P-40 R

ARMY AIR FORCES
MATERIEL CENTER

MEMORANDUM REPORT ON
Pursuit Single Engine P-40N, A.C. No. 42-9937 NRR:da:19
Date January 30, 1943

SUBJECT: Flight Tests

SECTION Flight

SERIAL No. FS-W-19-1535-A.

Contract No.
Expenditure Order No.
Purchase Order No.

A. Purpose.

1. Report on flight tests of Curtiss P-40N (P-40K loaded to 7413 pounds with the same drag conditions as P-40N) airplane at the manufacturer's plant. Airplane equipped with Allison V-1710-81 engine and a three-bladed 11 feet 0 inches constant speed electric propeller, blade design No. 5503-24N, blade angle range 54.5° to 24.4° at 42 inch radius. Gross weight at take-off was 7413 pounds with c.g. location at 30.15 percent m.a.c., wheels up. Wheels up, wing flaps neutral, carburetor cold, mixture auto-rich, unless otherwise specified, one flame dampening stack per cylinder, four .50 caliber wing guns with blast tubes taped and 235 rounds of .50 caliber ammunition per gun. Radio and radio mast and single strand antenna in place with belly tank shackle in place. Equipped with experimental aluminum alloy radiators, Dwg. No. B22359, Serial No. 9-R, and Dwg. No. B22359, Serial No. 10-L. No rear view mirror, no external gun peep sight. Horsepowers obtained from power curve V-1710-81, 83, and 85, dated October 28, 29, 1942 (2:1 propeller gear ratio; 9.6:1 blower gear).

B. Tests Results.

1. High speeds, cowl flaps in the neutral position.

Altitude Feet	Airspeed MPH	RPM	b.h.p.	Throttle	Intake Man. Pr. "Hg.
2960	323	3000	1125 900	Part	—
2960	344	3000	1415	Part	57
10550	348	3000	1125 970	Part	—
*10550	378	3000	1430	Wide	57
**17300	371	3000	1125 960	Wide	—
29700	348	3000	706 636	Wide	—

**Critical altitude for military rated power in level flight.
*Critical altitude for war emergency power in level flight.

2. Normal rated power and cruising speeds, cowl flaps in the neutral position.

Altitude	Airspeed MPH	RPM	b.h.p.	Throttle Position	Mixture Setting
17,130	356	2600	1005	Wide	Auto-rich
17,130	327	2280	800	Part	Auto-lean
17,130	307	2200	700	Part	Auto-lean
17,130	295	2100	650	Part	Auto-lean
17,130	283	1900	600	Part	Auto-lean
17,130	255	1700	500	Part	Auto-lean

3. Climb data, cowl flaps wide open, mixture control in the auto-rich position. Throttle set for 57 inches Hg. at 3000 RPM or wide open when below.

Altitude Feet	Airspeed MPH	RPM	b.h.p.	Rate of Climb Ft./Min.	Time of Climb Min.
Sea Level	156.5	3000	1400	3520	0
5,000	168.5	3000	1450	3640	1.39
*8,000	174	3000	1480	3720	2.21
10,000	175.5	3000	1340	3440	2.77
15,000	180.5	3000	1105	2680	4.41

*Critical altitude for war emergency power in climb.

4. Climb data. Cowl flaps wide open, mixture control in the auto-rich position, throttle set for 50.5 inches Hg. at 3000 RPM or wide open when below.

75 X 33000
741.5
33.4 (min/flip)

Altitude Feet	Airspeed MPH	RPM	b.h.p.	Rate of Climb Ft./Min.	Time of Climb Min.
Sea Level	151	3000	1195	3140	0
5,000	163	3000	1245	3260	1.56
10,000	175	3000	1290	3375	3.07
*10,400	176	3000	1300	3380	3.19
15,000	180.5	3000	1090	2680	4.72
20,000	186	3000	905	1970	6.89
25,000	191	3000	750	1400	9.89
30,000	197	3000	625	890	14.33
35,000	203	3000	520	400	22.52
S/C 38,200	-	3000	-	100	37.37
A/C 39,200	-	3000	-	0	-

*Critical altitude for military power in climb.

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5. Determination of airspeed indicator and altimeter installation errors. Pitot static holes located 21-1/4 inches in from left wing tip and 17-1/4 inches back from leading edge.

Indicated Airspeed MPH	Indicator vs. Water Column MPH	Calibrated Airspeed MPH	Airspeed Installation Error MPH	Altimeter Installation Error at Sea Level
330	328.5	337.5	-9	-280
300	300	308	-8	-205
275	274	283	-9	-165
250	249	256	-7	-140
225	225	231	-6	-120
200	199	204.5	-5.5	-100
175	174	179	-5	- 85
150	149	153.5	-4.5	- 70
130	130	132.5	-2.5	- 60

6. Complete cooling tests were not run on this airplane, however, it was found that prestone temperatures did not meet Air Corps cooling requirements in climb. Highest prestone temperature observed in war emergency power climb was 105°C at 8000 feet at 1480 b.h.p. with a free air temperature of -12°C. Highest prestone temperature observed in military power climb was 106°C at 12,000 feet at 1220 b.h.p. with a free air temperature of -12°C.

The oil cooler was not equipped with a 40-pound spring to allow all the oil to go through the oil cooler, however, indications are that oil temperatures would not meet Air Corps cooling requirements.

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