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AVIA 18/73 KON

6th Part of Report No. AAEE/783.

13 MAY 1942

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT

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BOSCOMBE DOWN	STOCK
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it Kittyhawk A.K. 572	
(Allison V.1710 F.3.R.)	
Fuel consumption trials.	
REDUCE TO 12	AUTHORISED
DATE 5.1.53	
Progress of issue of Report.	

This Report deals with the aircraft (or equipment) as tested. Action to remedy defects or decisions to accept items not in strict compliance with the specification are matters for decision and action by the M.A.P.

A. & A.E.E. Ref:- 4481/1 - A.S. 78.
M.A.P. Ref:- R.A.1871/D.A.N.A.1.

Report No.	Title
1st Part of AAEE/783	A.K.572 and A.K.764 - Carbon monoxide contamination tests
2nd ditto	A.K.764 - G.45 camera gun installation.
3rd ditto	A.K.579 - Flame damping trials with American design fish tails.
4th ditto	A.K.572 - Carbon monoxide contamination tests.
5th ditto	A.K.572 - Weights, loading data and leading particulars.

SUMMARY.

1. Introduction: Consumption tests were required on the Kittyhawk fitted with an Allison V.1710 - F.3.R. engine.
2. Tests: Consumption tests were made at 15,000 feet at various R.P.M. and boost settings in weak mixture. A few points in rich mixture were also observed.
3. Results: The maximum still air range is 650 miles at 15,000 feet at the most economical A.S.I. of 165 m.p.h. This was obtained with 1900 R.P.M. and 21" of boost, using weak mixture.

The above results make no allowance for the distance covered during the climb to 15,000 feet. Allowance has been made for the fuel used for take-off and climb, and for a further period of 15 minutes at full throttle. The endurance at the above air speed and engine conditions is 3.14 hours.

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1. Introduction:

Fuel consumption tests were required on a Kittyhawk fitted with an Allison V-1710 F.3.R. engine.

2. Tests made:

Fuel consumption tests were carried out at a height of 15,000 feet. The consumption was measured with a Kent flowmeter at various engine speeds at boost values ranging from the maximum permissible down to the lowest obtainable in level flight (at low R.P.M.'s). These tests were done in weak mixture. Three readings only were taken in rich mixture, and they serve only as a basis for comparison to show the difference in range that might be expected when using rich mixture.

3. Condition of aeroplane relevant to tests:

The aeroplane was not representative of the Kittyhawks that will be in use operationally, as none of the British modifications were incorporated in this aeroplane. The exterior differences were that four guns were installed instead of six and the housing for the G.45 camera under the starboard wing was not fitted. No aerial mast nor aeriels were fitted. These exterior differences should have no appreciable effect on range flying performance.

The take-off weight was 8,480 lb., the centre of gravity being 26.5 ins. aft of the datum, with the undercarriage down.

The tests were done on 2nd April, 1942.

4. Results:

In calculating the range, an allowance of 10 gallons of fuel for warm-up, take-off and climb to 15,000 feet was made, plus 25 gallons for 15 minutes flying at full throttle. The total fuel capacity is 123 gallons, and when the above allowances have been subtracted, the fuel available is 88 gallons. No allowance has been made for the distance covered during the climb.

The results are given in Table I and in Figs.1,2 and 3. The maximum range in still air is 650 miles at the most economical A.S.I. of 165 m.p.h.

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This speed was obtained at 1900 R.P.M. and 21" of boost in which the speed is suitable for operational use, the lowest speed for comfortable cruising being 150 m.p.h. A.S.I. The maximum endurance is obtained at 156 m.p.h. A.S.I. The engine conditions which gave this speed were 20" of boost.

TABLE I.
Fuel consumption tests in level flight.

CONDITIONS OF MERCH
INCHES OF MERC

Ht. feet.	Air speed		R.P.M.	Boost (ins. of Hg.)	Mixture control	Consumption		Air miles per gall.	Range (miles)	Endurance (hours)
	T.A.S. m.p.h.	A.S.I. m.p.h.				lb./hr.	gls./hr			
15,000	301	235	2600	35½	Rich	631	87.7	3.43	302	1.01
I.C.A.N	286	223.5	2300	30½	↓	458	63.7	4.48	395	1.38
14,450	262	205	2000	27	↓	325	45.0	5.82	513	1.96
Stand.	285	222.5	2300	30½	Weak	421	58.5	4.87	428	1.50
↓	269	210	↓	28	↓	342	47.5	5.66	498	1.85
↓	262	205	↓	27	↓	317	44.0	5.95	542	2.00
↓	247	193.5	↓	25	↓	274	38.0	6.48	570	2.31
↓	232	182	↓	23	↓	246	34.1	6.79	598	2.58
↓	225	177	↓	22	↓	235	32.6	6.88	606	2.70
↓	265	207	2100	28	↓	317	44.0	6.02	530	2.00
↓	258	202	↓	27	↓	295	41.0	6.28	553	2.15
↓	244.5	191.5	↓	25	↓	261	36.2	6.75	595	2.43
↓	227	179	↓	22½	↓	231	32.0	7.09	624	2.75
↓	247	193.5	1900	26	↓	263	36.5	6.76	595	2.41
↓	241	189	↓	25	↓	249	34.5	6.98	615	2.55
↓	221	174	↓	22½	↓	216	30.0	7.37	648	2.93
↓	207	164	↓	21	↓	202	28.0	7.39	650	3.14
↓	197	156	↓	20	↓	193	26.8	7.34	646	3.28

Fuel available = 88 gallons (see para.4)
 Specific gravity of fuel = .72.
 Estimated mean weight = 8,050 lb.
 Minimum speed for comfortable cruising = 150 m.p.h. A.S.I.

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67 P.O.R.N. A2AEE/783. CURVEN^o 3966 TRACED: Jh. D.O.T.: 24/4/42 CKD: RMH. APP: A.F. Gz DO

KITTYHAWK AK 572

[ALLISON V1710 F3R]

RANGE PER GALLON AT 15,000 FEET

— WEAK MIXTURE
 * RICH MIXTURE
 RADIATOR SHUTTERS IN MINIMUM DRAG POSITION.

BOOST IS INDICATED IN INCHES OF MERCUR.
 STANDARD ATMOSPHERIC CONDITIONS
 COLD AIR INTAKE USED

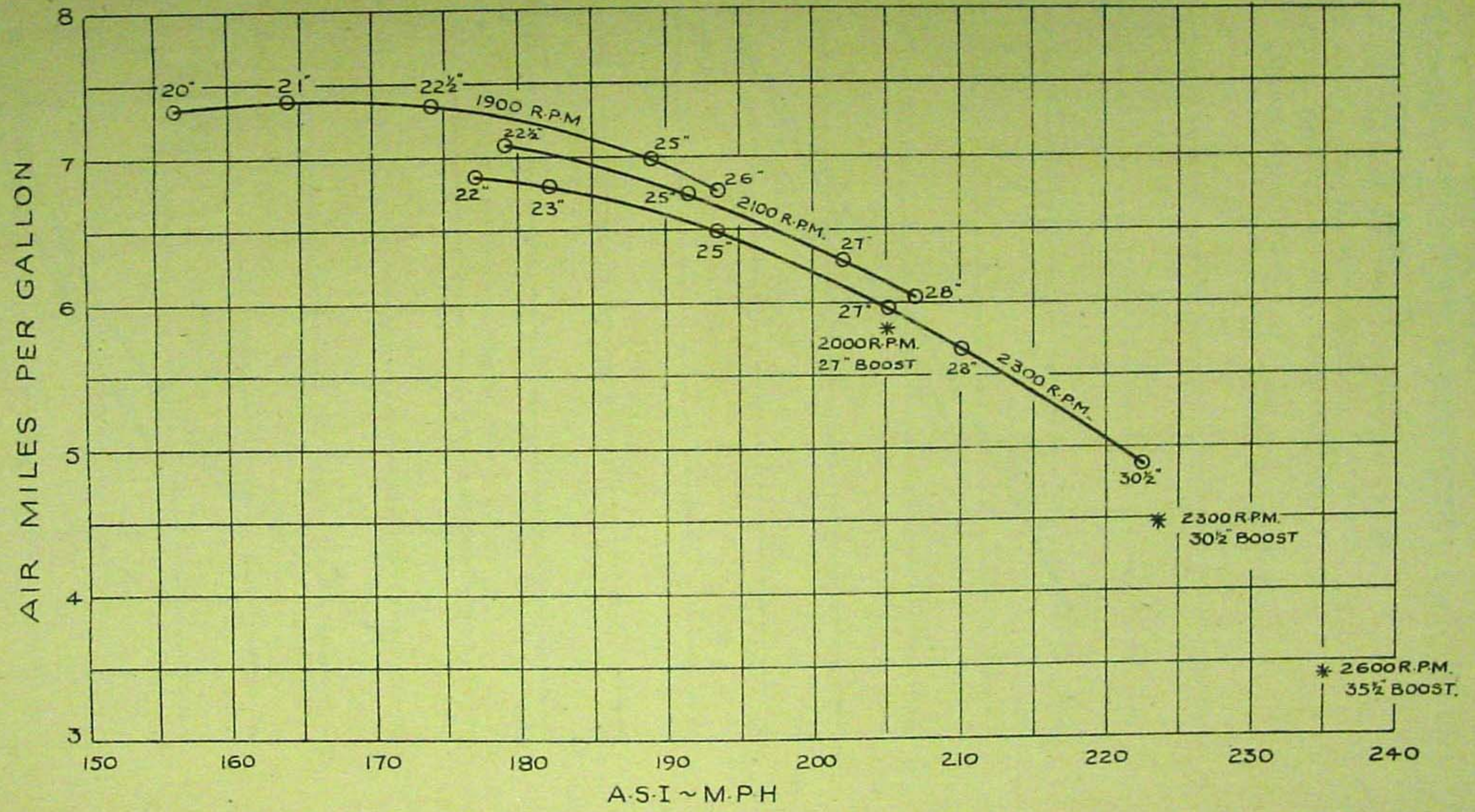


FIG 1

Air miles per Gall.	3.43
Range (miles)	302
Endurance (hours)	1.01

Weak mixture speed were 1900 R.P.M. obtained in comfort.

KITTYHAWK AK 572 FIGS 2 & 3

(ALLISON V-1710 F3-R)

FUEL CONSUMPTION AT 15,000 FEET

WEAK MIXTURE.

STANDARD ATMOSPHERIC CONDITIONS

COLD AIR INTAKE USED

RADIATOR SHUTTERS IN MINIMUM.

DRAG POSITION.

6TH PART OF REPORT NO. A & EE / 783. CURVE NO. 3965 TRACED. *Shubert* DATE OF TEST: 14 / 4 / 42 CHECKED: *DM* APPROV.

