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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AERONAUTICAL SYSTEMS DIVISION (AFSC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

2 JUNE 69

REPLY TO ATTN OF ASNPD

SUBJECT TN-WCLP-54-52 (TI-1119)

TO AFAPL/APO 4/LT. SILVERMAN

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Subject Report

(9) Technical Note, WCLP-54-52

(8) PRELIMINARY QUALIFICATION TESTS CONDUCTED ON FIRESTONE TIRE and RUBBER CO. SELF-SEALING RIGID FUEL CELL CONSTRUCTION 1095 .

(10) Jack Weil
Power Plant Laboratory

[redacted]

(11) 24 March 1954 (12) 13p.

(14) WADC-TN-WCLP-54-52

RDO No. 3[illegible]-505-F

Wright Air Development Center
Air Research and Development Command
United States Air Force
Wright-Patterson Air Force Base, Ohio

400 358

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(SEE WADCR 110-1)

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Technical Note
WCLP 54-52
24 March 1954

Power Plant Laboratory
Directorate of Laboratories
EDO No. 521-805-F

PRELIMINARY QUALIFICATION TESTS CONDUCTED ON FIRESTONE TIRE & RUBBER CO. SELF-SEALING RIGID FUEL CELL CONSTRUCTION 1095 MM

I. PURPOSE

1. To report results of preliminary qualification tests conducted as required by Specification AN-T-19a on subject fuel cells.

II. FACTUAL DATA

2. A description of the cells and the approved results of fuel contamination, water resistance, permeability, seam adhesion, and slit resistance tests conducted on the liner used in subject construction by Firestone Tire & Rubber Co. in accordance with methods outlined in Specification AN-T-19a are contained in Firestone Test Report dated 18 August 1952 and Appendix I of this report. The material satisfactorily passed all the above mentioned tests.

3. The hot sleeh test on Construction 1095 basic to subject construction was conducted at Wright-Patterson Air Force Base in accordance with Paragraph F-4c(2) of Specification AN-T-19a. The cell satisfactorily passed the hot sleeh test. Results of the test are contained in Memorandum Report MCREXP-521-2071 dated 27 June 1950.

4. The gunfire test was conducted at Wright-Patterson Air Force Base on 20 September 1950 in accordance with Paragraph F-4c(3) of Specification AN-T-19a. Subject cell satisfactorily passed the gunfire test, the results of which are contained in Appendix II and Exhibits A through D of this report. The test was witnessed by:

Mr. R. F. Wilson - Firestone Tire & Rubber Co.
Mr. R. T. Ridgway - Wright Air Development Center

5. The ninety day stand test was conducted at Wright-Patterson Air Force Base in accordance with Paragraph 4.3.2.2.5 of Specification MIL-T-5578A and completed 24 May 1950. The cell passed the ninety day stand test, the results of which are contained in Appendix III.

III. CONCLUSION

6. It is concluded that the subject construction conformed to the preliminary test requirements of Specification AN-T-49a.

IV. RECOMMENDATION

7. It is recommended that cell construction 1095 MM submitted by Firestone Tire & Rubber Company only be considered for final approval in aircraft for which the model specification requires fuel cell conformance to Specification AN-T-49a. This specification has been superseded by MIL-T-5578A.

COORDINATION:

J. H. Rodgers
J. H. Rodgers, WCLPI-4

R. H. Roth
for D. M. Ross, WCLPI

PREPARED BY:

Jack Weil
Jack Weil, WCLPI-4

PUBLICATION REVIEW

This report has been reviewed and is approved

NORMAN C. APPOLD, Colonel, USAF
Chief, Power Plant Laboratory

DISTRIBUTION:

BAGR
WCAPP
WCLPI-4 (2)
Firestone Tire & Rubber Co
2525 Firestone Boulevard
Los Angeles, California

APPENDIX I

A. Description of Tank

1. Manufacturer - Firestone Tire & Rubber Co.

2. Construction Number - 1095 NM

3. Type of Cell - Rigid Fuel

4. Tank Dimensions - 2 foot cube

5. Breakdown of tank construction

Material	Gauge - in.	Weight - lb/sq.ft.
Innerliner 95122	.035	.23
Nylon Barrier	—	—
Sealant L5352	.055	.29
3 oz. Nylon	.018	.10
Sealant L5352	.055	.29
Nylon Cord XP-36	.038	.18
Glass Cloth	.021	.08
Nylon Cord XP-36	.042	.12
Nylon Cord XP-36	.042	.12
Nylon Cord XP-36	.042	.12
Glass Cloth	.021	.08
Nylon Cord XP-36	.042	.12
Cement & Barrier	—	.20
TOTAL	.458 in.	2.14 lb/sq.ft.
Cured Wall Gauge	.40 in.	

B. Physical Property Tests

1. The physical property tests were conducted by Firestone Tire & Rubber Company in accordance with methods set forth in Specification AN-T-49a. The results of these tests are contained in Firestone Test Report dtd 18 August 1952, and are enumerated below:

Test	Paragraph	Determined	Specified
Fuel Contamination Non-Volatile Material	F-4b(1)	4mg/100ml	less 60mg/ 100ml
Stock Gum Residue		0.2mg/100ml	less 20mg/ 100/ml
Water Resistance	F-4b(2)	+1.91%	greater -20%
Permeability	F-4b(3)	Cup #1 .0068 Cup #2 .0171	less .025 fl.oz/sq.ft./ day
Seam Adhesion	F-4b(4)	Sample #1 30-33 lbs/in Sample #2 30 lbs/in	greater 12 lbs/in

APPENDIX I (Continued)

Slit Resistance	F-4b(5)	Trial #1 No change 1 hr. Trial #2 +1/32 in/hr.	less 1/ in/hr

2. Subject construction completed all tests satisfactorily. These tests were witnessed by the resident Air Force inspector.

APPENDIX II

GUNFIRE TEST

A. Conditions

1. Date - 20 September 1950

2. Type of Fluid - MIL-H-3136, Type III

3. Fluid Temperature - Ambient

4. Range - 75 feet

5. Ammunition - 50 Caliber AP

Round No. 1 - Entered at 90° angle to cell surface
Entrance - 3/4 tumble, damp, see Exhibit A
Exit - Full tumble, dry, See Exhibit B.

Round No. 2 - Entered at 90° angle to cell surface
Entrance - Full tumble, damp, See Exhibit A
Exit - Full tumble, seep, damp at 2 minutes, see Exhibit B

Round No. 3 - Entered at 90° angle to cell surface
Entrance - Full tumble, dry, see Exhibit C
Exit - Full tumble, dry, see Exhibit D

Round No. 4 - Entered at 90° angle to cell surface
Entrance - 1/4 tumble, dry, see Exhibit C
Exit - Full tumble, dry, see Exhibit D

Round No. 5 - Entered at 90° angle to cell surface
Entrance - Full tumble, seep, damp at 2 minutes, See Exhibit B
Exit - 3/4 tumble, dry, see Exhibit A

Round No. 6 - Entered at 45° angle to cell surface
Entrance - Full tumble, damp, see Exhibit C
Exit - Full tumble, damp, see Exhibit B

B. Conditions

1. Date - 20 September 1950

2. Type of Fluid - MIL-H-3136, Type III

3. Fluid Temperature - -20°F

4. Range - 75 feet

5. Ammunition - 50 caliber AP

APPENDIX II (continued)

Round No. 1 - Entered at 90° angle to cell surface
Entrance - 1/2 tumble, dry, see Exhibit A
Exit - Full tumble, seep, damp at 2 minutes, see Exhibit B

Round No. 2 - Entered at 90° angle to cell surface
Entrance - Full tumble, damp, see Exhibit A
Exit - Full tumble, damp, see Exhibit B

Round No. 3 - Entered at 90° angle to cell surface
Entrance - Full tumble, seep, damp in 2 minutes, see Exhibit C
Exit - Full tumble, damp, see Exhibit D

Round No. 4 - Entered at 90° angle to cell surface
Entrance - Full tumble, damp, see Exhibit C
Exit - Full tumble, damp, see Exhibit D

Round No. 5 - Entered at 45° angle to cell surface
Entrance - Full tumble, 1/4 inch stream, damp in 4 minutes, See Exhibit B

Round No. 6 - Entered at 90° angle to cell surface
Entrance - 1/2 tumble, damp, see Exhibit C
Exit - Full tumble, seep, damp in 2 minutes, see Exhibit D

C. Remarks

1. The cell satisfactorily completed the gunfire tests

APPENDIX III

STAND TEST

A. Conditions

1. Date - 1 October 1950
2. Type Fluid - MIL-H-3136, Type III
3. Fluid Temperature - Ambient
4. The cell was filled with test fluid and maintained at ambient temperature for 180 days.

B. Remarks

1. The cell satisfactorily completed the stand test.

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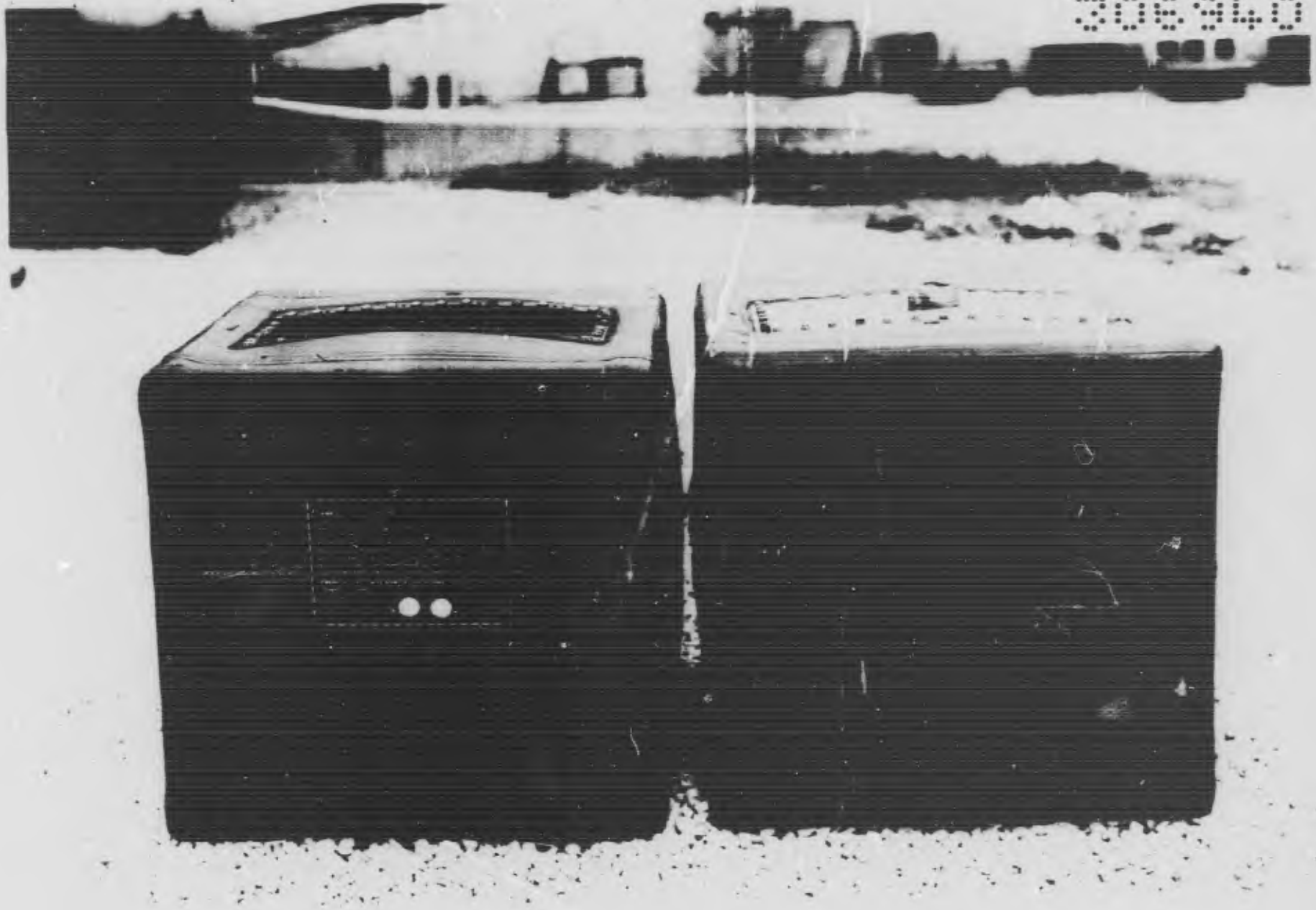

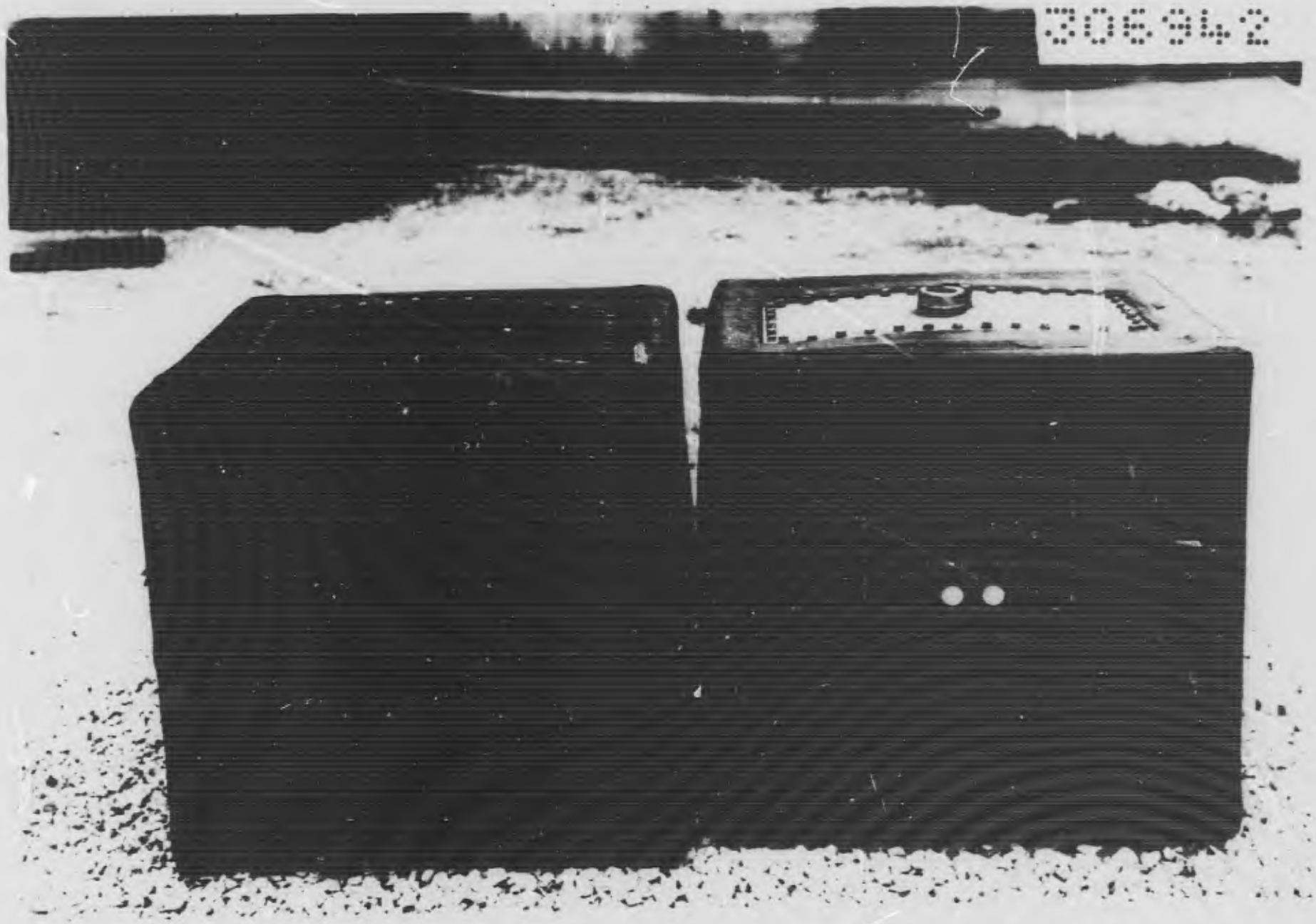
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