

Classification changed to
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DATE 4/15/49

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ARMY AIR FORCES
MATERIEL ~~SECTION~~ COMMAND
FLIGHT SECTION

CLASSIFICATION CANCELLED
OR CHANGED TO *Unclassified*
5-1-46

MEMORANDUM REPORT ON

Pursuit, Single Engine P-51, AAF No. 41-37320 RES:mem:19
Date 20 July 1943
SUBJECT: Comparative Performance Tests

SECTION FLIGHT

SERIAL No. ENK-19-1622-A

Contract No. _____
Expenditure Order No. 726-25
Purchase Order No. _____

A. Purpose

1. To report results of performance tests on P-51, AAF No. 41-37320, run at Wright Field. Airplane equipped with V-1710-39 engine with T manifold screens; three bladed, constant speed propeller, blade design No. 89301-6. Four cannons and armor plate in place. Gross weight at take-off as tested was 8,849 pounds with camera in, and 8,824 pounds with camera removed. Landing gear retracted, wing flaps neutral, radio antenna installed, prestone and oil cooler scoop closed.

B. Test Results

1. With several configurations the following high speeds were obtained at 3,000 RPM, wide open throttle, and 1,200 b.h.p. at 12,500 feet:

- a. Camera blister in place; fishtail stacks in place...376.5 MPH
- b. Camera blister removed; fishtail stacks in place....379.0 MPH
- c. Blister removed; standard stacks in place.....380.5 MPH
- *d. Same as c., plus cleaned up condition.....385.0 MPH
- e. Same as d., with airplane sanded.....388.5 MPH

*After fitting cowlings smoothed up, antenna wires to horizontal stabilizer removed, rear windows secured flush, gun access doors secured, rough sections repainted and cracks filled. Camouflage paint fairly smooth at this time due to normal wear.

2. High speed tests; same configuration as paragraph 1 e, mixture auto-rich.

ALTITUDE FEET	TRUE SPEED	RPM	BHP	THROTTLE POSITION
4,300	369.5	3,000	1,175	Part
*12,500	388.5	3,000	1,200	Wide Open
17,500	386.0	3,000	975	Wide Open
24,800	367.0	3,000	710	Wide Open

*Critical altitude for military rated power.

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3. Cruising speeds at 13,200 feet, mixture auto-lean, camera and camera blister installed.

TRUE SPEED MPH	RPM	BHP	THROTTLE POSITION
330	2,280	821	Wide Open
313	2,200	708	Part
291.5	2,100	610	Part
257	1,900	490	Part
212	1,700	365	Part

4. With drag condition similar, subject airplane was flown in formation at wide open throttle at 15,000 feet, against P-51, AAF No. 41-37427. No difference in speed was noticeable.

5. Climb data: Propeller set for 3,000 RPM for first five minutes with throttle open to give 1,150 BHP or wide open when below; mixture auto-rich:

ALTITUDE FEET	TRUE SPEED MPH	RPM	STD. BHP	RATE OF CLIMB FT/MIN	TIME OF CLIMB MIN.
0	158	3,000	1,150	-	0
5,000	170	3,000	1,150	2,650	2
7,000	176	3,000	1,150	2,780	2.75
10,000	184	3,000	1,040	2,460	4
12,500	187	3,000	955	2,200	5
15,000	194	2,600	770	1,600	6.5
20,000	205	2,600	640	1,130	10.0
25,000	217	2,600	520	670	15.5
S/C 31,300	231	2,600	-	100	36.0
A/C 32,600	234	2,600	-	0	-

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6. Determination of airspeed indicator and altitude installation error with wheels and flaps up. Airspeed static openings located approximately 29-1/4 inches from leading edge, 90-1/2 inches from right wing tip, and 14-5/8 inches from bottom wing surface.

INDICATED AIRSPEED MPH	WATER COLUMN MPH	CALIBRATED AIRSPEED MPH	AIRSPEED INSTALLATION ERROR MPH	ALTIMETER INSTALLATION ERROR FT.
320	319	304	-15	+300
280	277	266	-11	+200
240	237.5	232	+5.5	+100
200	199.5	196.5	+3	+40
170	170	170.5	-0.5	0
140	136.5	141.5	-5	-40

7. Horsepowers were obtained from power chart dated 12 December 1941. During the course of this series of tests, three different rebuilt engines were used. The engines in operation during the high speed tests compared favorably with the engine in the airplane during acceptance performance tests (Report PHQ-M-19-1415-A) run at manufacturers plant. The engine used during the climb tests developed less manifold pressure at wide open throttle, which resulted in a loss of approximately 45 b.h.p.

In report PHQ-M-19-1415-A on subject airplane dated 16 June 1942, all chart horsepowers were corrected for temperature variation from standard by the factor (T_s) 0.87. Experiments later showed the factor should be (T_s) 0.50; the latter factor was used for this report. The resulting variation in standard horsepower was a 2 per cent increase in power available.

Incl: 3 Summary Sheets

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C.H.B.
Prepared by ROBERT E. SCHREIBER, 1st Lt., AC

Approved by S. M. GILKEY, Colonel, AC
Chief, Flight Section

Approved by F. C. CARROLL, Brig. Gen., USAF
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POWER CLIMB & SPEED vs ALTITUDE

P-51 41-37320

8824 lbs T.O. GROSS WT.
4 CANNONS

