

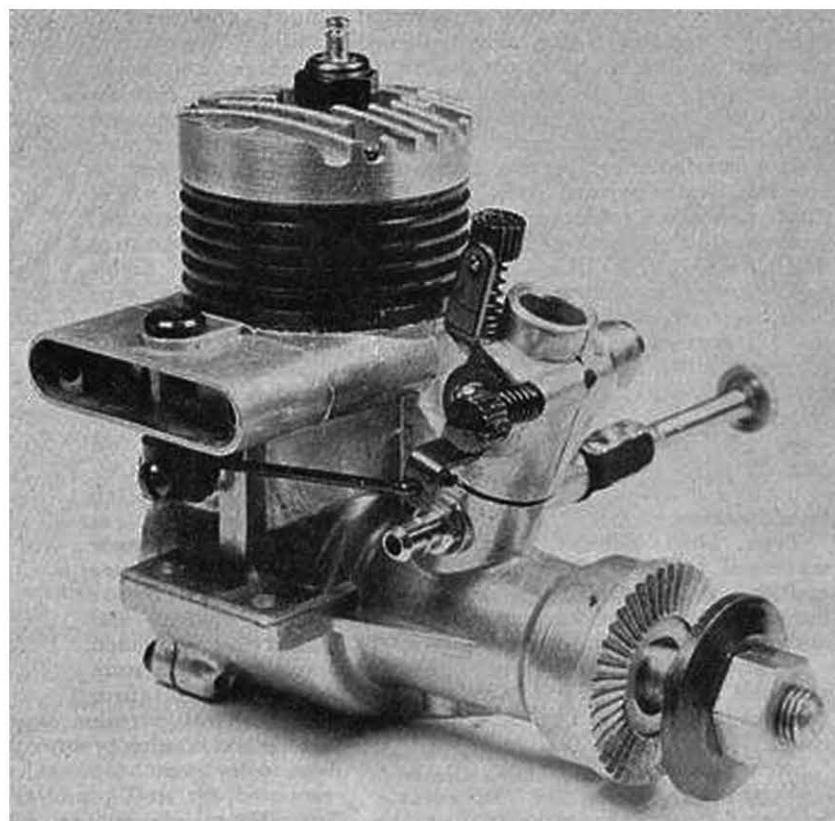
Peter Chinn Tests the . . .

O.S.

MAX .19 R/C

GLOW PLUG ENGINE

**“ . . . Outstanding
throttling qualities . . .
. . . handling characteristics
without vices.”**



ONE of the most successful smaller R/C engines and a favourite with exponents of the single-channel model in America, has been the 2.48 c.c. O.S. Max .15 glow engine in its throttle equipped version. It was, no doubt, with the object of maintaining their good standing in the field of small to medium size R/C engines, that the O.S. company introduced, last year, the Max .19 R/C motor that is the subject of our test report this month.

The Max .19 is generally similar in design to the current series III Max .15 but is, nevertheless, an entirely new engine using all new parts and is not merely an increased displacement version of the .15. Still a compact engine, it is, however, a little larger all round and about an ounce heavier than the .15. It is also slightly more expensive.

Compared with the .15 R/C, the .19 R/C has the advantage of offering more power on bigger props and better throttling due to the adoption of a new throttle assembly of unusual design. The effectiveness of the throttle is, in fact, one of the outstanding features of this engine. Most of the smaller type R/C engines use relatively simple, if not crude, speed-control systems and may have an effective "idling" speed no less than half that of the "full-throttle" revolutions on the same prop—scarcely sufficient to make engine-on landings practicable, for example. In contrast, the O.S. .19 throttle, on test, dropped an 11,000 r.p.m. high speed, to a steady 2,000-2,100 in test after test. Moreover, the engine could be left to idle for several minutes, then the throttle snapped open

and the motor would pick up again every time.

No other small R/C engine and very few large ones, in fact, have equalled the effective throttle range on test of the Max .19 R/C. It is interesting to note that the same throttle design has now been adopted for the Max-III .15 R/C (which previously used an assembly similar to that of the Max-III .29 and .35 R/C engines). The O.S. .19 speed control system consists of a barrel type carburettor throttle linked to an exhaust valve. In this respect it is similar to many other R/C engines. However, design details are a little different.

The carburettor body, which plugs into the intake boss and is sealed by a rubber ring, is an alloy die-casting. It is bored 0.305 in. for the machined brass throttle barrel. The intake converges to a 0.230 in. dia. where it meets the throttle barrel (which is bored for a choke diameter of 0.175 in.) and immediately below the barrel, is reduced to 0.215 in. Thus, the air intake opening is always a little wider than the opening through which gas is admitted to the rotary-valve, a precaution against any tendency for the mixture to richen when the throttle is closed. Supplementing this is an air-bleed hole which comes into use almost immediately the throttle begins to close. The amount of air admitted through the bleed hole can be controlled by an adjusting screw.

The carburettor is held in place by the needle-valve assembly which, at first sight, appears to be a spraybar type. In fact, although fuel enters the bar and

passes through it, it is not actually released into the engine at this point. Instead, after being metered by the needle and jet, it is conveyed through a short vertical pipe and thence, via a miniature union, to a jet which feeds directly into the throttle barrel. The barrel, incidentally, is provided with an adjustable stop-screw to set the idling speed and a blued steel throttle control arm is attached to it by means of a screw. Incidentally, this screw needs to be kept really tight, as it is otherwise liable to loosen through vibration. This also applies to the set screw in the retaining collar on the exhaust damper unit. The exhaust unit is a smaller version of that fitted to the O.S. 49 engine, the damper being in the form of a vertically pivoted vane operating in a separate diecast exhaust extension.

As one can gather from the foregoing, the throttle assembly is relatively complex for a small engine (in fact, counting all screws etc., it contains no less than 28 separate parts) but, judging by its performance, seems to be worth the extra complication. Unlike some other elaborate set-ups, the Max .19 throttle was not, on test, tricky to adjust. On the contrary, although we had had the complete assembly stripped down to its last screw to inspect it before testing and had, therefore, lost any precise adjustments that might have been made at the factory, we spent no more than four or five minutes setting up the various adjustments to achieve the speed range mentioned earlier.

The rest of the engine follows the general design and construction of the Max-III .15

fairly closely. The crankcase is the usual O.S. clean pressure casting. The hardened crankshaft, substantially heavier than in the .15, has a 10.5 mm. dia. journal, a 7.5 mm. gas passage and a large rectangular valve port, radiussed at the corners. It registers with a parallel sided bearing aperture to give rapid valve opening and closing. The intake period is a generous 195 deg., actual measured valve timing being 30 deg. ABDC to 30 deg. ATDC.

The engine is of attractive appearance, has the usual pleasing refinements found on O.S. engines—such as the comfortable-to-use, flexible needle-valve with plated parts—and workmanship throughout is good. O.S. engines are distributed in the U.K., of course, by the Keilkraft organisation.

Specification

Type: Single cylinder, air-cooled, loop-scavenged two-stroke cycle, glowplug ignition. Crankshaft type rotary-valve induction. Coupled carburettor throttle and exhaust restrictor.

Bore: 16.6 mm. (0.6535 in.). Stroke: 14.6 mm. (0.5748 in.).

Swept Volume: 3.159 c.c. or 0.1928 cu. in.

Stroke/Bore Ratio: 0.88 : 1.

Weight: 5.7 oz.

General Structural Data

Pressure diecast aluminium alloy crankcase unit with cast-in phosphor-bronze main bearing. Counterbalanced, hardened crankshaft with 10.5 mm. dia. journal and 5 mm. crankpin. Ground and lapped steel cylinder with integral cooling fins and

blued anti-corrosion finish. Diecast and machined aluminium alloy finned cylinder head attached with six Phillips screws, three extra long to secure complete assembly to crankcase. Soft aluminium head gasket. Lightweight, baffle type piston of mechanite c.i. with tubular fully-floating 4 mm. dia. hardened gudgeon-pin having brass end-pads. Machined aluminium alloy connecting-rod with lubrication hole at lower end. Pressure diecast carburettor body with brass throttle barrel and blued steel and plated brass fittings. Pressure diecast aluminium alloy exhaust extension attached with two screws and housing pressure diecast aluminium alloy vane type exhaust restrictor mounted on steel pin. (Entire throttle assembly may be removed and engine converted to standard type engine by substituting standard venturi and needle-valve assembly available.) Beam mounting.

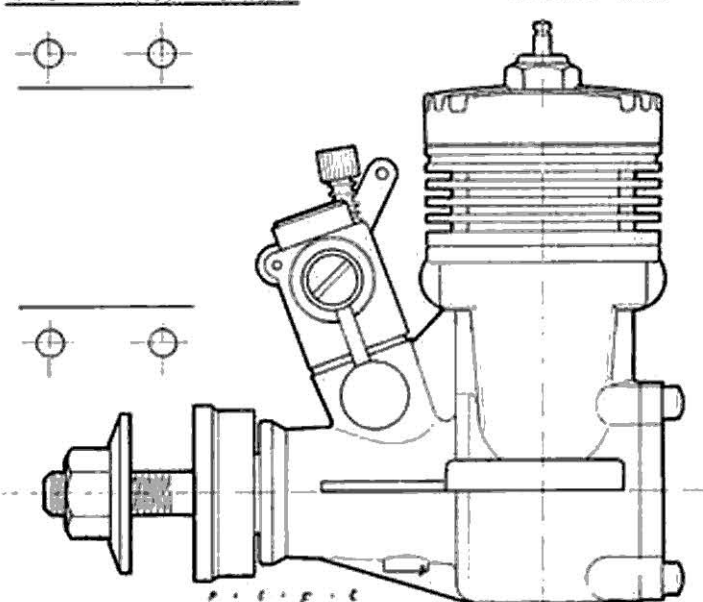
Test Conditions

Running time prior to test: 3 hours.

Fuel used: 70 per cent. methanol, 25

O.S. MAX 19 R/C

ACTUAL SIZE



per cent. Duckham's Racing Castor-oil, 5 per cent. nitromethane.

Ignition plug used: O.S. No. 6 shielded type.

Air temperature: 8 deg. C. (46 deg. F.).

Barometer: 29.3 in. Hg.

Performance

We have already commented, at length, on the outstandingly good throttling qualities encountered with this engine. It remains only to say something about the general handling characteristics and power output of the Max .19 F/C.

Starting, if not quite so instantaneous as on the Max-III .15 tested last year, was generally good.

Handling characteristics were without vices, the engine remained as easy to start on an 8 x 4 prop as on an 11 x 5. Best prop size for R/C, we would suggest, would be a 9 x 4 (which the engine turned at 11,300 r.p.m. static) with 10 x 4 (9,600) and 9 x 5 (10,400) as possible alternatives. On all these, the flywheel effect was sufficient to allow safe idling down to 2,000-2,100 r.p.m. On 8 in. dia. props, safe idling went up to over 2,500, added to which full throttle r.p.m. would tend to run past the peaking speed in the air.

On the test rig, the Max .19 R/C produced a peak output of 0.275 b.h.p. at 13,000-13,500 r.p.m. and a maximum torque of 27 oz. in. at 7,000 r.p.m. (55 lb./sq. in. b.m.e.p.) each of which is very good, taking into account the use of mild (5 per cent. nitro) fuel. The use of such a mixture is recommended by the makers, but a more powerful blend can be used if greater power is called for. We checked the Max .19 R/C on K & B Supersonic-1000 fuel and raised the r.p.m. by 800 on a 9 x 4 Tornado prop.

Power/Weight Ratio (as tested): 0.77 b.h.p./lb.

Specific Output (as tested): 87 b.h.p./litre.

