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Propeller

ARMY AIR FORCES
MATERIEL CENTER

MEMORANDUM REPORT ON
Single Engine Pursuit - P-47B, AC No. 41-5942 PTB:da:19

Date January 28, 1943

SUBJECT: Comparative Propeller Tests.

SECTION Flight

SERIAL No. FS-M-19-1533-A

Contract No.
Expenditure Order No. 430-4-60
Purchase Order No.

A. Purpose.

1. To report results of flight tests of the P-47B airplane, AC No. 41-5942, conducted at the manufacturer's plant in order to obtain comparative performance with a 13 feet 0 inch diameter, No. 826, Curtiss test propeller and with the standard production propeller, No. 714-1C2-12; cuffs were not installed on either propeller. Airplane equipped with Pratt and Whitney R-2800-21 engine with torque meter and with an exhaust driven turbo supercharger. Gross weight at take-off for all tests was 12,620 pounds at 28.3 percent m.a.c., wheels up. Radio mast and antenna in place and eight .50 caliber machine guns installed. All tests with wheels and flaps up and with the mixture auto-rich.

B. Test Results.

1. High speeds at 2700 RPM and 2000 b.h.p. at 5000 feet, 25,000 feet, and critical altitude for 18,250 turbo RPM. Cowl flaps closed, intercooler and oil cooler flaps neutral.

Altitude Feet	True Speed - MPH	
	Curtiss Prop. No. 826 13 ft. 0 in. Dia.	Curtiss Prop. No. 714-1C2-12 12 ft. 2 in. Dia.
5,000	342	350
25,000	408	414
Critical Altitude	415 at 27,000 ft.	421 at 27,300 ft.

2. Climb data obtained at 2700 RPM with throttle wide open and turbo on to give either 2000 torque b.h.p. or 18,250 turbo RPM. Cowl flaps, oil cooler, and intercooler flaps wide open.

CONFIDENTIAL

Flight Section
MEMORANDUM REPORT NO. FS-M-19-1533-A
January 28, 1943

Altitude Feet	I.A.S. MPH	Torque b.h.p.	Rate of Climb - ft/min. Curtiss No. 826 13 ft.0 in.Dia.	Curtiss No.714-1C2-12 12 ft.2 in. Dia.
10,000	185	2000	2720	2580
15,000	201	2000	2610	2440
20,000	218	2000	2440	2240
23,300*	231	2000	2295	2080
25,000	236	1900	2040	1850
30,000	252	1620	1345	1190
35,000	255	1350	700	550

* Critical altitude for 2000 b.h.p. at 18,250 turbo RPM.
Note: Above speeds are the same speeds as used for climbs in previous propeller tests on this airplane and are the minimum speeds at which the climbs can be made without overheating on a normal day.

Best climbing speed was 15 MPH slower and the rate of climb 20 feet per minute higher for the Curtiss 13 feet 0 inch diameter propeller No. 826. Best speed for the Curtiss No. 714-1C2-12 propeller was 5 MPH slower but there was no appreciable difference in rate of climb.

3. Distance required to take-off from a paved runway and clear a fifty foot obstacle with mixture auto-rich, cowl flaps, oil flaps, and intercooler flaps open.

Propeller	13 ft.0 in. Curtiss No. 826			12 ft.2 in. Curtiss No. 714-1C2-12	
Flap setting	1/2	1/2	Full	1/2	Full
RPM	2700	2700	2700	2640	2640
b.h.p.	1680	1760	1710	1600	1610
Man. Pr.-"Hg.	45	49	45.2	45.2	45.2
I.A.S. at T.O. - MPH	95	95	91	95	92
Ground Roll - Ft.	1190	1105	1115	1260	1210
Distance to clear 50-ft. obstacle - Ft.	1730	1655	1625	1755	1630
Gross weight - lbs.	12,150	12,450	12,250	12,450	12,250
Average of	4 trials	6 trials	4 trials	6 trials	5 trials

Flight Section
MEMORANDUM REPORTS NO. FS-M-19-1533-A
January 28, 1943

4. Determination of airspeed errors with a Kollsman type D-1 airspeed head located on left wing 43 inches in from the tip and with static holes 23-3/16 inches ahead of the leading edge and approximately 3/4 inch above the chord line.

Indicated Airspeed MPH	Water Column MPH	Calibrated Airspeed MPH	Airspeed Installation Error MPH
310	308	319.5	-11.5
280	279	289	-10.0
255	254.5	263.5	- 9.0
230	229.5	237.5	- 8.0
205	203	210.5	- 7.5
180	179.5	186.0	- 6.5

Concurrence:

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