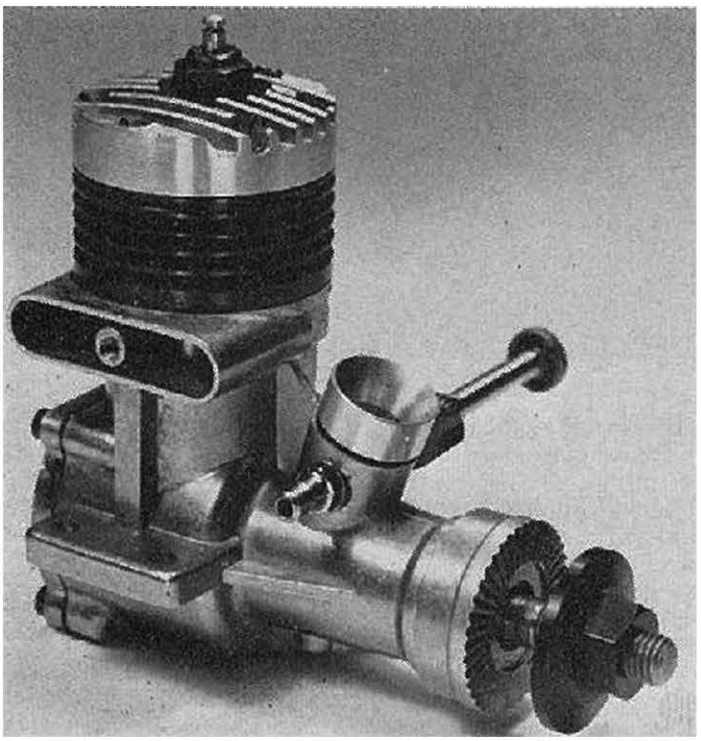
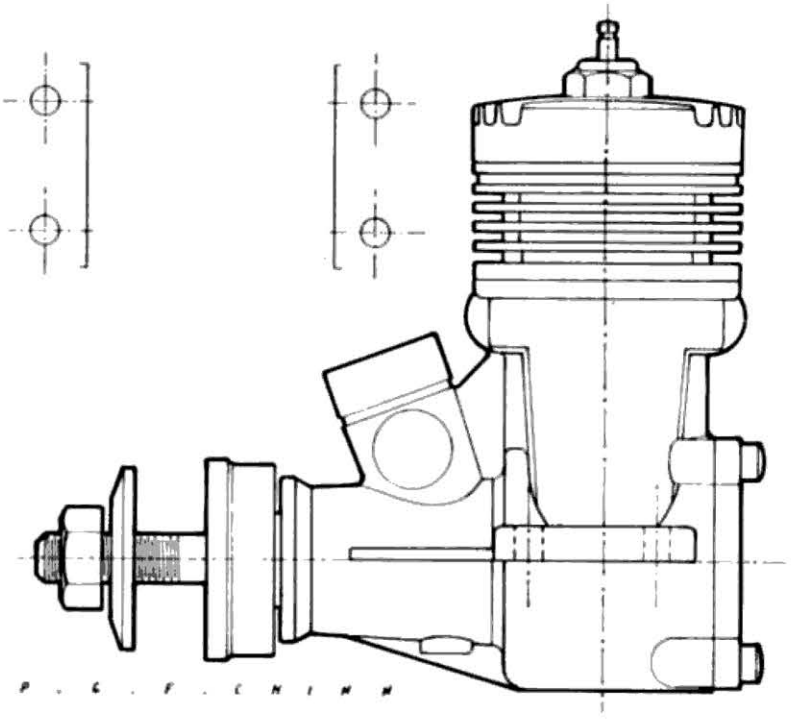
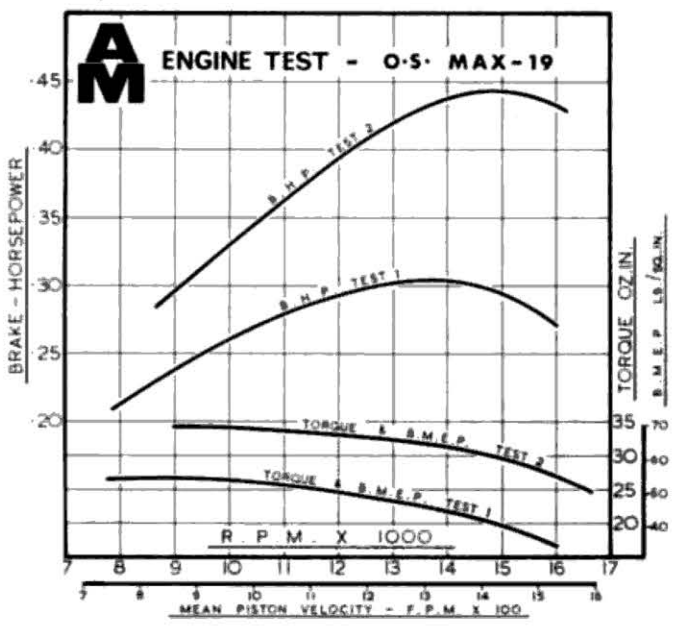




ENGINE TEST by Peter Chinn O.S.19

THE O.S.MAX-19 HAS, for many years, been one of the most popular motors in the O.S. range. Originally introduced in 1962, the Max-19 was the O.S. company's first venture into the .19 cu. in. capacity group and is now, in both standard and R/C versions, among the most widely accepted of all current engines in this useful intermediate size.

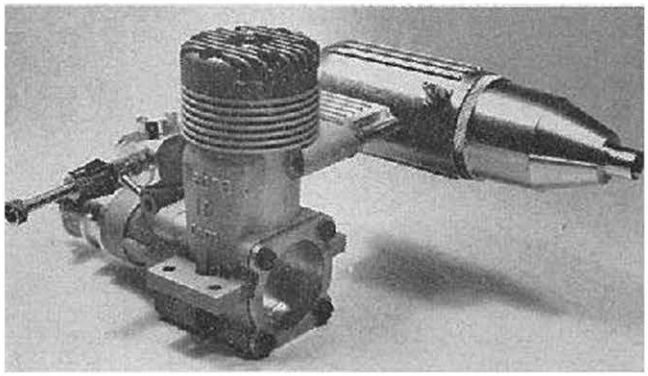
Various minor improvements have been incorporated in the engine over the years but, basically, it has remained unaltered in seven years of production. Actually, a successor to the present Max-19 was planned some time ago by the manufacturer. With the same bore and stroke as the present 19, prototype units have a one-piece cylinder/crankcase casting like other recent O.S engines and resemble the present S.30 model in design. However, with the demand for Max-19's still far in excess of current production capacity and in view of the factory's present preoccupation with other more urgent matters (such as their new Wankel type rotary piston engine), it may be some time yet before the Max-S.20 (as it will be called) reaches the production stage.



Among the features that are responsible for the Max-19's popularity, one would assume that its light weight, compact size and neat, well-engineered appearance must influence many purchasers, while those who know the engine by repute, or previous experience, probably choose it also for its lively performance, easy handling and flexibility (plus, in the case of the R/C version, exceptionally good throttle control).

If there is one area in which O.S. owners in the U.K. have sometimes had cause for complaint, it has been in the matter of the availability of spare parts – especially minor parts susceptible to crash damage, such as needle-valve assemblies. This is something that is now receiving the attention of Keilkraft, the British O.S. distributors, and the long delays that a few O.S. owners have suffered should, from now on, be a thing of the past.

One of the attractions of the Max-19 is that it is an extremely versatile engine which the user can employ to power a wide variety of models, should his finances or inclinations so dictate. As supplied, the engine comes with two venturi inserts. With the smaller of these, the 19 has very good fuel suction and makes an excellent power unit for medium sized control-line stunt models. With the larger one, more power is developed and, especially with a hotter fuel, the 19 offers a very good power/weight ratio for open type free-flight models. With the appropriate O.S. throttle type carburettor, in place of the existing needle-valve and venturi, the engine can be instantly converted into a first class R/C engine for single-channel or small multi-channel radio-controlled models. Finally,



O.S. Max 19 with Jetstream type S silencer.

a complete set of marine parts are obtainable to enable the engine to be adapted to model power-boat use.

In design, the Max-19 is fairly orthodox and is generally similar to the smaller Max-III 15. A generously dimensioned crankshaft runs in a bronze main bearing and a lapped Meehanite piston is used in conjunction with a one-piece cylinder with integral cooling fins. Skirt ports are incorporated in the piston and cylinder and the combustion chamber is of a shallow hemispherical pattern with a small squish area. The exhaust period is 138 deg., and the transfer period 114 deg., of crank angle. The shaft type rotary-valve opens early at 20 deg. ABDC and closes at 40 deg. ATDC.

Performance

There is, as our performance graph indicates, quite a big variation in the power output of the Max-19 depending on the type of fuel used, the venturi size and on whether the silencer is fitted or not.

Our *first* tests, after running-in, were conducted on the engine with the 'stunt' (small size) venturi, plus the standard O.S. small size silencer and running on a mild fuel containing 5 per cent nitromethane. We experimented by first substituting the larger venturi (this liberated another 250 r.p.m. on an 8 x 5 prop which was turned at 13,400 r.p.m.) then by removing the silencer (another 700 r.p.m.) and finally by substituting 30 per cent nitro fuel (another 900 r.p.m.). In this *final* 'all stops out' condition, the power increase, as confirmed by the output curves, was over 45 per cent. This, of course, was still with the engine on suction feed. Conceivably, an even higher peak output could be realised (in such installations as would suit such a set-up) with the venturi insert discarded and with the engine running on a pressurised feed of even hotter fuel.

However, interesting as this may sound, the Max-19 is not really intended as a racing engine and of greater importance to the average user is the question of performance available in standard trim on suitable props. We therefore ran some prop tests on the engine using standard KK 'Methanex' fuel. With the 7 mm. venturi and standard silencer, we obtained 10,800 r.p.m. on a 9 x 5 Top-Flite wood, 11,500 on a 9 x 4 Tornado nylon, 12,500 on an 8 x 6 Power-Prop and 13,300 on an 8 x 5 Top-Flite. There is no point in using a prop smaller than an 8 x 5 as the engine will obviously be accelerating well past its peak in the air. On the other hand, the Max-19 developed quite useful low speed torque and could use (with, for example, a larger scale-type model) a slightly bigger prop than those mentioned. Our test engine turned up a useful 10,400 r.p.m. on a 10 x 3½ Top-Flite nylon and a very good 8,500 r.p.m. on a 10 x 6 Tornado nylon.

Power/Weight Ratio

0.83 b.h.p./lb. (Test 1). 1.38 b.h.p./lb. (Test 2).

Specific Output

96 b.h.p./litre (Test 1). 139 b.h.p./litre (Test 2).

SPECIFICATION

Type: Single cylinder, aircooled glowplug ignition, two-stroke with shaft rotary-valve induction and bronze bushed main bearing.
Bore: 16.6 mm. (0.6535 in.)
Stroke: 14.6 mm. (0.5748 in.)
Swept Volume: 3.159 c.c. (0.1928 cu. in.)
Stroke/Bore Ratio: 0.88:1
Weight: 144 grammes – 5.08 oz. (less silencer)
167 grammes – 5.89 oz. (including standard and extension duct)
General Structural Data
Pressure diecast aluminium alloy *crankcase* with cast-in phosphor-bronze main bearing. One-piece counterbalanced hardened steel *crankshaft* with 10.5 mm. dia. main journal, 7.7 mm. dia. gas passage and 4.5 mm. dia. tubular crankpin. Ground and tapped steel *cylinder* with integral cooling fins and blued anti-corrosive finish. Pressure diecast and machined aluminium alloy *cylinder-head* with cast-in brass thread insert for glowplug. Head attached with six Phillips screws, three extra long and passing through fins to secure complete cylinder assembly to crankcase. Soft aluminium .015 in. head gasket. Rubber/asbestos cylinder base gasket. Lapped Meehanite cast-iron *piston* with flat crown and straight baffle with fillet radii each side at base. Piston dia. relieved .001 in. for 1.0 mm. below crown. Two 5 mm. dia. skirt transfer ports in piston and cylinder. Fully floating 3.9 mm. dia. hardened tubular *gudgeon-pin* with brass pads. Machined aluminium alloy *connecting-rod* with oil hole at big end. Two interchangeable machined aluminium alloy carburettor *venturi inserts* (one 5.5 mm. bore; one 7.0 mm. bore) retained by plated brass *spraybar assembly*. Pressure diecast aluminium alloy counterbalanced prop driver. Steel prop retaining washer and hexagon nut with blued finish. Pressure diecast aluminium alloy crankcase backplate retained with four Phillips screws. Beam mounting lugs.

OPTIONAL EXTRAS
(a) O.S. Jetstream Type 'S' expansion chamber silencer. Weight 23 grammes – 0.81 oz. (b) AMA safety pattern spinner nut. (c) R/C type carburettor. (d) Marine flywheel. (c) Marine conversion set for watercooling cylinder head and crankcase. (f) Marine universal-joint drive coupling.

TEST CONDITIONS
Running time prior to test: 1 hour.
Fuels used:
Test No. 1: 5 per cent pure nitromethane, 25 per cent Duckhams racing castor-oil, 70 per cent I.C.I. methanol.
Test No. 2: 30 per cent pure nitromethane, 25 per cent Duckhams racing castor-oil, 45 per cent I.C.I. methanol.
Venturi insert used:
Test No. 1: Small size (5.5 mm.) *Test No. 2:* Large size (7.0 mm.)
Silencer used
Test No. 1: O.S. Jetstream Type S with extension duct. *Test No. 2:* No silencer.
Air Temperature: 52 deg.F. **Barometer:** 29.6 in. Hg.