O.S Max I .29

ENGINE ANALYSIS

NUMBER 36

Outstanding plain-bearing glowplug 5 c.c. from Japan

OS 29

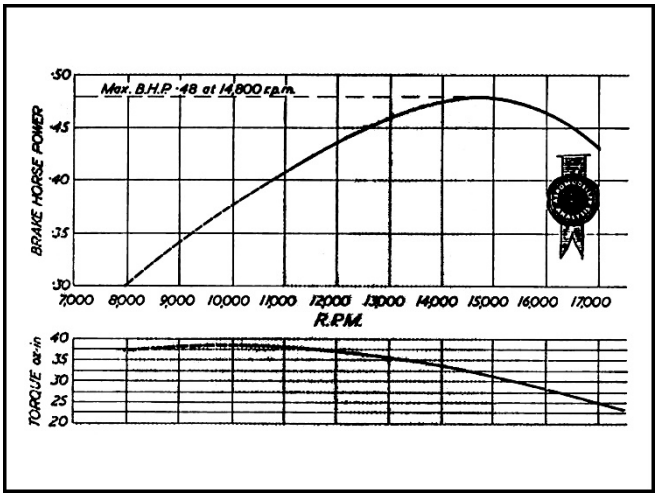
reviewed by *R. H. Warring*

After a Run of the smaller sizes of engines, to come up against a really potent 5 c.c. job for test can be a little shattering, and in this category the O.S. “29” rates with the best both for power and noise output. Frankly it would be invidious to attempt criticism of design, workmanship or performance. It is a first class engine in every respect, even if a bit of a brute to handle.

Mainly these latter remarks are concerned with starting characteristics. The test engine needed flooding through the exhaust port to get any signs of life, and a sharp flick over even on the larger sizes of propellers. The kick back is really vicious and the compression ratio and compression seal good enough for any diesel. As regards piston cylinder fit, m fact, it puts many a contemporary American glow motor to shame. The Japs, some-where along the line, have acquired a lot of “know how” on model engine design and construction and whilst following American general technique, have added a few ideas of their own to good effect.

For what main purpose the O.S. “29” is designed we were not told presumably control-line stunt work? It is a high revving engine producing its peak power in the region of 15,000 r.p.m. which should give wonderful results in free flight power duration, if people do get around to building models that size again. Frankly, though, we would be tempted to “detune” it somewhat if we were using it in a stunt model with a smaller diameter propeller, by decreasing the compression ratio with an additional gasket under the head. We noticed, too, that jhe engine submitted for test had an inserted venturi throat section (located by the spray bar) which is made to be interchangeable for other throat dia¬meters. A smaller throat diameter coupled with reduced compression ratio would undoubtedly tame the O.S. “29” down somewhat as regards starting. But perhaps we were a little put off when our initial attempts at starting produced a backfire and the ejection of solid fuel back out of the intake straight into our face!

Running tests were conducted between a range of 11,000 and 18,000 r.p.m., smooth two-stroking being obtained readily by adjustment of the needle valve after starting very rich in each case. Nothing smaller than an 8-inch diameter propeller was used for hand starting. The engine inevitably “died” unless started very rich and also ran very hot, but it ran steadily and smoothly when properly adjusted.



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It did, however, appear to generate a fair amount of vibration at all speeds. The power output achieved on test could no doubt be improved with more rigid mounting and experimenting to find an optimum fuel mixture, when its performance for a plain bearing engine could be quite phenomenal.

Constructionally the O.S. "29" follows conventional glow motor practice. Only one major casting is involved the crankcase unit, which is bushed with a bronze or brass sleeve for the main bearing. (It is reputed that the bearing life is low on the O.S. "29", which would be the case if this is brass. On the other hand the fit was perfect and there was not the slightest evidence of wear on the test engine at the conclusion of two to three hours running.)

The cylinder is of mild soft steel, machined with thin fins in the conventional American manner. This is a sliding fit and a tight one, too in the crankcase casting, with only a relatively narrow seating area on the transfer passage side. Nevertheless the sealing seems quite satisfactory, the cylinder unit being held down with two long bolts. Four more bolts secure the finned head to the top of the cylinder. Both the head and the crankcase back-plate are light alloy pressure die castings.

The (upper) transfer and exhaust ports are rectangular and of generous area, cut into the cylinder walls diametrically opposed. The lower transfer ports consist of two holes in the cylinder, matching two similar holes in the piston, the transfer passage being provided in the crankcase casting. Transfer and exhaust overlap to a considerable extent, the transfer opening very shortly after the exhaust. The piston is provided with a deflector on the transfer side to direct the incoming mixture, into the head. Nevertheless a considerable proportion of incoming unburnt fuel is ejected through the exhaust, adding to the fuel consumption of an already thirsty engine.

The inlet port timing is also quite extreme, being open for well over 180 degrees. It opens very early long before the transfer is closed. The porting is thus quite obviously designed for efficient high speed operation.

PROPELLER—R.P.M. DATA

Propeller dia. x pitch	*r.p.m.*
9 x 4 (Stant)	13,500
10 x 4 (Stant)	12,000
8 x 4 (Stant)	16,300
8 x 5 (Stant)	15,100
7 x 4 (Stant)	17,600
8 x 8 (Stant T.R.)	13,600
7 x 9 (Stant T.R.)	13,400

Fuel used: methanol 40 per cent.
nitromethane 20 per cent.
Castor 40 per cent.

At lower speeds the O.S. "29" is not so happy about running at all.

The connecting rod appears to be a forging, with a brass or bronze big end bush, drilled through for oil passage. Gudgeon pin diameter is 5 mm. (.196 in.), this being an easy "floating" fit in the cast iron piston. The little end bearing extends the full internal width of the piston, but is not bushed. Fits throughout are excellent. The piston itself is not as light as on some American glow motors of similar size, but is still only just over .1 ounce. It is important when taking this engine apart to reassemble with all the components the design way round.

The crankshaft is quite massive 11 mm. diameter (.434 in.), stepping down to ¼ in. at the threaded front end. All sizes, incidentally, appear to be metric throughout with the exception of the crankshaft thread which is ¼ x 28 American National Fine standard. The crankpin is hollow (drilled through) and the crank web machined away to produce a counterweight. The in. hole through the crankshaft extends past the intake port for lightness, the crankshaft weighing 1 ½ ounces nevertheless. The main bearing fit and finish is just about as perfect as one could hope to achieve, with the shaft a smooth, sliding fit inserted from either end.

The spray bar is mounted right at the bottom of the bell-mouthed intake (cast integral with the crankcase unit), the height of this tube being relatively short.

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The spray bar unit is of brass, with the fuel tube fitting angled back a feature we would like to see on more engines. It certainly means that the fuel line can be laid neatly alongside the engine without kinking. The exterior part of this fitting is nickel plated. The needle valve is mounted on a flexible extension, with coil spring locking inside the thimble. This, again, was another welcome feature since it meant that the needle could be adjusted out of range of the heat and waste oil ejected from the exhaust. Another fore and aft spacing of the mounting bolt holes, practical feature deserving of comment is the wide giving a nice firm base for anchoring the motor securely.

Summarising: an engine where the general standard of design, workmanship and finish is very high; and although a plain bearing engine its performance must be competitive with many racing engines of similar size. Certainly not the sort of engine you want to bench run at home if you want to stay popular with your neighbours and the rest of your family—but one which could undoubtedly win honours on the flying field, in the right hands.