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**WAR DEPARTMENT
AIR CORPS, MATERIEL DIVISION**

MEMORANDUM REPORT ON
Republic P-47B, AC No. 41-5931

FFB-da
Date September 7, 1942

SUBJECT: Performance Tests

SECTION Flight

SERIAL No. FS-M-19-1469-A

Contract No. _____
Expenditure Order No. 443-4-60
Purchase Order No. _____

A. Purpose

1. To report results of flight tests conducted to determine the rate of climb and the level flight critical altitude at military power on the P-47B airplane AC No. 41-5931. This airplane equipped with Pratt & Whitney R-2800-21 engine with turbo supercharger and four-bladed Curtiss electric constant speed propeller with cooling cuffs; blade design No. 714-102-12; blade angle range 28° to 58°. Gross weight as tested was 12,560 pounds at 32 percent m.a.c., wheels up. Radio mast and antenna in place and eight .50 caliber machine guns installed. All tests with wheels up, wing flaps up, and with the mixture automatic rich.

No torque meter was installed on this airplane so that power data was not obtained. However, from torque meter data on other P-47B airplane tests, military rated power of 2000 b.h.p. at 2700 RPM would be obtained at approximately 52.2" Hg. at 25,000 feet on this airplane.

B. Test Results

1. Critical altitude in level flight for approximately 2000 b.h.p. at 2700 RPM at 18,250 turbo RPM with cowl flaps, oil cooler, and intercooler flaps flush and throttle wide open with turbo on to give 18,250 turbo RPM.

Condition	Critical Altitude	True Speed	Manifold Pressure
Original duct without dust screen	26,800	429	52.3
New duct with dust screen inst.	24,900	419	52.4
New duct with dust screen by-passed	25,200	421	52.6
New duct with dust screen removed	25,600	423	52.8

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2. Climb data obtained with throttle wide open, and turbo on to give 52.2" Hg. or 18,250 turbo RPM. Cowl flaps, oil cooler flaps and intercooler flaps wide open. Original intake duct without dust screens installed.

Altitude Ft.	True Speed MPH	RPM	Manifold Pressure "Hg.	Turbo RPM	Rate of Climb ft/min
15,000	207	2700	51.8	14,050	2330
20,000	233	2700	52.0	16,450	2150
23,400	245	2700	52.2	18,250	2000
25,000	252	2700	49.2	18,250	1810
30,000	265	2700	41.0	18,250	1190
35,000	272	2700	32.7	18,250	570

*Climbs up to 25,000 feet were made at 15 MPH above best climbing speed and this was gradually reduced so that best climbing speed was reached at 35,000 feet. This was done in order to cool the engine and the loss in rate of climb at 25,000 feet was approximately 40 feet/minute. The engine apparently cooled satisfactorily at the speeds given above.

3. A series of climbs were conducted in order to determine the effect of cowl flap position on cylinder head temperature from the pilot's cockpit temperature gage.
- a. Climbs at best climbing speed of 155 MPH I.A.S. at 2500 RPM and 42" Hg. were made to 30,000 feet from stabilized level flights at 10,000 feet with 1/2, 3/4, and wide open cowl flap positions. Head temperature at 28,000 feet was 25°C hotter at 1/2 cowl flap and 10°C hotter at 3/4 cowl flap than it was with cowl flaps wide open. Slight buffeting at wide open flap disappeared below 3/4 cowl flap setting.
- b. At an increased climbing speed of 170 MPH I.A.S., climbs were repeated at 1/2 and wide open cowl flap positions. Cylinder temperature was only 10°C hotter at 1/2 flap than with cowl flaps wide open. This increased climbing speed caused a 10°C decrease in cylinder head temperature at the wide open cowl flap setting.

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Prepared by PAUL F. BIKLE
(Name)Approved by GEORGE J. EPPRIGHT, Colonel, A.C.
Acting Chief, FLIGHT SECTION

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