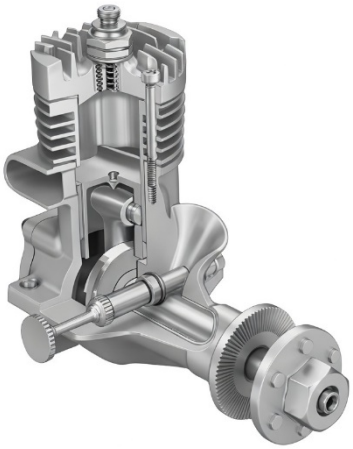
O.S Max I - .15

Engine Tests

No. 80. The Japanese O.S. Max-I

With the recent F.A.I. decision to adopt the 2.5 c.c. class engine as the official International class for all models (i.e. not merely F/F power duration as previously), there is bound to be a further increase in the attention being paid to this already popular sized engine. We may expect to see renewed efforts by manufacturers to further improve performance, and competition minded modelers in all countries will doubtless be eager to learn of the latest 2.5 engines from abroad and to be informed of their capabilities.

During the past two or three years, that is, during the time that the 2.5 c.c. class has become widely adopted internationally, the " M.A." Engine Tests have included all the most successful 2.5 c.c. units, both British and foreign and it will be our policy to continue to give emphasis to the International class in future tests.



In the past we have dealt with 2.5 c.c. engines from Great Britain, Italy, the U.S.A., Holland, Norway, Australia and Germany. This month, for the first time, we are dealing with a Japanese International class engine. This is the new O.S. Max-I 0.15 glow-plug unit, built by the Ogawa Model Mfg. Co. Ltd., of Osaka, and which is now being exported to the U.S.A, and other countries and may, therefore, be seen in future international competitions.

The Max-I 0.15 is the best 2.5 c.c. engine being manufactured in Japan at the present time. The Ogawa Model Mfg. Co. are old-established model engine manufacturers, having built their first engines nearly 20 years ago and their present products, particulary the Max-I series of engines which are at present available in three different capacities, are modem designs, soundly made and of good performance.

In general, the design of the Max-I follows current American practice, but with some differences. For instance, somewhat more conservative cylinder porting is used, than is to be found on some of the more extreme examples of loop scavenged high speed glow-plug engines. On the other hand, the rotary valve timing is more generous and the extra large main bearing port gives a total induction period of over 200 deg. of crank angle.

Constructionally, the engine is pleasing, with excellent diecastings, matt finished and with polished edges. The integral cylinder fins are blued in order to provide a certain amount of protection against rusting. The beautifully diecast cylinder head is retained by six Phillips head screws, two of which pass through into

O.S Max I - .15

the crankcase castings to secure the entire cylinder assembly.

As on most Japanese glow-plug engines, a cast in threaded bronze bush is used for the glow-plug hole. Also bronze bushed is the connecting rod big-end (an unusual feature on a relatively small engine) and the crankshaft main bearing. Incidentally, all bushings on Japanese engines appear to be of a rather yellow bronze and, presumably, the alloy used is of a lower copper content than the normal bearing bronzes employed in British, American and most other engines.

As delivered, the Max-I is equipped with a 5.5 mm. choke tube and this was retained during our tests. With the choke tube removed, the venturi diameter is increased to 6.5 mm. which, provided that the cylinder porting proves adequate, may be expected to extend the top end performance of the engine.

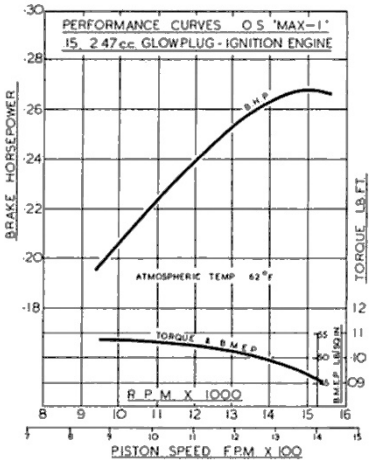
Despite its solid appearance, the Max-I 0.15 is of notably moderate weight and this helps to give it one of the best power-to-weight ratios yet realised on the 2.5 c.c. class.

Specification.

Type: Single-cylinder, air-cooled, loop-scavenged two stroke cycle, glow-plug ignition. Shaft type rotary valve induction. No supplementary air induction. Lapped piston with baffle.
Swept Volume: 2.47 c.c. (0.151 cu. in.)
Bore: 15 mm. Stroke: 14 mm.
Stroke/Bore Ratio: 0.933 : 1.
Weight: 3.5 oz.

General Structural Data.

Diecast aluminium alloy crankcase and main bearing housing with integral carburettor intake and mounting lugs. Diecast rear cover secured with four Phillips head machine screws. Counter balanced alloy steel crankshaft with rectangular induction port and running in bronze main bearing. Fully machined steel cylinder with integral cooling fins blued against corrosion. Lightweight lapped piston. Forged connecting rod, with bronze big end bearing. Brass end pads on gudgeon pin. Diecast aluminium alloy



with bronze big end bearing. Brass end-pads on gudgeon pin. Diecast aluminium alloy cylinder head contoured to suit piston deflector and with central plug location. Aluminium alloy prop driver keyed to flat on shaft. Brass spray-bar type needle-valve assembly. Provision made for installation of second needle valve for two speed operation. Beam type mounting lugs.

Test Engine Data.

Running time prior to test: i ' hours.

Fuel used: 50 per cent. Blending Methanol, 25 per cent. B.D.H. Nitro-methane, 25 per cent. Duckham's Racing Castor-Oil.

Ignition equipment used: O.K. long- reach glowplug. 1.6 volts used to start.

Performance.

The Max-I is a pleasant engine to handle. It starts well, using the standard glow-plug engine procedure of an exhaust prime when starting from cold and a choked preliminary flick when restarting hot. It is not fussy about the sort of fuel it consumes and will run on economical methanol/castor mixes as well as on the more potent nitro- paraffin-doped blends.

The best performances are obtained at r.p.rn. well into the 'teens and there is little point in loading the engine for anything less than a five figure speed. However, the Max-I is relatively flexible and delivers useful torque figures at the more moderate

O.S Max I - .15

revolutions as well as running quite evenly when four-stroking at reduced speed on a rich mixture. Thus, the provision for an extra needle valve, suggesting R/C use for this normally high-speed engine, is by no means incongruous and the unit should prove quite tractable in its two- speed version.

The maximum torque delivered was very good, being the equivalent of a b.m.e.p. of 53 Ib./.sq. in. at 10,000 r.p.rn., which is above average for the glow-plug engine of under 0.2 cu. in. capacity. The torque curve declines steadily as r.p.rn. are increased, but b.m.e.p. does not drop below 50 Ib./sq. in. until14,000 r.p.rn. are approached, so that the peak output is realised in the region of 15,000 r.p.rn. Actual maximum b.h.p. obtained on test was slightly under 0.27 which, of course, is very good.

One feature we would like to see changed (not only on this engine but on others using similar methods) is the manner in which the alloy prop driver is hinged to a flat on the crankshaft. In-variably, in time, the hole in the driver becomes enlarged and gives rise to backlash. A preferred system is the use of mating tapers. There is, however, very little else about the Max-t 0.15 with which one can find legitimate cause for complaint.

Power/weight ratio (as tested): 1.23 b.h.p./lb.
Specific output (as tested): 108 b.h.p./litre.