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ARMY AIR FORCES  
MATERIEL CENTER

## MEMORANDUM REPORT ON

Pursuit Single Engine P-47B, A.C. No. 41-5942

RES-da-19

Date December 26, 1942

SUBJECT: Comparative Propeller Tests

SECTION Flight

Contract No. ....

Expenditure Order No. 430-4-60SERIAL No. FS-M-19-1523-A

Purchase Order No. ....

A. Purpose

1. To report results of flight tests of six four-bladed propellers installed on P-47B airplane. Tests were run at Republic Factory, Farmingdale, New York. Airplane equipped with Pratt and Whitney, R-2800-21 engine with torque meter and with an exhaust driven turbo supercharger. Gross weight as tested was 12,620 pounds at 30.32 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 mixture auto-rich.
2. Propellers, design Nos. 814-103-24A, 714-102-12, and 814-303-18 were fitted with cooling cuffs.

B. Test Results

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

| Altitude<br>Feet | True Speed - MPH |             |                  |            |            | Ham. Std.  |
|------------------|------------------|-------------|------------------|------------|------------|------------|
|                  | 12'2"            | 13'2"       | Curtiss<br>13'6" | 12'2"      | 12'2"      |            |
|                  | 714-102-12       | 814-103-24A | 814-303-18       | 101348-12  | 101350-12  | 6501A-0    |
| 5,000            | 353              | 343         | 337              | 352        | 350        | 347        |
| 25,000           | 419              | 402         | 397              | 418        | 415        | 414        |
| Critical         | 428 at           | 408 at      | 406 at           | 426 at     | 425 at     | 424 at     |
| Altitude         | 28,000 ft.       | 27,000 ft.  | 28,000 ft.       | 27,400 ft. | 28,200 ft. | 28,200 ft. |

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

CONFIDENTIAL



CONFIDENTIAL

Flight Section  
MEMORANDUM REPORT NO. FS-M-19-1523-A  
December 26, 1942

Page 2.

| Propeller     | Rate of Climb - Ft./Min. |        |        |         |        |
|---------------|--------------------------|--------|--------|---------|--------|
|               | 10,000                   | 15,000 | 20,000 | *24,000 | 30,000 |
| Curtiss 12'2" |                          |        |        |         |        |
| 714-1C2-12    | 2420                     | 2350   | 2180   | 1960    | 1180   |
| Curtiss 13'2" |                          |        |        |         |        |
| 814-1C3-24A   | 2600                     | 2540   | 2400   | 2200    | 1320   |
| Curtiss 13'6" |                          |        |        |         |        |
| 814-3C3-18    | 2610                     | 2560   | 2400   | 2200    | 1410   |
| Curtiss 12'2" |                          |        |        |         |        |
| 101348-12     | 2590                     | 2530   | 2390   | 2180    | 1320   |
| Curtiss 12'2" |                          |        |        |         |        |
| 101350-12     | 2600                     | 2550   | 2405   | 2210    | 1300   |
| Ham. Std. 13' |                          |        |        |         |        |
| 6501A-0       | 2700                     | 2620   | 2460   | 2270    | 1400   |
| Torque b.h.p. | 2000                     | 2000   | 2000   | 2000    | 1645   |
| True Speed    | 185                      | 201    | 218    | 233     | 250    |

\*Critical altitude for 2000 b.h.p. at 18,250 turbo RPM.

Note: Above speeds are minimum speeds at which climbs could be run due to poor engine cooling. On a hot day it would not be possible to climb at these speeds. Airspeeds for maximum rate of climb are 10 to 15 MPH slower than above speeds.

3. Distance required to take-off from a concrete runway and clear a fifty foot obstacle with engine operating at 2700 RPM and mixture auto-rich.

| Propeller                          | 12'2" Curtiss        |        |        | 13'2" Curtiss        |        |        |
|------------------------------------|----------------------|--------|--------|----------------------|--------|--------|
|                                    | Design No. 101348-12 |        |        | Design No. 101350-12 |        |        |
| Flap setting                       | 0                    | 1/2    | Full   | 0                    | 1/2    | Full   |
| I.A.S. at T.O.                     | 99                   | 98     | 91     | 103                  | 100    | 86     |
| b.h.p.                             | 1760                 | 1770   | 1765   | 1750                 | 1750   | 1735   |
| Ground Roll                        | 1425                 | 1200   | 1000   | 1440                 | 1200   | 1180   |
| Distance to clear 50-foot obstacle | 2100                 | 1935   | 1615   | 2080                 | 1915   | 1750   |
| Average of No. of trials           | 3 of 4               | 3 of 4 | 2 of 4 | 4 of 4               | 3 of 4 | 2 of 3 |

CONFIDENTIAL

CONFIDENTIAL

## Flight Section

MEMORANDUM REPORT NO. FS-M-19-1523-A

December 26, 1942

4. Determination of airspeed and altimeter error with a Kollsman type D-1 airspeed head located with static holes  $23\frac{3}{8}$  inches ahead of the leading edge of the left wing and 43 inches in from the tip and approximately one inch above the chord line.

| Indicated<br>Airspeed<br>MPH | Water<br>Column<br>MPH | Calibrated<br>Airspeed<br>MPH | Airspeed<br>Installation<br>Error<br>MPH | Altimeter<br>Error<br>at Sea Level<br>Feet |
|------------------------------|------------------------|-------------------------------|--|--|
| 310                          | 308.0                  | 320.0                         | -12.0                                    | -215                                       |
| 290                          | 290.0                  | 299.0                         | - 9.0                                    | -175                                       |
| 260                          | 260.0                  | 267.5                         | - 7.5                                    | -145                                       |
| 230                          | 229.5                  | 236.5                         | - 7.0                                    | -105                                       |
| 200                          | 199.0                  | 205.0                         | - 6.0                                    | - 80                                       |
| 170                          | 168.5                  | 174.0                         | - 5.5                                    | - 60                                       |

Concurrence:

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