

FROG •049

LARGEST OF THE current crop of British "049" glow motors, and leading its competitors by 3 months' sales in the model market the .8 c.c. Frog bears a distinct resemblance to the Frog "80" diesel, particularly as it incorporated the same crankcase casting with its characteristic integral stub exhausts. However, the 049 glow is basically a new engine which has undergone extensive development work to arrive at a good "sports" performance with smooth running and easy starting characteristics. Whilst the crankshaft and crankcase remain unaltered, the cylinder is entirely new and the result of

some dozens of individual set-ups to determine the best porting arrangement, compression ratio and combustion chamber shape.

The result is a very easy glow motor to handle, with a performance comparable with that of the diesel version at the higher speeds. Starting characteristics are extremely good, so good, in fact, that the manufacturers have felt that the complication of any starter device was quite unnecessary, even for beginners, which claim would seem to be borne out by practical tests. Having established rough settings for any particular size of propeller, first flick starting can be obtained from hot; or cold after filling the fuel line by finger choking and giving a prime through the exhaust. And the flick does not have to be a very smart one. You can almost—but not quite—start by twisting the propeller nut.

This nut is deliberately made large in size and knurled, the object being that if "assisted" starting is required—useful if the engine is well and truly flooded—a length of cord can be wound round the nut and pulled off to spin the motor. This simple technique works very well and can be applied to the engine mounted in a model since one does not have to grasp both ends of the starter cord but merely aim to pull the cord off the spinner in line with the propeller.

(continued overleaf)

FROG 049 (continued)

SPECIFICATION

Displacement: .808 c.c. (.04926 cu. in.)
Bore: .400 in.
Stroke: .392 in.
Bare weight: 1.8 ounces.
Max. power: .037 B.H.P. at 12,000 r.p.m.
Power rating: .046 B.H.P. per c.c.
Power/weight ratio: .0205 B.H.P. per ounce.

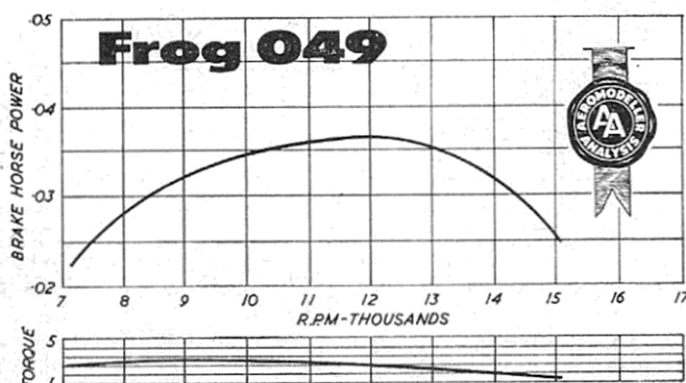
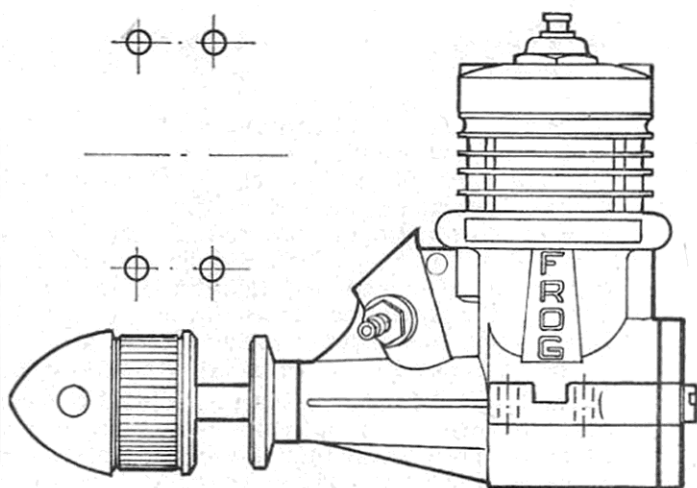
Material specification

Crankcase: light alloy pressure die casting
Cylinder: leaded steel
Piston: cast iron
Connecting rod: light alloy forging
Crankshaft: hardened steel—3BA propeller shaft thread
Main bearing: plain
Prop. driver: dural
Cylinder head: dural
Spraybar: brass (ratchet spring locking)
Glow plug: KLG Miniglow "X"
Manufacturers: International Model Aircraft Ltd.

PROPELLER—R.P.M. TESTS

Propeller dia x pitch	r.p.m.
7 x 4 Stant	7,400
6 x 4 Stant	8,400
6 x 4 Trucut	7,600
5 x 3 Trucut	11,900
6 x 4 Frog nylon	11,400
6 x 6 Frog nylon	8,400
5 x 6 Frog nylon	10,600
5 x 6 Frog plastic (styrene)	9,700
6 x 4 Tornado nylon	9,600
6 x 3 Tornado wood	10,600
5½ x 3 O.K. plastic	11,500
6 x 4 D-C nylon	12,400
5½ x 3½ D-C nylon	14,400

Fuel used: equivalent 60-25-15, methanol, castor, nitromethane blend



The "049" is fitted with the new Miniglow "X" glow plug and we tried starting on both 1.5 dry and 2 volt wet batteries. Either appear suitable, but the 2 volt supply is better when first handling the engine (i.e. with needle setting not established). Certainly the life of the plug did not appear to be affected by the greater voltage and the hotter element temperature appears to offer an advantage with this motor.

Running was smooth and consistent, with a tendency to increase r.p.m. slightly on warming up. Needle valve setting was very non critical and could be opened up a turn or more before over-rich running became apparent. Starting and running was just as consistent on straight glow fuel as on doped fuel, although r.p.m. figures for any given propeller load were improved by some 5 per cent., using the latter.

Basically the Frog "049" appears to have been proportioned around the Frog nylon 6 x 4 as a matching size of propeller, with no particular attempt made to develop higher speed performance. Peak power on test was, in fact, measured at 12,000 r.p.m. with a marked fall off in performance past this point. In this respect, of course, high speed demand would be beyond the requirements of an engine designed specifically for sports use. At low speeds performance remained consistent and the Frog "049" was still reasonably happy driving an 8 x 6 nylon propeller with which, incidentally, it has proved capable of flying a model. Within this lower speed range, of course, performance is inferior to its diesel counterpart.

The entirely new "049" cylinder incorporating integral finning has upward-angled drilled transfer ports (a pair each side), overlapping the two exhaust ports (actually emerging in the substantial pillars between the

exhaust ports). The cylinder is secured by two screws through the head, the bottom flange resting on the crankcase casting and sealing with a gasket. The two large transfer passages are formed in the crankcase casting and the fact that the hold-down screws pass through the cylinder fins ensures that the cylinder ports line up, irrespective of which way round the cylinder is replaced.

The head is turned from dural, with an appreciable spigot plugging into the open top of the cylinder. This has been shaped to give a hemispherical combustion chamber, found to give the smoothest running and flexibility of operation, particularly with doped fuels. The head also seals with a gasket with the KLG plug screwing into the centre of the head.

The piston is of cast iron, flat topped with a bevelled edge. Cylinder wall thickness is quite light, no doubt contributing to the low level of vibration experienced whilst running. Workmanship and finish is generally of a high order throughout.

The balance of the construction is as for the Frog "80" diesel, with the exception of the large spinner nut already mentioned. This is turned from dural, giving a knurled section of approximately 9/16 in. diameter and ankle length for cord winding with a spinner entry, the latter with the usual tommy bar hole for tightening.

Manufacturing tolerances appear to be held almost to "diesel" standards, with a close fitting piston giving a definite compression feel, and also marked crankcase compression. Crankcase volume, too, is relatively large which means that if the motor is accidentally flooded there is a lot of raw fuel to blow out in order to give the plug a chance! A point, too, with regard to the use of a battery connecting clip. The blued finish on the cylinder can act as an insulator and thus not give a proper earth connection, if the clip is only lightly positioned. It is not likely that this will happen every time, but is a point worth checking if the engine does not start. The Frog "049" is an engine that should—and does normally—start first flick every time, after a prime. And provided the needle valve is somewhere near the right setting, it will keep running as many modellers have already discovered.

Guess it came out a little heavy—must build one of the 049 lightweights!

