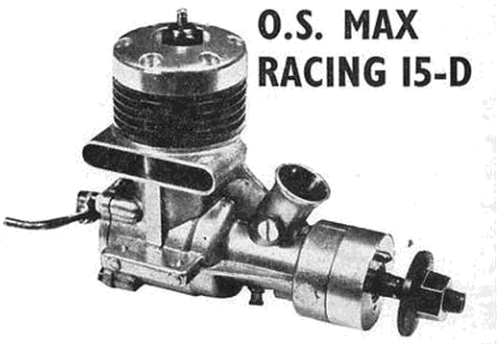
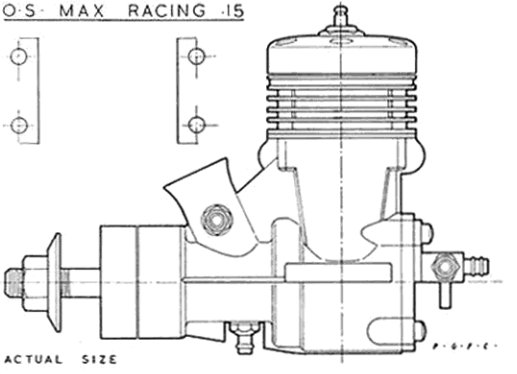
TWO OUTSTANDING INTERNATIONAL CLASS

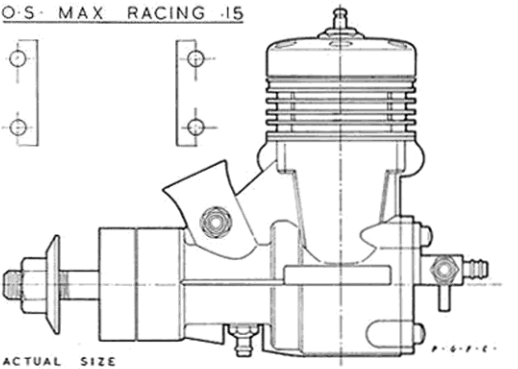
2·5 c.c. RACING GLOWPLUG MOTORS



O.S. MAX RACING 15-D

IN last month's issue we dealt with two of the leading 2.5 c.c. contest engines currently available: the latest factory-modified British Oliver Tiger Mk. 3 and the American Cox Tee-Dee 15. We now turn to two very powerful contributions from Italy and Japan: the 1961 Super-Tigre G.20 and the O.S. Max-D 15 racing glow engines.





O.S. Max Racing 15 2.48 c.c. Glowplug Engine

This impressive engine first appeared some 18 months ago, but, due to the O.S. company's manufacturing capacity being fully occupied in producing their existing range of engines, has only just reached the stage where regular production is getting under way.

Meanwhile, a few small batches of engines have been produced and six examples have, during the past three months, reached the U.K. Marking the first appearance of a Max Racing 15 in this country, George French used one of these to clearly top the British team selection trials for the 1961 World F/F Power Championships. After being the only competitor to score five maximums in the first round, he had only to make four flights in the second to be certain of top team placing.

The O.S. Max-D 15 Racing Glow (to give it its official factory title) is based on the crankcase unit of the somewhat less successful Max-D 15 diesel—hence the "Max-D" designation. The two engines are, however, totally unrelated as regards performance and handling qualities, the glow engine being vastly superior in every respect.

The O.S. Racing 15 is, of course, a twin-ball-bearing, shaft valve motor. The shaft has a diameter of 10.5 mm., which is the largest journal of any ball-bearing supported glow 2.5 shaft to date, and thereby permits the use of a 7.5 mm. (0.295 in.) gas passage and a generous valve port without risk of physically weakening the shaft. As on other recent high performance shaft valve glow engines, the valve port and bearing aperture have parallel sides to promote quick opening and closing of the induction cycle. Measured intake timing is 35 deg. ABDC to 45 deg. ATDC. Forward of the 10.5 mm. main journal, the shaft steps down to 6 mm. for the front ball-bearing and machined alloy drive hub. An unusual feature, the drive hub has eight 4 mm. dia. holes drilled in its rear face, half of which are lead filled to provide counterbalancing in addition to the normal counterbalanced shaft web. The rear face of the hub is then relieved to fit inside the front bearing housing to provide additional protection for the sealed front bearing. Both bearings, incidentally, are extremely smooth and free running.

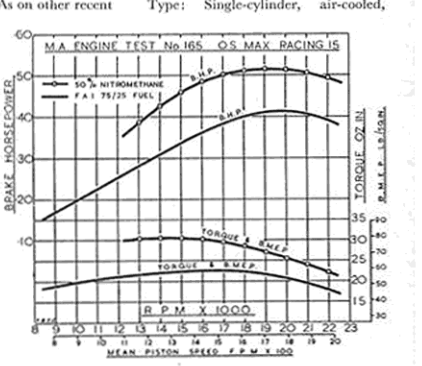
The finely finished cylinder is typically O.S. It has integral cooling fins and a pair of 4.5 mm. dia. skirt transfer ports which register with appropriately positioned ports in the piston skirt. An all-machined alloy head is used, having an offset plug position (transfer side) and a soft aluminium gasket. The piston is basically that of the standard Max-II 15 glow engine and has a filleted baffle and a 3.5 mm. gudgeon-pin with brass end pads. The piston skirt is relieved 0.001 in. below the gudgeon-pin.

The Max Racing 15 is intended for operation on pressure feed only. A shaft valve controlled pressure fitting is installed in the bottom of the bearing housing and no choke insert or spraybar is fitted, the venturi sectioned carburettor having a 9 mm. dia. throat into which a fixed jet is fitted on the left-hand side. The needle-valve is separately located at the rear of the engine and meters fuel to the jet via a short length of tubing. The complete needle-valve assembly is mounted on a triangular plate which is attached via the top two crankcase backplate screws and can be rotated to any convenient position. It could be mounted independently from the engine if more convenient.

Workmanship throughout is first class. Externally, the cast components (crankcase and backplate) have a dull satin tumbled finish, the cylinder fins, prop washer, head and back plate screws are blued and all other parts have a natural, machined or polished finish. Each engine is supplied with a rubber dust plug for the exhaust.

Specification

Type: Single-cylinder, air-cooled,



loop scavenged two-stroke cycle, glow-plug ignition. Crankshaft type rotary valve induction. Baffle piston and offset ignition plug. High pressure fuel system standard.

Bore: 0.598 in. Stroke: 0.539 in.

Swept Volume: 0.1514 cu. in. = 2.482 c.c.

Stroke/Bore Ratio: 0.901 : 1.

Weight: 5.85 oz.

General Structural Data

Pressure diecast aluminium alloy crankcase/main bearing housing unit. Counterbalanced, hardened crankshaft with 5 mm. dia. hollow crankpin and supported in one 10.5 mm. i.d. rear and one 6 mm. i.d. front ball journal bearings. Hardened steel cylinder with integral cooling fins. Machined aluminium alloy cylinder head attached with six Phillips screws, three extra long to secure complete cylinder assembly to crankcase. Lightweight innoculated cast-iron deflector piston, relieved below gudgeon-pin bosses. Fully floating hardened 3.5 mm. dia. gudgeon-pin with brass end pads. Machined aluminium alloy connecting rod with plain unbushed eyes and lubrication holes at both ends. Alloy, counterweighted prop driver secured to shaft via brass split taper collet. Pressure diecast aluminium alloy back cover attached to crankcase with four Phillips screws. Fuel pressure nipple fitted as standard below main bearing. Provision for alternative low pressure system via backplate fitting. Brass fuel metering valve assembly fitted at rear of engine, with gland nut to adjust needle grip. Beam mounting lugs.

Test Conditions

Running time prior to test: 3 hours. (First hour in short rich mixture runs not exceeding one minute duration.)

Fuels used: (i) 75 per cent. methanol and 25 per cent. Duckham's Racing Castor Oil. (Running-in and first dynamometer test.) (ii) 50/50 mixture of KK Record Super-Nitrex and Record Nitrex-70 (i.e. 50 per cent. nitromethane content and including 10 per cent. polyoxide lubricant).

Ignition plug used: KLG Miniglow (old type).

Fuel system: Veco pressure tank off standard rotary-valve tapping.

Air temperature: 70 deg. F.

Barometer: 29.95 in. Hg.

Performance

Starting qualities of the O.S. were among the best we have encountered in the 2.5 c.c. class. When the engine is cold, port priming brings it to life very quickly. When warm, the engine will usually start instantly, simply by flicking the prop. (Choking the intake is, of course, unnecessary and is, in fact, ineffective with a pressurised fuel system since fuel is automatically pumped to the carburettor as the engine is turned over. This ease of starting was maintained even on props down to 6 and 7 in. dia. allowing speeds in excess of 20,000 r.p.m.

The parts of the O.S. Max D-15.

The engine was found to run quite happily on a wide variety of props, ranging from 9,300 r.p.m. on a Tornado nylon 10 × 4 to 20,300 on a PAW 7 × 3, on straight 75/25 fuel. Subsequent torque tests on this fuel indicated, however, that maximum torque was not realised until some 16,000 r.p.m. were reached, torque dropping by about 15 per cent. at 10,000 r.p.m. Maximum power was reached at just on 20,000 r.p.m. where the very good figure of 0.41 b.h.p. was recorded, suggesting that this engine should be no mean performer as an F.A.I. class speed unit.

A very substantial improvement, however, was obtained on 50 per cent. nitromethane. Maximum torque jumped from 22.5 oz. in. to 30.5 oz. in. (80 lb./sq. in. b.m.e.p.) and 18,100 r.p.m. were obtained on a wood 8 × 4 Power-Prop. An 8 × 4 Top-Flite nylon was turned at 16,750 and 20,200 r.p.m. were obtained on a 7 × 4 Power-Prop. The 7 × 3 PAW was turned at 21,700 r.p.m. Maximum power on this fuel was realised at a slightly lower speed, approximately 19,500 r.p.m., although the peak was so flat that there was only about 3 per cent. drop in power at 2,000 r.p.m. either side of the peak. The actual power figure returned was no less than 0.515 b.h.p. which is the best we have yet obtained for a 2.5 c.c. motor and also gives the highest ever specific output recorded in this series—over 200 b.h.p./litre.

We were unable to fault running and handling characteristics (although we must add that one user has claimed that the counterweighted prop driver increases, rather than lessens, vibration *in a model*) and found the engine smooth and even running and very pleasant to handle. The needle-valve was easy and comfortable to adjust and the effortless manner in which the engine would hold a steady speed in excess of 20,000 r.p.m. was most impressive. The test engine has now accumulated about one hour's running at speeds of 17,000-22,000 r.p.m. and appears to be on the peak of its form, being extremely free running, yet with excellent piston seal both hot and cold.

Power/Weight Ratio (as tested): 1.12 b.h.p./lb. (straight fuel). 1.41 b.h.p./lb. (50 per cent. nitro).

Specific Output (as tested): 165 b.h.p./litre (straight fuel). 207.5 b.h.p./litre (50 per cent. nitro).