 | -40 | 60 | 210 | 50 | -1 | -30 | -80 | -50 | -30 | 90 | 90 | 30 | | | |
| 060 | -30 | 80 | 270 | 70 | 1 | -20 | -30 | -40 | -10 | 140 | 130 | 30 | | | |
| 070 | -20 | 150 | 310 | 110 | 30 | -30 | -100 | -50 | -30 | 140 | 140 | 60 | | | |
| 080 | -20 | 190 | 350 | 140 | 40 | -30 | -120 | -50 | -20 | 160 | 150 | 70 | | | |
| 000 | 10 | -40 | -80 | -60 | -40 | -30 | -40 | -40 | -30 | -120 | -70 | -20 | | | |
| 040 | -1 | 50 | 150 | 50 | -1 | -20 | -80 | -70 | -40 | 1 | 20 | 10 | | | |
| 080 | -20 | 180 | 340 | 140 | 60 | -40 | -120 | -50 | -20 | 140 | 120 | 40 | | | |
| 090 | -20 | 220 | 380 | 170 | 60 | -50 | -90 | -40 | -10 | 180 | 150 | 70 | | | |
| 100 | -90 | 280 | 460 | 190 | 60 | -50 | -160 | -40 | -10 | 180 | 160 | 90 | | | |
| 000 | | -50 | -130 | -20 | -30 | -10 | -30 | -30 | -20 | -200 | -120 | | | | |
| 050 | -40 | 80 | 150 | 70 | 40 | -10 | -30 | -30 | -10 | 10 | 10 | 20 | | | |
| 100 | -100 | 240 | 410 | 190 | 70 | -50 | -140 | -40 | -10 | 150 | 120 | 80 | | | |
| 110 | -80 | 250 | 410 | 210 | 80 | -50 | -170 | -40 | -1 | 160 | 130 | 100 | | | |
| 120 | 100 | 200 | 90 | 210 | 110 | -60 | -170 | -30 | 1 | 120 | 100 | 100 | | | |
| 130 | 110 | 150 | 70 | 190 | 100 | -110 | -220 | -60 | 1 | 90 | 80 | 90 | | | |
| 140 | 130 | 160 | 50 | 150 | 60 | -340 | -270 | -130 | -20 | 80 | 70 | 110 | | | |
| 000 | 70 | -90 | -240 | -20 | -10 | | -10 | -20 | -20 | -260 | -230 | 10 | | | |
| 050 | 50 | -10 | -190 | 60 | 20 | -170 | -110 | -70 | -130 | -1 | -50 | -1 | | | |
| 100 | 110 | 100 | -100 | 170 | 60 | -280 | -180 | -100 | -100 | 50 | 10 | 100 | | | |
| 000 | 10 | -110 | -280 | -30 | -30 | -120 | -60 | -30 | -110 | -230 | -190 | -30 | | | |
| 050 | 60 | 1 | -170 | 70 | 30 | -160 | -100 | -60 | -120 | -30 | -60 | -1 | | | |
| 100 | 90 | 100 | -110 | 180 | 70 | -260 | -170 | -80 | -100 | 40 | 10 | 100 | | | |
| 140 | 160 | 170 | -80 | 200 | -160 | -820 | -420 | -280 | -140 | -1 | -30 | 110 | | | |
| 000 | | -120 | -300 | -30 | -100 | -220 | -170 | -70 | -120 | -250 | -200 | -50 | | | |

0829

[redacted] UNCLASSIFIED

[redacted]



TABLE III

Strains Measured on the Fiberglass Case During Test No. 3 - Static Test of Filament Wound MK-43 Center Bomb Subassembly.

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 1 CH 1 | CH 2 | CH 3 | ROSETTE 2 CH 4 | CH 5 | CH 6 | ROSETTE 3 CH 7 | CH 8 | CH 9 | ROSETTE 4 CH 10 | CH 11 | CH 12 | ROSETTE 5 CH 13 | CH 14 | CH 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | -10 | 10 | | | 10 | 10 | | | | | | | | |
| 010 | 30 | 10 | 70 | 310 | -1 | 120 | 370 | 330 | 270 | 10 | -20 | 50 | 70 | 60 | 130 |
| 020 | 180 | 190 | 280 | 590 | -10 | 480 | 350 | 610 | 900 | 100 | 40 | 160 | 180 | 200 | 380 |
| 030 | 300 | 380 | 520 | 790 | -20 | 840 | 200 | 890 | 1600 | 190 | 140 | 310 | 320 | 370 | 630 |
| 040 | 430 | 600 | 770 | 1050 | -1 | 1320 | 40 | 1260 | 2390 | 250 | 200 | 460 | 470 | 590 | 910 |
| 050 | 580 | 790 | 1120 | 1320 | -1 | 1780 | -180 | 1610 | 3190 | 320 | 300 | 630 | 600 | 800 | 1260 |
| 060 | 690 | 1050 | 1430 | 1590 | 20 | 2300 | -390 | 1950 | 4090 | 430 | 430 | 810 | 740 | 1090 | 1580 |
| 000 | -100 | -100 | -100 | 10 | -60 | -80 | 40 | 10 | -500 | -270 | -100 | -70 | -60 | -50 | -40 |
| 060 | 680 | 1050 | 1400 | 1570 | -50 | 2280 | -540 | 1850 | 3700 | 140 | 400 | 780 | 600 | 1090 | 1590 |
| 070 | 810 | 1280 | 1690 | 1810 | -50 | 2770 | -710 | 2280 | 4600 | 250 | 550 | 970 | 850 | 1330 | 1910 |
| 080 | 970 | 1500 | 1990 | 2090 | -30 | 3280 | -970 | 2660 | 5500 | 460 | 710 | 1200 | 1040 | 1620 | 2300 |
| 090 | 1120 | 1730 | 2310 | 2360 | -20 | 3780 | -1240 | 2990 | 6200 | 570 | 870 | 1410 | 1230 | 1910 | 2670 |
| 100 | 1260 | 1950 | 2600 | 2600 | -20 | 4320 | -1530 | 3370 | 7200 | 230 | 1020 | 1610 | 1410 | 2220 | 3060 |
| 110 | 1360 | 2160 | 2940 | 3230 | -20 | 4500 | -2120 | 3710 | 8300 | 850 | 1190 | 1830 | 1600 | 2540 | 3480 |
| 120 | 1480 | 2390 | 3240 | 3550 | -20 | 4900 | -2440 | 4090 | 8900 | 1000 | 1350 | 2070 | 1820 | 2870 | 3870 |
| 000 | -70 | -100 | -110 | 350 | -30 | | -120 | 160 | 100 | -270 | -100 | 20 | 20 | 30 | 70 |
| 100 | 1240 | 1970 | 2670 | 3000 | -20 | 4100 | -1980 | 3390 | 7400 | 650 | 1040 | 1720 | 1510 | 2380 | 3190 |
| 120 | 1470 | 2390 | 3240 | 3550 | -20 | 4900 | -2480 | 4080 | 9000 | 960 | 1340 | 2070 | 1840 | 2880 | 3880 |
| 130 | 1600 | 2610 | 3630 | 4040 | -20 | 5700 | -2870 | 4480 | 10100 | 1130 | 1510 | 2340 | 2080 | 3230 | 4330 |
| 140 | 1730 | 2830 | 3920 | 4350 | -1 | 6500 | -3100 | 4820 | 11400 | 1360 | 1670 | 2550 | 2300 | 3530 | 4670 |
| 150 | 1830 | 3040 | 4280 | 4580 | -20 | 6700 | -3430 | 5000 | 12100 | 1390 | 1700 | 2800 | 2510 | 3830 | 4900 |
| 160 | 1940 | 3260 | 4590 | 4840 | -10 | 7300 | -3820 | 5300 | 13100 | 1530 | 1940 | 3060 | 2730 | 4160 | 5200 |
| 170 | 2070 | 3510 | 4960 | 5200 | -220 | 8500 | -4220 | | | 1810 | 2040 | 3290 | 2930 | 4410 | 5700 |
| 180 | 2180 | 3760 | 5000 | 5300 | -240 | 8700 | -3500 | | | 1970 | 2180 | 3440 | 3110 | 4770 | 5900 |
| 190 | 2260 | 3980 | 5600 | 5700 | -250 | 9500 | -3600 | | | 2240 | 2510 | 3780 | 3200 | 5100 | 6400 |
| 000 | -180 | -70 | | 300 | -60 | 450 | 250 | | | 240 | 220 | 230 | 310 | 270 | 290 |

0830

Unsigned Numbers Signify Tension
Numbers Signed (-) Signify Compression

Limit Load = 42,500 pounds

(See Figure 13)

UNCLASSIFIED

[redacted]

[redacted]

TABLE III (Cont'd)

Strains Measured on the Fiberglass Case During Test No. 3

Static Test of Filament Wound Mk-43 Center Bomb Subassembly.

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LOAD | ROSETTE 6 | | | ROSETTE 7 | | | ROSETTE 8 | | | ROSETTE 9 | | | ROSETTE 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | CH 16 | CH 17 | CH 18 | CH 19 | CH 20 | CH 21 | CH 22 | CH 23 | CH 24 | CH 25 | CH 26 | CH 27 | CH 0 | CH 0 | CH 0 |
| 000 | | | -10 | | | -10 | | -10 | 10 | | | | | | |
| 010 | 40 | 70 | 230 | 20 | -30 | -60 | 50 | 10 | -50 | 120 | 20 | -100 | | | |
| 020 | -80 | 180 | 650 | 50 | -100 | -230 | 120 | 30 | -120 | 330 | 70 | -210 | | | |
| 030 | -140 | 320 | 1050 | 80 | -190 | -360 | 240 | 90 | -170 | 580 | 150 | -270 | | | |
| 040 | -270 | 520 | 1540 | 170 | -210 | -470 | 450 | 220 | -150 | 950 | 330 | -290 | | | |
| 050 | -370 | 720 | 2060 | 290 | -180 | -490 | 680 | 410 | -70 | 1400 | 520 | -340 | | | |
| 060 | -530 | 980 | 2650 | 450 | -110 | -480 | 980 | 620 | 10 | 1920 | 710 | -420 | | | |
| 000 | -20 | -20 | -20 | -60 | -20 | -10 | -50 | -30 | -30 | -10 | -20 | -100 | | | |
| 060 | -620 | 980 | 2710 | 390 | -140 | -540 | 950 | 570 | -50 | 1920 | 680 | -560 | | | |
| 070 | -770 | 1220 | 3220 | 540 | -70 | -530 | 1250 | 750 | 40 | 2420 | 870 | -630 | | | |
| 080 | -950 | 1480 | 3880 | 720 | 60 | -460 | 1570 | 1000 | 130 | 2980 | 1100 | -740 | | | |
| 090 | -1150 | 1740 | 4500 | 960 | 190 | -390 | 1920 | 1260 | 210 | 3600 | 1320 | -890 | | | |
| 100 | -1390 | 1970 | 4800 | 940 | 280 | -330 | 2230 | 1460 | 260 | 4160 | 1510 | -1030 | | | |
| 110 | -1650 | 2210 | 5400 | 1170 | 430 | -260 | 2590 | 1690 | 350 | 4810 | 1720 | -1220 | | | |
| 120 | -1970 | 2420 | 6100 | 1380 | 550 | -170 | 2930 | 1890 | 430 | 5400 | 1880 | -1390 | | | |
| 000 | -170 | -30 | -200 | -260 | -30 | | -20 | | -20 | | -140 | -160 | | | |
| 100 | -1690 | 1970 | 5000 | 990 | 310 | -300 | 2330 | 1510 | 280 | 4300 | 1360 | -1160 | | | |
| 120 | -2080 | 2430 | 6200 | 1380 | 550 | -160 | 2950 | 1900 | 430 | 5500 | 1640 | -1450 | | | |
| 130 | -2480 | 2680 | 6900 | 1590 | 690 | -80 | 3390 | 2170 | 490 | 6200 | 2110 | -1650 | | | |
| 140 | -2760 | 2890 | 7300 | 2050 | 820 | 20 | 3760 | 2390 | 570 | 6600 | 2320 | -1830 | | | |
| 150 | -3150 | 3070 | 8000 | 2250 | 960 | 100 | 4140 | 2600 | 610 | 7200 | 2510 | -2050 | | | |
| 160 | -3610 | 3210 | 8700 | 2480 | 1080 | 170 | 4540 | 2840 | 650 | 7900 | 2700 | -2270 | | | |
| 170 | -4320 | 3380 | 9300 | 2720 | 1220 | 220 | 4900 | 3030 | 690 | 8600 | 2800 | -2530 | | | |
| 180 | -4400 | | 10100 | 2640 | 1330 | 300 | 5400 | 3280 | 740 | 9400 | 3000 | -2750 | | | |
| 190 | -5000 | 3730 | 10900 | 3170 | 1470 | 390 | 5900 | 3490 | 750 | 10000 | 3200 | -2960 | | | |
| 000 | -1090 | -60 | 570 | 40 | -50 | -60 | 250 | 90 | -70 | 250 | 50 | -320 | | | |

0821

UNCLASSIFIED

[redacted]

[redacted]

**Strains Measured on the Fiberglass Case During Test No. 4 - Static Test of Filament Wound MK-43 Center Bomb Subassembly.**

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 1 CH 1 | CH 2 | CH 3 | ROSETTE 2 CH 4 | CH 5 | CH 6 | ROSETTE 3 CH 7 | CH 8 | CH 9 | ROSETTE 4 CH 10 | CH 11 | CH 12 | ROSETTE 5 CH 13 | CH 14 | CH 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | -10 | -20 | -10 | -10 | -20 | -20 | -20 | -10 | -20 | -10 | 10 | -30 | | -10 | -30 |
| 010 | 250 | 140 | 90 | 140 | -20 | 400 | -100 | 490 | 960 | 30 | -20 | -20 | 10 | -80 | 30 |
| 020 | 550 | 320 | 190 | 320 | -20 | 690 | -240 | 760 | 1590 | 120 | -20 | -1 | 50 | -100 | 100 |
| 030 | 1050 | 590 | 340 | 590 | -30 | 1080 | -380 | 1160 | 2350 | 210 | -1 | 50 | 110 | -120 | 230 |
| 040 | 1450 | 820 | 470 | 810 | -20 | 1390 | -510 | 1460 | 3000 | 330 | 20 | 90 | 170 | -120 | 340 |
| 050 | 1790 | 1030 | 590 | 1060 | -20 | 1720 | -630 | 1760 | 3640 | 450 | 50 | 140 | 230 | -140 | 480 |
| 060 | 2300 | 1350 | 770 | 1300 | -20 | 2140 | -910 | 2120 | 4490 | 580 | 70 | 200 | 330 | -120 | 650 |
| 070 | 2630 | 1540 | 870 | 1490 | -20 | 2400 | -990 | 2380 | 5400 | 580 | 80 | 230 | 390 | -130 | 720 |
| 080 | 3020 | 1790 | 1020 | 1720 | -20 | 2770 | -1160 | 2710 | 6200 | 650 | 90 | 260 | 460 | -160 | 840 |
| 090 | 3470 | 2040 | 1200 | 1930 | -20 | 3130 | -1350 | 3020 | 6800 | 780 | 120 | 310 | 540 | -170 | 970 |
| 100 | 3850 | 2260 | 1340 | 2120 | -10 | 3490 | -1570 | 3360 | 7600 | 900 | 140 | 340 | 620 | -180 | 1080 |
| 110 | 4310 | 2530 | 1520 | 2340 | -10 | 3910 | -1830 | 3720 | 8400 | 1020 | 150 | 360 | 690 | -200 | 1200 |
| 120 | 4710 | 2770 | 1670 | 2530 | -10 | 4310 | -2100 | 4060 | 9100 | 1150 | 190 | 420 | 770 | -210 | 1300 |
| 000 | 600 | -160 | -20 | -40 | -40 | 170 | -240 | 140 | 700 | -160 | -10 | -20 | -30 | -20 | -20 |
| 100 | 3910 | 2320 | 1440 | 2060 | -10 | 3650 | -1830 | 3420 | 7800 | 890 | 150 | 350 | 630 | -180 | 1090 |
| 100 | 4770 | 2840 | 1730 | 2520 | -20 | 4440 | -2250 | 4120 | 9200 | 1210 | 200 | 420 | 790 | -210 | 1300 |
| 130 | 5700 | 3040 | 1870 | 2690 | -10 | 5200 | -2710 | 4410 | 10000 | 1480 | 230 | 460 | 870 | -220 | 1370 |
| 140 | 6100 | 3300 | 2030 | 2870 | -20 | 5400 | -3020 | 4780 | 10700 | 1630 | 260 | 500 | 970 | -230 | 1470 |
| 150 | 6500 | 3480 | 2220 | 3010 | -10 | 6200 | -3380 | 6100 | 12100 | 1800 | 320 | 560 | 1080 | -230 | 1590 |
| 160 | 6900 | 3810 | 2410 | 3220 | -1 | 6800 | -3220 | | 13100 | 1950 | 380 | 580 | 1180 | -240 | 1670 |
| 170 | 7100 | 3890 | 2520 | 3370 | -10 | 7000 | -3570 | | 12200 | 2070 | 370 | 630 | 1260 | -270 | 1760 |
| 180 | 7500 | 4260 | 2730 | 3480 | -10 | 7500 | -3720 | | 13900 | 2240 | 420 | 670 | 1370 | -280 | 1870 |
| 190 | 7800 | 4540 | 2950 | 3550 | -10 | 8200 | -4030 | | 16500 | 2420 | 450 | 710 | 1470 | -300 | 1960 |
| 200 | 8100 | 5500 | 3180 | 3640 | -1 | 8800 | -4190 | | | 2560 | 460 | 740 | 1570 | -320 | 2050 |
| 000 | -70 | -50 | 70 | -170 | -50 | 540 | -380 | | | -100 | 60 | 60 | | 30 | 30 |

Unsigned Numbers Signify Tension
Numbers Signed (-) Signify Compression

0832

Limit Load = 21,300 pounds

(See Figure 15)

UNCLASSIFIED

[redacted]

[redacted]

Strains Recorded on the Fiberglass Case During Test No. 4 -

Static Test of Filament Wound MK-43 Center Hub Subassembly.

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 6 CH 16 | CH 17 | CH 18 | ROSETTE 7 CH 19 | CH 20 | CH 21 | ROSETTE 8 CH 22 | CH 23 | CH 24 | ROSETTE 9 CH 25 | CH 26 | CH 27 | ROSETTE 10 CH 0 | CH 0 | CH 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | -10 | -10 | -10 | -10 | -10 | -20 | -10 | -10 | -20 | -10 | -10 | -40 | | | |
| 010 | -50 | -100 | 150 | -80 | -260 | -370 | -40 | -180 | -420 | 120 | -210 | -710 | | | |
| 020 | -150 | -130 | 350 | -110 | -450 | -680 | 10 | -250 | -710 | 300 | -340 | -1260 | | | |
| 030 | -270 | -140 | 650 | -160 | -770 | -1100 | 70 | -350 | -1100 | 550 | -510 | -1970 | | | |
| 040 | -340 | -140 | 920 | -200 | -1010 | -1510 | 90 | -440 | -1390 | 660 | -650 | -2500 | | | |
| 050 | -440 | -160 | 1230 | -230 | -1280 | -1910 | 120 | -540 | -1690 | 750 | -840 | -3050 | | | |
| 060 | -600 | -151 | 1620 | -310 | -1600 | -2420 | 120 | -660 | -2070 | 980 | -1170 | -4020 | | | |
| 070 | -690 | -170 | 1820 | -320 | -1790 | -2710 | 140 | -730 | -2300 | 1090 | -1290 | -4200 | | | |
| 080 | -830 | -200 | 2120 | -360 | -2060 | -3080 | 130 | -840 | -2580 | 1270 | -1550 | -4600 | | | |
| 090 | -970 | -230 | 2420 | -400 | -2300 | -3450 | 110 | -930 | -2810 | 1340 | -2030 | -5200 | | | |
| 100 | -1110 | -270 | 2710 | -450 | -2500 | -3740 | 70 | -1030 | -3010 | 1580 | -2370 | -5200 | | | |
| 110 | -1240 | -320 | 2960 | -570 | -2690 | -4020 | -110 | -1120 | -3100 | 430 | -1890 | -4100 | | | |
| 120 | -1350 | -390 | 3190 | -610 | -2850 | -4230 | -220 | -1230 | -3210 | 140 | -1840 | -3800 | | | |
| 000 | -90 | -30 | 10 | -290 | -290 | -430 | -230 | -120 | -70 | -130 | -400 | -100 | | | |
| 100 | -1190 | -320 | 2740 | -550 | -2480 | -3650 | -230 | -1090 | -2740 | -120 | -1580 | -3000 | | | |
| 100 | -1440 | -450 | 3220 | -650 | -2890 | -4260 | -340 | -1280 | -3140 | -360 | -1630 | -3100 | | | |
| 130 | -1550 | -500 | 3400 | -690 | -3070 | -4300 | -520 | -1360 | -3310 | -460 | -1680 | -3200 | | | |
| 140 | -1700 | -580 | 3670 | -820 | -3300 | -4500 | -570 | -1500 | -3500 | -650 | -1770 | -3000 | | | |
| 150 | -1850 | -670 | 3890 | -870 | -3520 | -4800 | -650 | -1640 | -3670 | -930 | -1840 | -2700 | | | |
| 160 | -2000 | -740 | 4130 | -930 | -3740 | -5200 | -720 | -1760 | -3870 | -910 | -1920 | -3800 | | | |
| 170 | -2170 | -810 | 4380 | -1010 | -4000 | -5200 | -740 | -1890 | -4060 | -1020 | -2060 | -3400 | | | |
| 180 | -2370 | -920 | 4660 | -1050 | -4230 | -5500 | -760 | -2020 | -4310 | -1080 | -2240 | -3900 | | | |
| 190 | -2570 | -1010 | 5400 | -1220 | -4470 | -5800 | -810 | -2170 | -4500 | -1100 | -2650 | -5000 | | | |
| 200 | -2790 | -1120 | 5700 | -1260 | -4730 | -6200 | -870 | -2300 | -4730 | -1180 | -3070 | -5700 | | | |
| 000 | -130 | -120 | 60 | -470 | -220 | -250 | -670 | -200 | 440 | -1210 | -2180 | -3950 | | | |

0823

UNCLASSIFIED

[redacted]

[redacted]

TABLE V



Strains Measured on the Fiberglass Case During Test No. 5 -

Static Test of Filament Wound MK-43 Center Rush Subassembly.

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 1 CH 1 | CH 2 | CH 3 | ROSETTE 2 CH 4 | CH 5 | CH 6 | ROSETTE 3 CH 7 | CH 8 | CH 9 | ROSETTE 4 CH 10 | CH 11 | CH 12 | ROSETTE 5 CH 13 | CH 14 | CH 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | -20 | -10 | | | | | | | | | -10 | | | -10 |
| 010 | -350 | -100 | 20 | -470 | -140 | 20 | -790 | -50 | 80 | 70 | -10 | -130 | 30 | -30 | -200 |
| 020 | -590 | -140 | 60 | -810 | -250 | 50 | -1350 | -250 | 90 | 140 | -1 | -210 | 80 | -40 | -310 |
| 030 | -870 | -190 | 120 | -1220 | -350 | 80 | -1930 | -510 | 60 | 220 | 1 | -300 | 130 | -60 | -450 |
| 040 | -1150 | -240 | 170 | -1600 | -470 | 100 | -2510 | -760 | -20 | 300 | 20 | -370 | 190 | -70 | -600 |
| 050 | -1400 | -280 | 210 | -1930 | -580 | 140 | -2990 | -970 | -1 | 370 | 30 | -450 | 250 | -80 | -730 |
| 060 | -1630 | -320 | 260 | -2290 | -680 | 180 | -3520 | -1120 | 100 | 430 | 40 | -530 | 300 | -100 | -870 |
| 070 | -1910 | -350 | 340 | -2690 | -790 | 270 | -4160 | -1270 | 380 | 490 | -1 | -670 | 330 | -160 | -1100 |
| 080 | -2200 | -410 | 390 | -3080 | -920 | 320 | -4790 | -1420 | 670 | 570 | -10 | -790 | 400 | -180 | -1280 |
| 090 | -2490 | -440 | 470 | -3500 | -1020 | 390 | -5000 | -1540 | 1080 | 630 | -20 | -910 | 470 | -200 | -1460 |
| 100 | -2730 | -480 | 520 | -3850 | -1120 | 460 | -5600 | -1620 | 1470 | 690 | -30 | -1020 | 540 | -230 | -1640 |
| 110 | -2250 | -940 | -110 | -3380 | -520 | 1250 | -7200 | -1770 | 3100 | 800 | -20 | -1190 | 720 | -160 | -1900 |
| 120 | -2200 | -660 | 290 | -3900 | -550 | 1500 | -8500 | -2110 | 3400 | 900 | -60 | -1350 | 800 | -220 | -2190 |
| 000 | -80 | -190 | -120 | | -30 | 80 | -160 | -280 | -10 | -60 | -60 | -70 | 90 | | -140 |
| 120 | -1950 | -480 | 460 | -3850 | -600 | 1410 | -8700 | -2160 | 3100 | 920 | -1 | -1290 | 850 | -100 | -2090 |
| 130 | -2100 | -330 | 750 | -4270 | -690 | 1530 | -9800 | -2320 | 3500 | 1020 | -1 | -1410 | 960 | -90 | -2280 |
| 140 | -2310 | -230 | 1050 | -4820 | -760 | 1770 | -11100 | -2410 | 4500 | 1150 | -1 | -1580 | 1130 | -50 | -2560 |
| 150 | -2620 | -110 | 1360 | -5200 | -740 | 2700 | -12700 | -2560 | 6100 | 1390 | 1 | -1850 | 1420 | -20 | -2980 |
| 160 | -2770 | 150 | 1920 | -5900 | -460 | 3500 | -15000 | -2860 | 7700 | 2900 | 820 | -1190 | 3300 | 660 | -3140 |
| 170 | -3410 | 860 | 3200 | -7300 | 50 | 4700 | -18700 | -2140 | 11500 | 3700 | 980 | -1550 | 3700 | 460 | -3940 |
| 180 | -3950 | 1270 | 3830 | -8000 | 460 | 5400 | -15800 | -1240 | 10500 | 3100 | 1020 | -920 | 3200 | 670 | -3270 |
| 190 | -4250 | 1420 | 4110 | -8600 | 550 | 5700 | -14600 | -1220 | 9600 | 3900 | 1570 | -930 | 2900 | 370 | -3690 |
| 200 | -5100 | 1460 | 4990 | -10100 | 380 | 6900 | -12200 | -1500 | 8000 | 4200 | 1510 | -1300 | 3200 | 60 | -4920 |
| 000 | -130 | | 250 | -780 | 50 | 670 | -3750 | -550 | 2300 | 50 | 160 | 250 | 280 | 20 | -180 |

Unsigned Numbers Signify Tension
Numbers Signed (-) Signify Compression

Limit Load = 34,000 pounds

See Figure 16

0833

UNCLASSIFIED

[redacted]

[redacted]

Static Test of Filament Wound MK-43 Center Dome Subassembly.

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 6 CH 16 | ROSETTE 6 CH 17 | ROSETTE 6 CH 18 | ROSETTE 7 CH 0 | ROSETTE 7 CH 0 | ROSETTE 7 CH 0 | ROSETTE 8 CH 0 | ROSETTE 8 CH 0 | ROSETTE 8 CH 0 | ROSETTE 9 CH 0 | ROSETTE 9 CH 0 | ROSETTE 9 CH 0 | ROSETTE 10 CH 0 | ROSETTE 10 CH 0 | ROSETTE 10 CH 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | | 10 | | | | | | | | | | | | |
| 010 | -120 | =180 | -270 | | | | | | | | | | | | |
| 020 | -180 | =270 | -440 | | | | | | | | | | | | |
| 030 | -240 | =380 | -650 | | | | | | | | | | | | |
| 040 | -290 | =490 | -880 | | | | | | | | | | | | |
| 050 | -320 | =580 | -1100 | | | | | | | | | | | | |
| 060 | -330 | =660 | -1300 | | | | | | | | | | | | |
| 070 | -400 | =840 | -1620 | | | | | | | | | | | | |
| 080 | -400 | =950 | -1900 | | | | | | | | | | | | |
| 090 | -390 | =1050 | -2200 | | | | | | | | | | | | |
| 100 | -370 | =1140 | -2510 | | | | | | | | | | | | |
| 110 | -200 | =1080 | -2880 | | | | | | | | | | | | |
| 120 | -210 | =1230 | -3270 | | | | | | | | | | | | |
| 000 | 340 | 70 | -280 | | | | | | | | | | | | |
| 120 | -10 | =960 | -3150 | | | | | | | | | | | | |
| 130 | -1 | =1060 | -3440 | | | | | | | | | | | | |
| 140 | 110 | =1130 | -3830 | | | | | | | | | | | | |
| 150 | 350 | =1230 | -4500 | | | | | | | | | | | | |
| 160 | -340 | =1440 | -4800 | | | | | | | | | | | | |
| 170 | -1880 | =2220 | -5200 | | | | | | | | | | | | |
| 180 | -2830 | =3510 | -6300 | | | | | | | | | | | | |
| 190 | -3100 | =4000 | -7100 | | | | | | | | | | | | |
| 200 | -1270 | =3800 | -3600 | | | | | | | | | | | | |
| 000 | -50 | =170 | -690 | | | | | | | | | | | | |

0835

UNCLASSIFIED

[redacted]

[redacted]

Static Strength of the Chrysler Case Testing Test No. 7 -

**Static Test of Filament Wound MK-43 Center Bomb Subassembly.**

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 1 CH 1 | CH 2 | CH 3 | ROSETTE 2 CH 4 | CH 5 | CH 6 | ROSETTE 3 CH 7 | CH 8 | CH 9 | ROSETTE 4 CH 10 | CH 11 | CH 12 | ROSETTE 5 CH 13 | CH 14 | CH 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | | | -10 | | | -10 | | | | | | | | |
| 010 | -430 | -260 | 70 | -480 | -320 | 10 | -580 | -420 | -10 | -20 | -200 | -320 | -100 | -370 | -470 |
| 020 | -650 | -390 | 90 | -730 | -500 | -1 | -900 | -640 | -60 | -50 | -280 | -490 | -130 | -540 | -720 |
| 030 | -980 | -580 | 150 | -1070 | -740 | -10 | -1300 | -960 | -150 | -50 | -390 | -700 | -170 | -780 | -1060 |
| 040 | -1330 | -780 | 190 | -1440 | -1000 | -40 | -1740 | -1300 | -270 | -60 | -510 | -970 | -200 | -1030 | -1420 |
| 050 | -1720 | -1020 | 240 | -1880 | -1300 | -70 | -2280 | -1670 | -400 | -60 | -630 | -1240 | -220 | -1320 | -1840 |
| 060 | -2090 | -1220 | 270 | -2270 | -1540 | -120 | -2720 | -1940 | -510 | -70 | -750 | -1450 | -260 | -1550 | -2190 |
| 070 | -2400 | -1390 | 300 | -2600 | -1750 | -140 | -3080 | -2210 | -610 | -70 | -840 | -1650 | -270 | -1740 | -2510 |
| 080 | -2720 | -1570 | 340 | -2960 | -2000 | -160 | -3580 | -2490 | -630 | -50 | -950 | -1890 | -250 | -1980 | -2890 |
| 090 | -3100 | -1770 | 390 | -3340 | -2250 | -130 | -4030 | -2730 | -600 | 40 | -1030 | -2140 | -130 | -2210 | -3250 |
| 100 | -3460 | -1950 | 480 | -3760 | -2490 | -80 | -4540 | -2950 | -450 | 130 | -1120 | -2400 | -20 | -2470 | -3660 |
| 110 | -3760 | -2110 | 570 | -4080 | -2650 | -10 | -4300 | -3100 | -220 | 250 | -1180 | -2590 | 110 | -2660 | -3940 |
| 120 | -3980 | -2220 | 630 | -4320 | -2790 | 40 | -4700 | -3180 | -10 | 340 | -1230 | -2740 | 210 | -2810 | -4170 |
| 000 | -260 | -180 | -20 | -320 | -240 | -60 | -340 | -270 | -180 | 30 | -10 | -130 | 170 | -70 | -310 |
| 120 | -4160 | -2250 | 710 | -4450 | -2780 | 90 | -4800 | -3220 | -160 | 600 | -1040 | -2770 | 710 | -2470 | -4270 |
| 130 | -4360 | -2330 | 800 | -4700 | -2870 | 200 | -5200 | -3220 | 160 | 980 | -930 | -2690 | 1310 | -1980 | -4260 |
| 140 | -4600 | -2400 | 990 | -4500 | -2940 | 470 | -5700 | -3180 | 870 | 930 | -830 | -2850 | 1820 | -1900 | -4710 |
| 150 | -4300 | -2480 | 1130 | -4800 | -3010 | 620 | -6000 | -3150 | 1310 | 890 | -670 | -2880 | 1980 | -1850 | -4400 |
| 160 | -4500 | -2540 | 1300 | -5000 | -3080 | 870 | -6200 | -3100 | 1950 | 1120 | -500 | -3010 | 1920 | -1930 | -4800 |
| 170 | -4700 | -2590 | 1410 | -5200 | -3130 | 1030 | -6400 | -3030 | 2300 | 1230 | -400 | -3080 | 1690 | -1920 | -4800 |
| 180 | -4900 | -2630 | 1550 | -5300 | -3160 | 1220 | -6700 | -2930 | 2740 | 1310 | -290 | -3170 | 1420 | -1870 | -4900 |
| 190 | -5100 | -2680 | 1670 | -5600 | -3200 | 1360 | -6800 | -2870 | 3150 | 1590 | -80 | -3300 | 1190 | -1920 | -5000 |
| 200 | -5100 | -2900 | 1340 | -5400 | -3100 | 1410 | -6800 | -2720 | 3440 | 1940 | -20 | -3300 | 530 | -1920 | -4800 |
| 000 | | -830 | -120 | -600 | -300 | -20 | -500 | -600 | 130 | -10 | 120 | -10 | -340 | 240 | 700 |

Unsigned Numbers Signify Tension
Numbers Signed (-) Signify Compression

Limit Load = 22,600 pounds

0835

UNCLASSIFIED

[redacted]

[redacted]

TABLE VI (Contd)

Strains Measured During Fiberglass Case Burning Test No. 2

Static Test of Filament Wound MK-43 Center Bomb Subassembly.

UNCLASSIFIED

STRAIN - MICROINCHES PER INCH

| LIMIT LOAD % | ROSETTE 6 CH 16 | ROSETTE 6 CH 17 | ROSETTE 6 CH 18 | ROSETTE 7 CH 0 | ROSETTE 7 CH 0 | ROSETTE 7 CH 0 | ROSETTE 8 CH 0 | ROSETTE 8 CH 0 | ROSETTE 8 CH 0 | ROSETTE 9 CH 0 | ROSETTE 9 CH 0 | ROSETTE 9 CH 0 | ROSETTE 10 CH 0 | ROSETTE 10 CH 0 | ROSETTE 10 CH 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | | | | | | | | | | | | | | | |
| 010 | -190 | -610 | -600 | | | | | | | | | | | | |
| 020 | -250 | -910 | -930 | | | | | | | | | | | | |
| 030 | -350 | -1320 | -1340 | | | | | | | | | | | | |
| 040 | -470 | -1770 | -1820 | | | | | | | | | | | | |
| 050 | -580 | -2300 | -2380 | | | | | | | | | | | | |
| 060 | -680 | -2710 | -2830 | | | | | | | | | | | | |
| 070 | -760 | -3080 | -3240 | | | | | | | | | | | | |
| 080 | -770 | -3570 | -3710 | | | | | | | | | | | | |
| 090 | -740 | -4030 | -4120 | | | | | | | | | | | | |
| 100 | -780 | -4610 | -4560 | | | | | | | | | | | | |
| 110 | -740 | -4400 | -4200 | | | | | | | | | | | | |
| 120 | -670 | -4800 | -4500 | | | | | | | | | | | | |
| 000 | 280 | -400 | -540 | | | | | | | | | | | | |
| 120 | 220 | -4900 | -4900 | | | | | | | | | | | | |
| 130 | 610 | -5300 | -5200 | | | | | | | | | | | | |
| 140 | 670 | -6000 | -5800 | | | | | | | | | | | | |
| 150 | 770 | -6300 | -6300 | | | | | | | | | | | | |
| 160 | 1870 | -7100 | -8400 | | | | | | | | | | | | |
| 170 | 2730 | -7500 | -10400 | | | | | | | | | | | | |
| 180 | 2890 | -8600 | -14100 | | | | | | | | | | | | |
| 190 | 2820 | -10700 | -13800 | | | | | | | | | | | | |
| 200 | | | | | | | | | | | | | | | |
| 000 | | | | | | | | | | | | | | | |

0837

UNCLASSIFIED

[redacted]