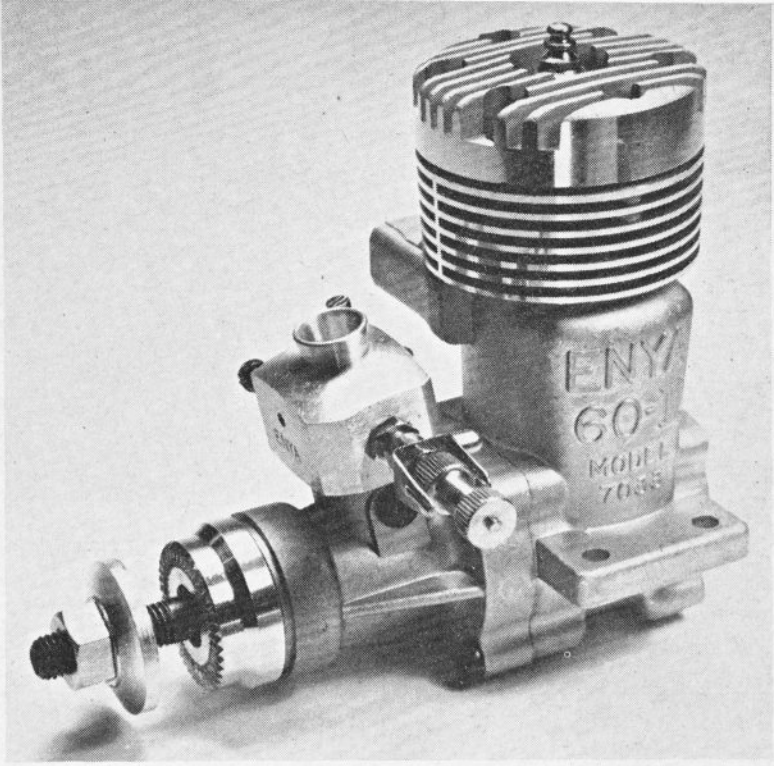
Peter Chinn

tests the World Championship winning

ENYA 60-IIIB

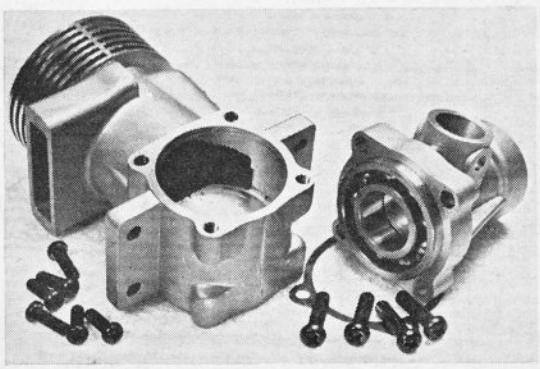
"Soundly engineered, moderately priced, excellent all-round performance."



PRODUCTION of the Enya Model 7033, otherwise known as the Enya 60-III, began in the Autumn of 1969. The 60-IIIB version of this engine followed exactly three years later and is the model currently obtainable.

In appearance the 60-IIIB looks very little different from its predecessor. In fact, the only obvious change is the lack of a coupled exhaust baffle on the "B" version. Inside, however, there are many changes. These include a new crankshaft, a new piston, a new cylinder-head and sundry modifications to other parts including the cylinder-liner and carburettor. The crankshaft has a stronger crankweb (thickness increased from 5.5 mm. to 7.0 mm.) and a slightly larger valve port. The piston is made from a high silicon content aluminium alloy casting instead of being turned from bar stock. It no longer has bronze bushed gudgeon pin holes and uses a single compression ring instead of the two rings of the earlier type. The cylinder head has a wider squish-band (3 mm. instead of 1.5 mm.) and raises the compression ratio of the cylinder to approximately 10 to 1. The cylinder liner has 9 per cent less exhaust and transfer port area but ports are relocated to marginally extend timing.

The Enya Type G carburettor is essentially the same as was introduced on the 60-III except that the fuel metering groove on the throttle barrel has been modified to improve throttle response.



An option with the 60-IIIB is the Type G-8 carburettor. This has a larger (8.0 mm. instead of 7.1 mm.) choke bore than the standard G type carb and a smaller o.d. jet tube. The result of these changes is to increase effective choke area by more than 50 per cent. A low-pressure forced-feed fuel system then becomes necessary (silencer pressure is recommended) to compensate for the larger choke's reduced fuel suction, but a substantial gain in power is obtained.

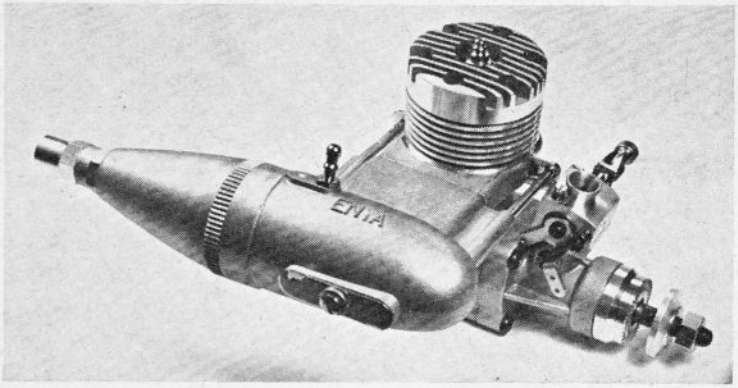
Design and Construction Summary

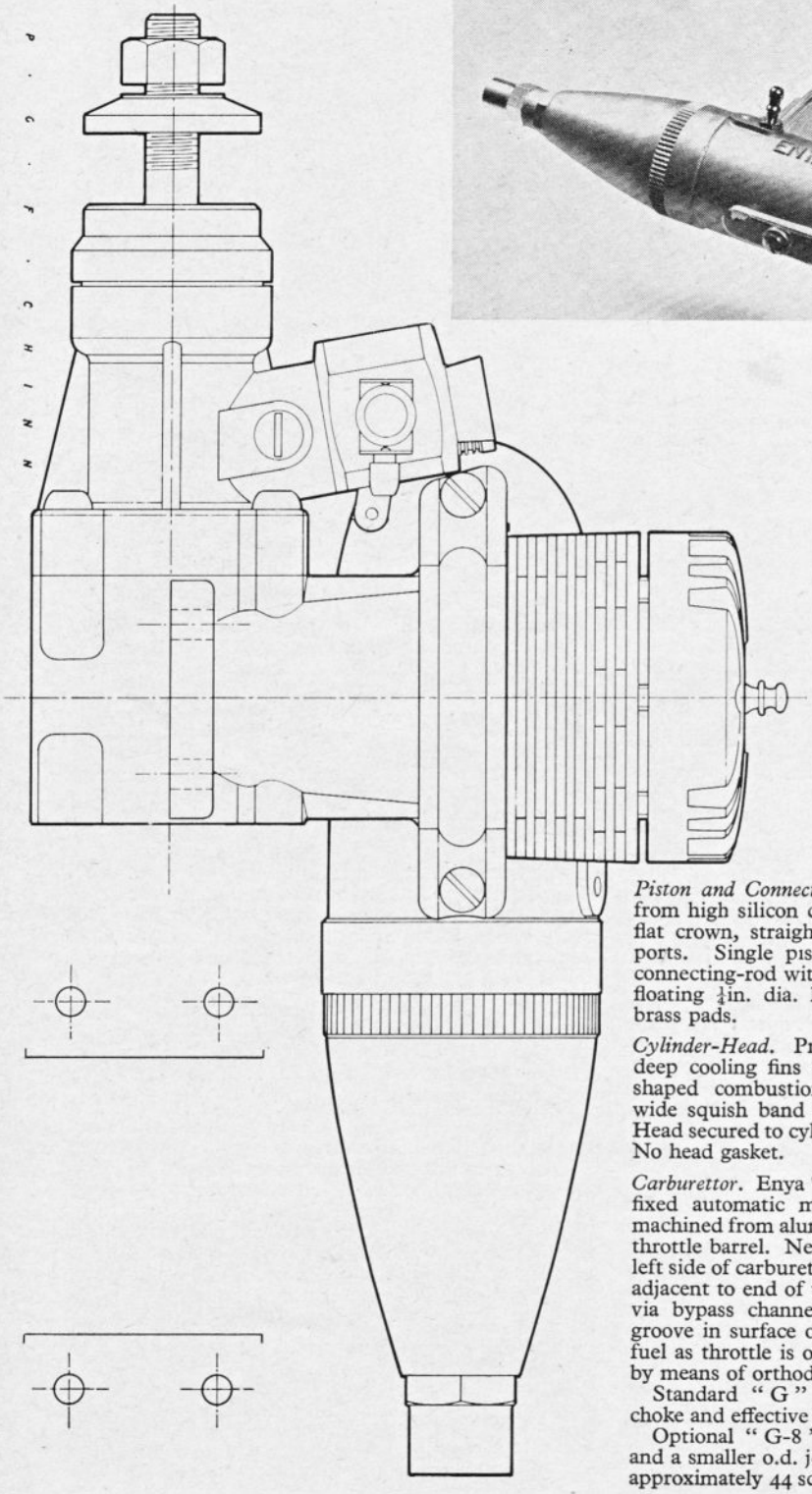
Main Casting. This comprises the crankcase (with integral backplate) and full length cylinder casing in pressure diecast aluminium alloy. It includes wide beam mounting lugs and a short exhaust duct on the right side.

Cylinder-liner. Closely fitted to main casting. Five exhaust ports timed to open and close at 68 degrees each side of BDC. Four transfer ports timed to open and close at 60deg. each side of BDC. Two 8 mm. wide elongated skirt ports.

Crankshaft and Prop Drive Assembly. Counterbalanced hardened crankshaft having 15 mm. o.d. main journal, 9.5 mm. o.d. front journal and 7 mm. integral crankpin on 7 mm. thick crankweb. Rectangular valve port, timed to open at 39deg. ABDC and to close at 55deg. ATDC and admitting gas to 11 mm. i.d. passage through main journal. Machined aluminium alloy prop driver located by parallel flats on shaft. Aluminium prop retaining washer and steel hexagon nut.

Front Housing and Bearings. Pressure diecast aluminium alloy main bearing housing with intake boss for carburettor and containing one 15 × 32 mm. 9-ball steel caged ball journal bearing at rear and one 9.5 × 22 mm. 7-ball steel caged shielded ball journal bearing at front. Housing aligned in crankcase by o.d. of rear ball-bearing and secured by four Phillips screws with gasket between joint faces.





GENERAL INFORMATION

Manufacturer: Enya Metal Products Company Ltd., Nakanoku, Tokyo, Japan.
U.K. Distribution and Service: Ripmax Ltd., Green Street, Enfield, Middlesex.
Type: Throttle equipped shaft rotary-valve glowplug engine with twin ball-bearings and ringed aluminium piston.
Bore and Stroke: 24 x 22 mm. (0.9449 x 0.8661 in.).
Stroke/Bore Ratio: 0.917:1.
Displacement: 9.953 c.c.—0.6073 cu. in.
Checked Weights:
(i) 411 grammes—14.5 oz. (less silencer).
(ii) 504 grammes—17.8 oz. (with silencer
Recommended Retail Price: £22.95 less glowplug. (Silencer £2.70 extra.)
Optional Equipment:
(i) Enya 60-III expansion chamber type silencer with removable restrictor nozzle and provision for pressurising fuel system.
(ii) Enya G-8 large-choke carburettor for operation on pressurised fuel feed.
Also Available: Watercooled marine model, price £25.95.

Piston and Connecting-rod Assembly. Piston machined from high silicon content aluminium alloy casting with flat crown, straight baffle and two 7.8 mm. dia. skirt ports. Single piston ring. Forged aluminium alloy connecting-rod with bronze bushes at both ends. Fully floating ¼in. dia. hardened tubular gudgeon-pin with brass pads.

Cylinder-Head. Pressure diecast aluminium alloy with deep cooling fins and brass bushed plug hole. Bowl shaped combustion chamber surrounded by 3 mm. wide squish band and slot for piston baffle clearance. Head secured to cylinder casting with six Phillips screws. No head gasket.

Carburettor. Enya " G " Series barrel throttle type with fixed automatic mixture control. Carburettor body machined from aluminium alloy bar stock. Ground steel throttle barrel. Needle-valve and fuel inlet tee fitted on left side of carburettor and feeding into shallow chamber adjacent to end of throttle barrel. Fuel conveyed to jet via bypass channel in carburettor body and tapered groove in surface of throttle barrel which meters more fuel as throttle is opened. Fine control of idle mixture by means of orthodox adjustable airbleed.

Standard " G " type carburettor has 7.1 mm. i.d. choke and effective choke area of approx. 29 sq.mm.

Optional " G-8 " carburettor has 8 mm. i.d. choke and a smaller o.d. jet tube giving effective choke area of approximately 44 sq.mm.

Silencer. The maker's silencer for the 60-IIIB is of the expansion box type without baffles and is of pressure diecast aluminium alloy construction. A screw-in 8 mm. i.d. outlet nozzle restricts outlet area to 50 sq.mm. for effective muffling, but can be removed to increase outlet i.d. to 10 mm. (78 sq.mm. area) for extra power. The silencer is attached to the engine by a plated steel strap and two screws and has a pivoted external plate to give access to the exhaust port for priming.

Performance

Two examples of the Enya 60-IIIB were submitted for test. One of these was the standard model: the other being the more powerful version with G-8 carburettor. Both engines were carefully run-in on straight 3 to 1 methanol/castor-oil fuel before changing to our standard 75/20/5 methanol/castor-oil/nitromethane blend for actual performance tests. Enya engines imported into the U.K. are sold without glowplugs and, for our tests, we used Fox long-reach bar type glowplugs which, following checks with Enya plugs, were found to suit the engines very well. Atmospheric temperature at the time of testing was 11deg. C (52deg.F) and barometric pressure was 998 mb (29.47 in.Hg.).

Starting and Running. Cold starting was excellent at all times. Hot restarts by hand were less rapid at first and we used an electric starter until piston rings had become bedded in sufficiently to raise compression seal to the level required for quick restarts. Thereafter both engines responded well under all conditions and on all prop sizes up to a maximum of 14 × 6. The Enya has more than sufficient torque to pull props in the 12-14 in. dia. sizes (such as might be used for certain scale models) at useful speeds but experiment with still larger sizes indicated that (probably due to the engine's relatively high compression ratio) loading the 60-IIIB for speeds below about 8,500 rpm might best be avoided.

Power—Standard Carburettor

In all, we ran four series of tests, the first two being on the engine in standard 60-IIIB trim. Using the silencer with its 8 mm. i.d. outlet nozzle installed produced the first set of curves indicating a peak output of 0.92 bhp at just below 12,000 rpm with reasonably good muffling. Removing the silencer outlet nozzle raised peak output by approximately 11 per cent at the expense of a fair increase in noise level. It is estimated that output could be further improved to around 1.20 bhp by using one of the proprietary " no-loss " type silencers but, in the interests of less noisy operation, one can instead switch to the G-8 carburettor.

Typical prop rpm obtained with the standard carburettor and silencer (less outlet nozzle) included 10,800 rpm on a 12 × 6 Super nylon glassfibre, 10,600 rpm on an 11 × 8 Super nylon-glassfibre, 11,300 on an 11 × 7 Top Flite maple, 11,400 on an 11 × 7 Super nylon-glassfibre, 12,300 on an 11 × 6 Top-Flite maple and 12,800 on an 11 × 6 Power Prop maple.

Power—G-8 Carburettor. Substantially increased torque over the whole rpm range was obtained with the 60-IIIB equipped with the G-8 carburettor and maximum power *with* silencer (less nozzle) was raised to 1.15 bhp at between 13,000 and 13,500 rpm. Prop revolutions were improved by up to 500 rpm compared with the standard carburettor.

Our final check was with the 60-IIIB G-8 less silencer to determine gross bhp. Here maximum output was raised to approximately 1.32 bhp at 14,500; a figure which puts the Enya among the top performers in the crossflow scavenged 60 R/C engine group.

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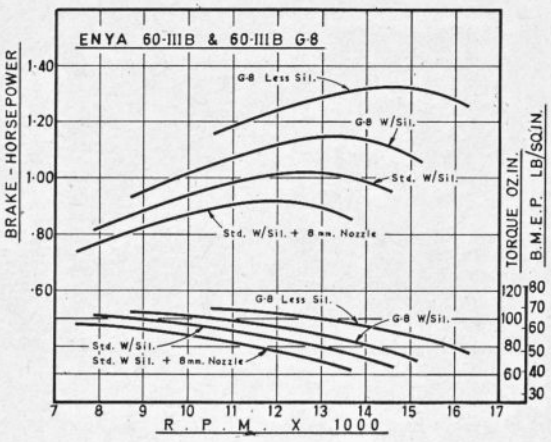

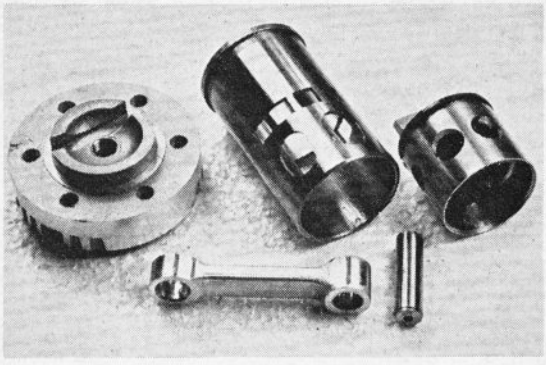

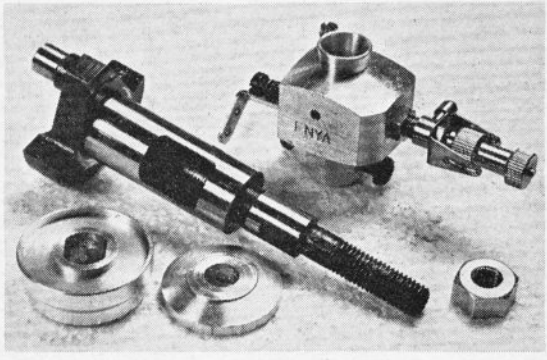

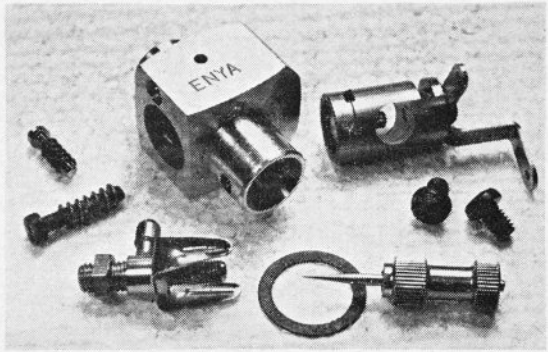

ENGINE TEST—*continued from page 37*

Throttling. On both carburettors, throttle response was excellent. Safe idling speed on 11 × 8 and 11 × 7 props was 2200-2300 on the standard carb and around 2500-2600 rpm on the G-8 carb. Recovery to higher speeds was reliable and there was a steady transition as the engine was speeded up or slowed down.

Comment

A soundly engineered yet moderately priced engine of excellent all-round performance.

It was an Enya 60-IIIB (but fitted with a Yamada carburettor and fuel pressure regulator) that powered Yoshioka's winning model at the 1973 World R/C Championships.