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WAR DEPARTMENT

AIR CORPS, MATERIEL DIVISION

MEMORANDUM REPORT ON LHS-BC

Pursuit Single Engine (P-39C), A.C. No. 40-2988

Date July 17, 1941

SUBJECT: Flight Tests

SECTION Flying Branch

SERIAL No. PHQ-M-19-1266-A

Contract No. W-535 AC-13383

Expenditure Order No. 430-4-40

Purchase Order No.

A. Purpose

1. Report on flight tests of Bell P-39C. Airplane equipped with Allison V-1710-35 engine and 3-bladed constant speed propeller, blade design No. 614CC1.5-21, blades not equipped with cuffs. Gross weight as tested 6689 lbs. Wheels up; wing flaps neutral; carburetor cold; one exhaust stack per cylinder; airplane camouflaged; cannon, two 30 cal. and two 50 cal. guns as well as radio antenna in place. Horsepowers obtained from Fig. 3, T.O. No. 02-5AD-1.

B. Test results

1. Military rated power speeds:

Altitude Ft.	Speed MPH	R.P.M.	B.H.P.	Oil Cooler and Prestone Flap Control Position
13,050	369	3000	1150	Wide open
*13,050	379	3000	1150	Flush with cowling
5,000	340.5	3000	1150	Wide open
5,000	350	3000	1150	Flush with cowling

*Critical altitude for military rated power in level flight.

The airplane does not meet Air Corps cooling requirements with the oil and prestone radiator flap controls in the wide open position. The flaps are spring loaded and are therefore not positive in action; with the controls in the wide open position the flaps are pushed up towards the flush position by the force of the air stream.

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2. Normal rated power and cruising speeds:

Altitude Ft.	Speed MPH	R.P.M.	B.H.P.	Oil Cooler and Prestone Flap Control Position
*12,600	362	2600	1000	Flush with cowling
12,600	327	2280	750	Flush with cowling
12,600	309	2200	630	Flush with cowling
12,600	286	2100	520	Flush with cowling
12,600	256	1900	400	Flush with cowling
12,600	217	1700	270	Flush with cowling

*Critical altitude for normal rated power; oil cooling does not meet Air Corps requirements under this condition.

3. Climb data, prestone and oil cooler flaps wide open, mixture control automatic rich below 18,000 ft., automatic lean position above 18,000 ft. Oil and prestone temperatures do not meet Air Corps requirements in climb.

Altitude Ft.	Speed MPH	R.P.M.	B.H.P.	Rate of Climb Ft/Min	Time of Climb Min.
S.L.	153	3000	1150	3720	0
5,000	165	3000	1150	3720	1.35
10,000	178	3000	1150	3720	2.7
13,050	185.5	3000	1030	3040	3.6
16,750	194.5	3000	895	2360	5.0
20,000	200	2600	675	1530	6.9
25,000	211	2600	535	975	11.0
30,000	221	2600	-	440	18.4
S/C 33,200	227	2600	-	100	32.2
A/C 34,150	229	2600	-	0	-

4. Fuel consumption at 750 bhp at 327 mph at 2280 rpm at 12,600 ft. with mixture control in automatic lean position is 435 lbs/hr (72.5 gals/hr at 6.0 lbs/gal). Specific fuel consumption 0.58 lbs/hp/hr. This consumption is excessive; instructions for reworking carburetors are being issued by the Power Plant Laboratory.

Fuel consumption at 1000 bhp at 362 mph at 2600 rpm at 12,600 ft. with mixture control in automatic rich position is 648 lbs/hr (108 gals/hr at 6.0 lbs/gal). Specific fuel consumption 0.648 lbs/hp/hr.

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5. Carburetor heat tests at 1300 ft. pressure altitude at 2280 rpm at 30" Hg. manifold pressure, free air temperature +15° C., carburetor air temperature with heat control in cold position was +23.5° C., with control in full hot position +46° C.

6. Indicated take-off, landing and gliding speeds:

Wing Flaps	Minimum Speed MPH	Condition
0	95	Take-off
26°	90	Take-off
35°	88	Take-off
Full	85	Landing, gross weight 7000 lbs.
Full	80	Landing, gross weight approx. 6300 lbs.
Full	100	Glide approach for landing

The above listed speeds are minimum. Values recommended are 5 mph more for take-off and 5 to 10 mph more for glide, depending on load and wind conditions.

7. Determination of airspeed indicator and altimeter installation errors. Airspeed static openings located approximately 32" in from left wing tip and 29" fore leading edge of wing at that point. Barometric pressure at test level was 29.04" Hg. Wheels up, wing flaps neutral.

Indicated Airspeed MPH	Indicator Vs. Water Column MPH	Calibrated Airspeed MPH	Airspeed Installation Error MPH	Altimeter Installation Error Ft.
300	303	310.5	-7.5	-140
275	278	285	-7	-110
250	253	260	-7	-85
225	227	234	-7	-55
200	201	208	-7	-20
175	176	181.5	-5.5	0
150	151	154	-3	+30

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