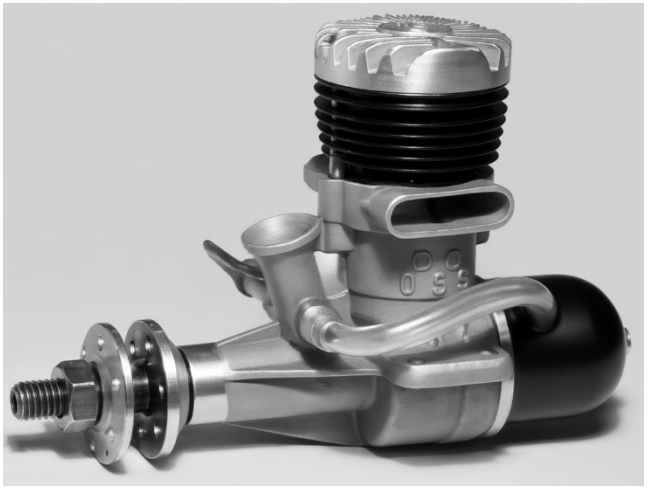
O.S New .099

MA Engine Tests



No. 62. The Japanese O.S. 099

The O.S 099 is the first Japanese made engine to be dealt with in this series. In fact, although we reported on the O.S. 29 model some two years ago in " Accent on Power," this will, so far as we know, be the first full test report on a Japanese model engine to appear in a British publication. In view of the interest attaching to Japanese products following recent publicity given to the Japanese industrial invasion of world markets with all kinds of merchandise, there will, we think, be some interest in their efforts in the miniature engine field.

It would, of course, be foolish to suggest that any conclusions about Japanese engines as a whole could be drawn from a test of one example only. It is worth mentioning, therefore, that the writer has in his possession four other examples of Japanese and that, the standards displayed by these units, it is considered that the O.S. 099 may be assessed as a very fair example of present Japanese production. It does not have such a good specific output as some of the other O.S. built models, nor is it the best finished of Japanese engines, but it runs well and starts extremely easily and, in general, it compares quite favourably with the average European product.

The O.S. 099 is a lightweight, glow-plug ignition, shaft rotary-valve engine of 1.62 c.c. or 0.9g cu. in. capacity. In this respect, it may be said to follow the American trend, but the genera' structure of the engine is not a copy of any Western engine. The unit uses a simple form of reverse-flow scavenged cylinder, employing two diametrically opposed exhaust ports and, between them, two transfer grooves in combination with a flat topped piston and hemispherical head.

The crankcase, rear cover, cylinder-head and prop driver and front plate are die castings of quite good quality. The crankcase embodies twin exhaust ducts in addition to the carburettor intake. A bronze main bearing is fitted and a bronze insert is also provided in the cylinder head for the glow-plug an unfamiliar feature which, however is also to be seen on some other Japanese motors. I he cylinder has integral machined fins and is secured by two long screws which pass through from the cylinder head and screw into lugs on the crank-case at the front and rear. Two more short screws secure the head and cylinder at the sides.

The one piece crankshaft has a crescent-shaped counter-weight and the shaft journal has a diameter of 9/32 in. and is exactly 1 in. long, which is a generous bearing surface for an engine of this capacity and duty. No glow-plug was supplied by the manufacturer with the test engine, although a variety of no less than six different O.S. plugs are listed some with platinum elements for use on 1.5 volts and others with nickel-chrome elements for operation on 2 volts. We believe that the plug most commonly used in Japan is patterned on the original Arden glow-plug and an Arden E.8000s plug was therefore selected for our tests. A Herkimer-O.K. plug was also used satisfactorily in preliminary runs.

O.S New .099

Specification.

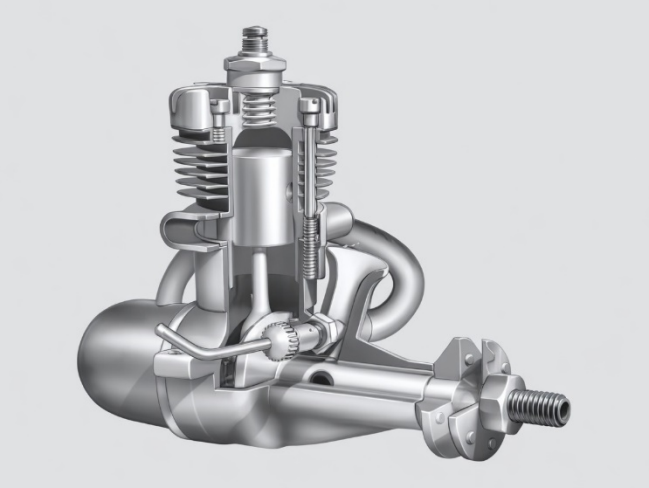
Type: Single-cylinder, air cooled, two stroke cycle, glow-plug ignition. Shaft type rotary induction valve with sub-piston supplementary air induction. Twin exhaust ports and twin transfer passages. Flat crown piston. Centrally disposed glow-plug.

Swept Volume: 1.62 c.c. (.099 cu. in.)
Bore 12.8 m.m. Stroke 12.6 m.m.
Compression Ratio: 7: 1.
Stroke/Bore Ratio: 0.984 : 1.
Weight: 2 ¼ oz.

General Structural Data.
Diecast aluminium alloy crankcase with integral main bearing, air intake and exhaust ducts. Diecast screw in rear cover. Main bearing bronze bushed.
One piece machined steel cylinder with integral cooling fins. Diecast finned aluminium alloy cylinder head secured with four machine screws, two of which pass through cylinder finning into crankcase lugs to secure assembly. Counterbalanced crankshaft. Steel connecting rod. Cast iron lapped piston with solid steel gudgeon-pin pressed in. Diecast propeller driver fitted on crankshaft " flat." Spun aluminium fuel tank, anodised red and mounted on rear cover with single screw. Spray-bar type needle valve assembly. Beam type mounting lugs.

Test Engine Data.
Running time prior to test: 1 hour.
Fuel used: 28 per cent. B.D.H. nitromethane, 28 per cent, castor-oil B.P., 45 per cent, power blending methanol.
Ignition equipment used: Arden E.8000s glow-plug, 1.6 volts for starting.

Performance.
One of the O.S. 099's really good points is its extremely easy starting. " Guesstimating " the required needle setting, we had the engine running within a few seconds of filling the tank and connecting up the glow-plug to the battery. Thereafter the engine would re-start instantly and, when warmed up, starting really was " first, flick." Priming through the ports is not necessary at any time, incidentally. From



cold we merely choked the intake for three or four times. The needle valve setting on the test engine was approximately 2 ¾ turns open and varied only slightly over the entire r.p.m. range tested. The adjustment was, however, fairly critical for optimum performance, although the engine will keep going despite considerable deviation from the best setting.

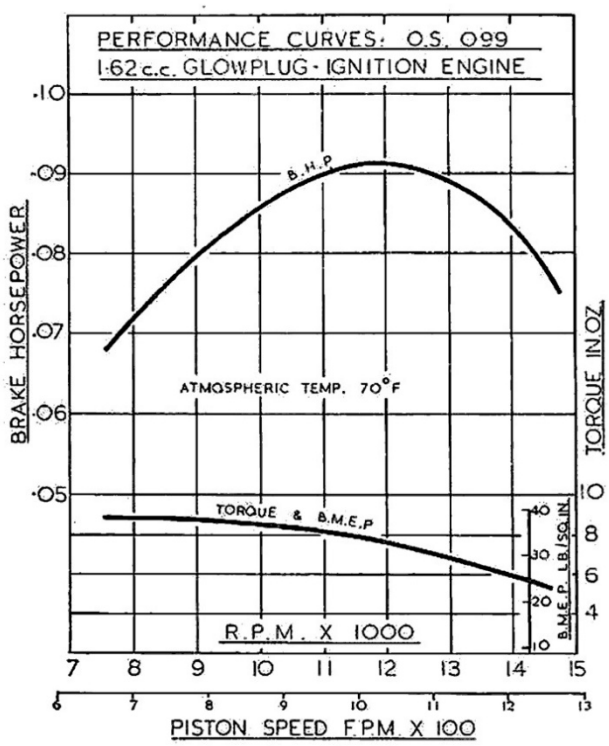
As with so many modern high speed small engines, the O.S. is only really happy when allowed to " rev." Actually, despite the fact that the 099 peaks no higher than 12,000 r.p.m., it is at 12,000/15,000 r.p.m. that the engine runs most steadily. The maximum load advisable, we would say, is one which produces a speed of not less than 10,000 r.p.m. We note that the makers recommend 7x4, and 8 x 2 ½ props, which would, in fact, correspond to speeds of 10,000 r.p.m., or slightly above in the air, and this suggests that our findings are, in fact, representative of these engines.

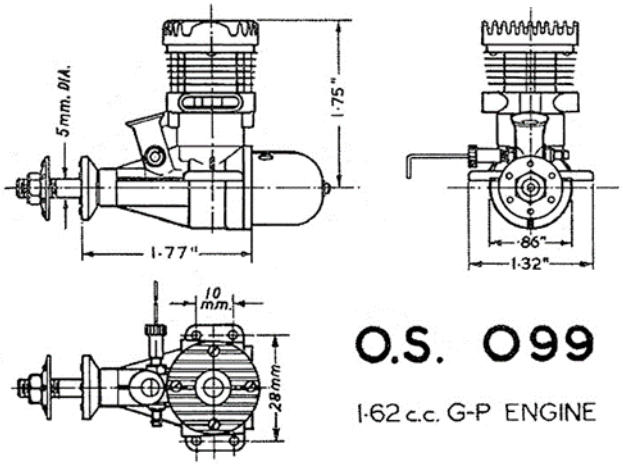
As we said earlier, the 099 does not produce such high power, relative to its capacity, as some of the other O.S. engines, but the maximum b.h.p. of .091 indicated, while not as high as is being realised with 1.5 c.c. class competition diesels is quite acceptable for a lightweight engine which, by reason of its easy handling characteristics, should be of particular interest to newcomers to power flying who, of course, are not concerned with obtaining absolute maximum power.

Power/weight ratio: (as tested) 0.65 b.h.p./lb.
Specific output: (as tested) 56 b.h.p./lb.

Model Aircraft Magazine August 1954 by Hlsat

O.S New .099





O.S. 099

1·62 c.c. G-P ENGINE

Model Aircraft Magazine August 1954 by Hlsat

O.S New .099