



NEW BRISTOL TYPE TESTS

Improved "Lucifer" Develops 120 B.H.P.

SINCE the first Bristol "Lucifer" engine was produced, work on improvements has been steadily going on, and the engine has now reached a degree of perfection which would be extremely difficult to beat. Quite recently the latest type of "Lucifer," known as the series IV, has passed the Air Ministry's 100 hours' type test with flying colours, with the result that the rated b.h.p. at a normal speed of 1,700 r.p.m. has been increased to 120.

The improvements incorporated in the series IV "Lucifer" have been based on practical experience obtained with the previous model during two years of service in the Bristol Flying School. That the older engine has been giving extremely good results will be gathered when it is stated that during the two years in which this type of engine has been used by the school there has not been a single forced landing due to engine trouble. Considering the very trying conditions obtaining in school work, this is a record of which the Bristol aeroplane Company may well be proud, and bears convincing testimony to the reliability of the "Lucifer." The fact that this engine has only three cylinders results in greater simplicity and ease of maintenance, since there are very few parts requiring inspection or overhaul.

Before the series IV "Lucifer" was put up for the recent Air Ministry tests, each modification was tried out in the air for a considerable flying period, so that by the time the engine commenced its strenuous tests it was by no means an untried proposition, and barring unforeseen mishaps there was every possibility that the engine would have no difficulty in passing the tests. This was, in fact, the case, as the following particulars will indicate.

The tests, which comprised in all 105 hours 10 minutes running, included:—

- 1½ hrs. on Froude Dynamometer .. 1st power curve.
- 40 " " " " .. 108.2 b.h.p. (90 per cent.) at 1,700 r.p.m.
- 50 " hangar 108.2 b.h.p. (90 per cent.) at 1,700 r.p.m.
- 9 " Froude Dynamometer .. 108.2 b.h.p. (90 per cent.) at 1,700 r.p.m.
- 1 hr. on " " .. 120 b.h.p. at 1,700 r.p.m.
- 1 " " " .. high speed at 1,960 r.p.m.
- 10 mins. " " .. slow running at 400 r.p.m.
- 1 hr. " " .. high power 143.2 b.h.p. at 1,870 r.p.m.
- 1½ " " " .. 2nd power curve.

The readings taken during the 100-hour test at 1,700 r.p.m. were:—

Run.	Hours non-stop.	Power at end.	Consumptions.			
			Fuel Gals.		Oil Pints.	
			Gals./Hour.	Pts./B.H.P./Hr.	Pts./Hour.	Pts./B.H.P./Hr.
1	3 & 7*	123.9*	7.89	.582	2.75	.025
2	10	123	7.89	.582	2.75	.025
3	10	123	8.0	.591	4.6	.042
4	10	123	8.0	.591	3.6	.033
5	10	Hangar	8.12	.598	2.6	.024
6	10	"	8.0	.591	4.6	.042
7	10	"	8.02	.592	6.1	.056
8	10	"	7.89	.582	5.1	.047
9	10	"	8.02	.592	4.4	.040
10	10†	131.9	7.88	.581	4.4	.040

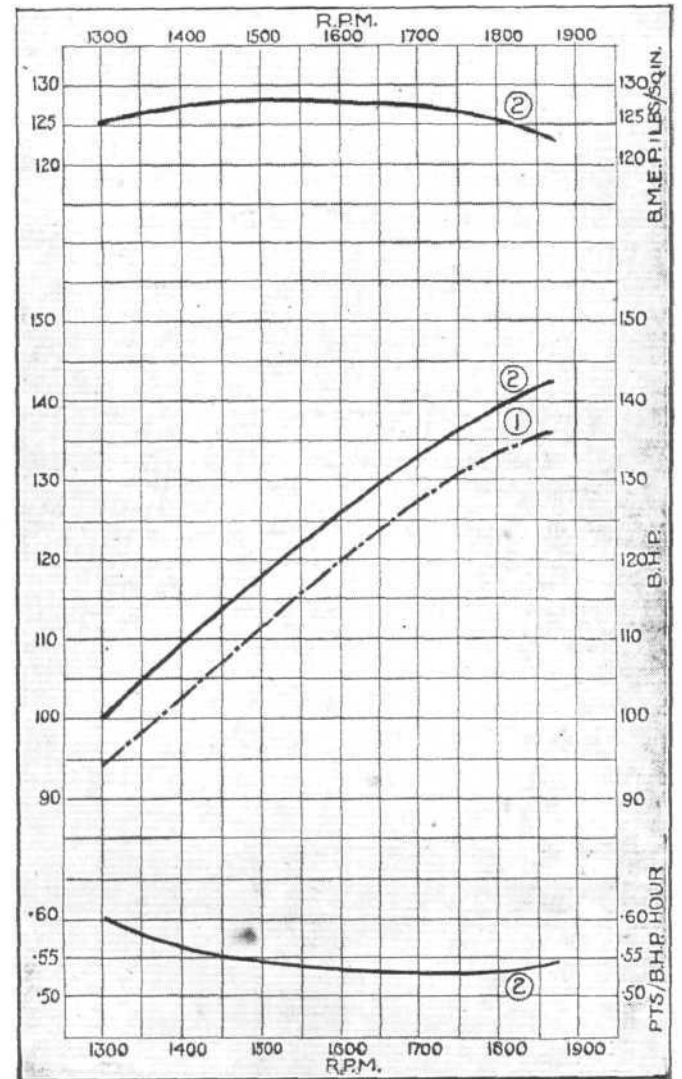
* Test stand Breakdown. † Last hour full throttle.

Throughout the tests the performances of the engine steadily improved, as will be seen from the accompanying power curves taken before and immediately after the 100 hours' running. It will be seen that before the 100 hours' running the engine developed 127 b.h.p. at 1,700 r.p.m., with a consumption of 0.574 pts./b.h.p./hr.; while at 1,870

r.p.m. the power was 136 b.h.p., with a consumption of 0.555 pts./h.p./hr. At the end of the 100 hours' test the engine developed 132.5 b.h.p. at 1,700 r.p.m. and the consumption was 0.535 pts./h.p./hr. At 1,870 r.p.m. the power had increased to 142.3 b.h.p. and the consumption was only 0.540 pts./h.p./hr.

Throughout the period of the 100 hours the average consumption was 7.98 gallons per hour, or 0.590 pts./b.h.p./hr., while the oil consumption averaged 4.1 pts./hr., or 0.038 pts./b.h.p./hr.

After the conclusion of the tests the engine, which had then been running for 105 hours under type test conditions, was stripped for inspection by the representatives of the



NEW BRISTOL "LUCIFER" TYPE TESTS: Curve 1 shows the power before the 100 hours type tests, while curves 2 show power, brake mean effective pressure, and consumption after the 100 hours type tests.

A.I.D. and was found to be in excellent condition, the actual wear on the major components being infinitesimal.

How important are the improvements represented by the series IV "Lucifer" will be realised when it is pointed out that the power at normal speed has been increased from 100 h.p. to 120 h.p., while the reliability is at least as good as that of the earlier model. The power-weight ratio has also been improved upon, being 2.75 lbs./h.p. in the series IV, as compared with the 3.25 lbs. in the series III.

In view of its great simplicity, and its definitely established reliability, the Bristol "Lucifer" IV should be exceptionally useful in school machines. The engine is now provided as standard, with hand turning gear and complete exhaust system.