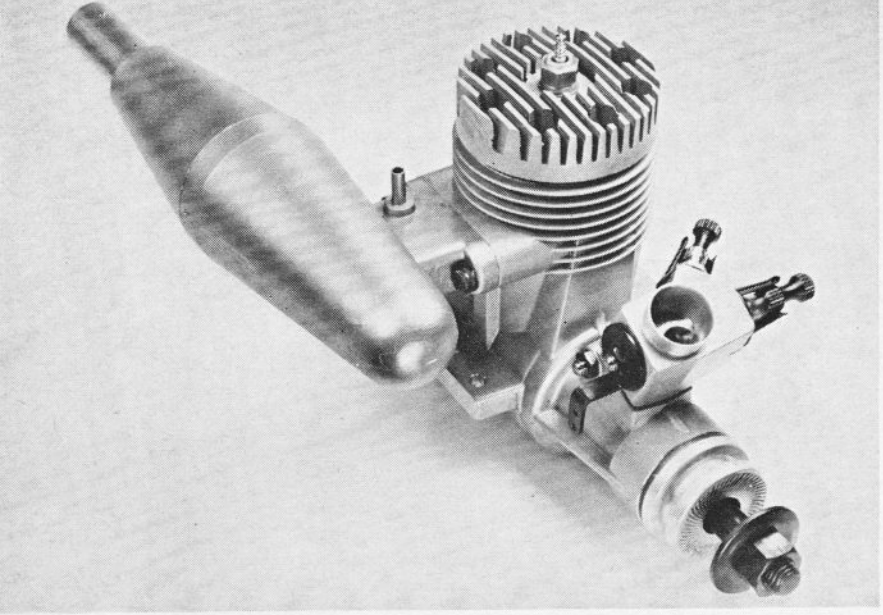


Peter Chinn tests the KRAFT 61 R/C

KRAFT SYSTEMS Inc. of Vista, California, are widely known as one of the world's leading manufacturers of model radio control equipment. In 1974, however, they announced an entirely new product, the 10 c.c. Kraft 61 R/C engine and this was put into production in the spring of last year. A description of an early example was contained in our "Motor Miscellany" column in the July 1975 issue.

The model used for the following test report is from a later production batch. This is identical in outward appearance but incorporates minor internal changes. These include modifications to the cylinder port timing and to the cylinder-head and the omission of the unique piston crown heat-shield featured by the early version. This latter, a polyfluorocarbon coating, has much to commend it but was found to present problems in production and has been discontinued—at least until these difficulties can be overcome.

Designed by ex C/L speed exponent Roger Theobald, the Kraft 61 is basically similar to other recent high-performance .60 cu.in. R/C motors in its use of, for example, Schneurle scavenging, but incorporates one or two novel features that set it apart, such as its domed piston crown, flush-fitting cylinder-head, "stop-less" carburettor and non-metallic moulded backplate.

The engine is generally well constructed and of attractive appearance.

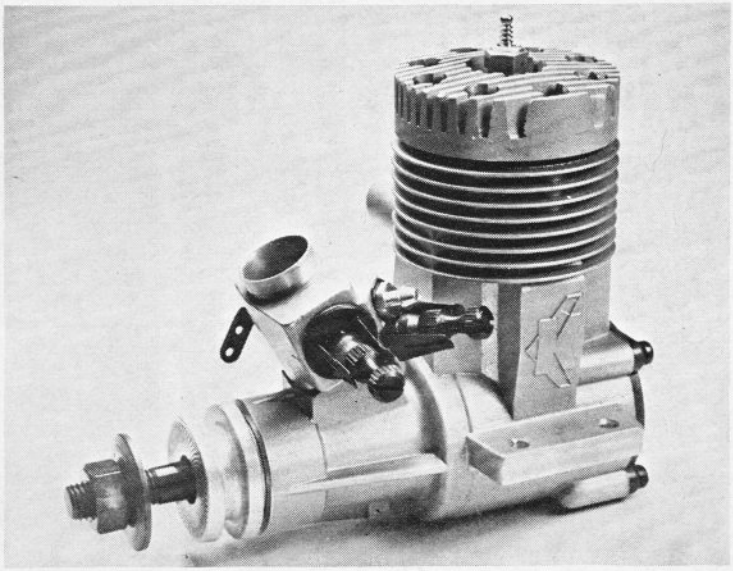
Design and construction summary

Main casting. This is an investment casting in aluminium alloy that embodies the crankcase, front housing and full length cylinder casing in a single unit. It includes substantial beam mounting lugs, a boss for the carburettor and a short exhaust duct having tapped holes for silencer attachment.

Cylinder-liner. Hardened steel, closely fitted to main casting and located by flange at top. Centrally bridged exhaust port on right side, timed to open and close at 73½ deg. each side of BDC. Two main transfer ports flanking exhaust, angled to direct gas to left side of cylinder and timed to open and close at 61 deg. each side of BDC. Large rectangular third port, diametrically opposite exhaust, chamfered to sweep gas upward and timed to open and close 55 deg. each side of BDC. The liner skirt has rectangular cutaways, fore and aft, to avoid masking the entry to the main transfer channels.

Crankshaft and bearings. Counterbalanced hardened steel crankshaft with 15 mm. o.d. main journal, ⅜in. dia. front journal and integral ¼in. dia. solid crankpin. Rectangular valve port, 15.4mm. long, timed to open at 31 deg. ABDC and close at 54 deg. ATDC and admitting gas to 11.5mm. i.d. gas passage. Shaft supported in one 15 x 32mm. 9-ball brass-caged ball journal bearing at rear and one ⅜ x ⅞in. 7-ball brass-caged shielded bearing at front. Aluminium alloy prop driver mounted on steel split tapered collet. 5/16in. UNF thread for prop nut.

Piston and connecting-rod assembly. Piston machined from aluminium alloy bar with shallow domed crown, skirt cutaways fore and aft and large rectangular third-port window. Single compression-ring, pinned to prevent rotation. Forged aluminium alloy connecting-rod, 41mm. between centres, with bronze bush and lubrication slit at each end. Hardened tubular gudgeon-pin of ¼in. nominal o.d. tightly fitted to piston bosses and retained by circlip.



KRAFT 61 R/C

ACTUAL SIZE

GENERAL INFORMATION

Manufacturer: Kraft Systems Inc., 450 West California Avenue, Vista, California, 92083, U.S.A.

U.K. Distribution: Geoff Franklin, 101 Jarrom Street, Leicester.

Type: Schnuerle scavenged, shaft rotary-valve throttle equipped glow-plug engine with twin ball-bearings and ringed aluminium piston.

Bore and Stroke: 0.940 x 0.875in. (23.88 x 22.22 mm.)

Stroke/Bore Ratio: 0.931 : 1.

Measured Nominal Compression Ratio: 11.5 : 1.

Displacement: 0.6072 cu. in—9.951 c.c.

Checked Weights:
(i) 481 grammes—17.0oz. (less silencer)
(ii) 556 grammes—19.6oz. (with Kraft silencer)

Cylinder-head. Pressure diecast aluminium alloy, finned, with bowl shaped combustion chamber surrounded by 3.7mm. wide squish band angled to match domed piston crown. Combustion chamber is positioned above rather than inside the cylinder liner, the head being located only by the eight Phillips type head screws. No gasket.

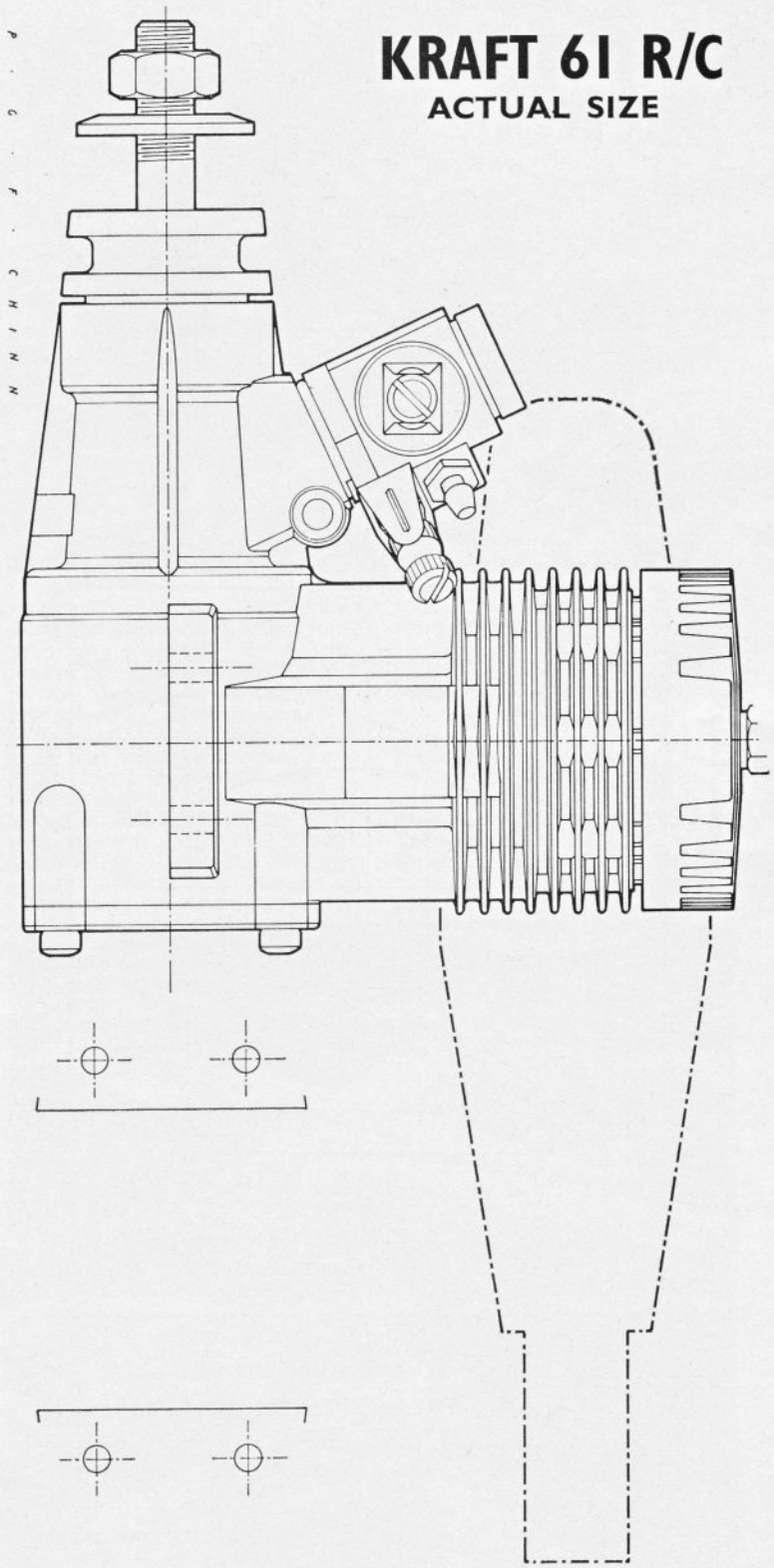
Crankcase backplate. Deeply recessed crankcase backplate of moulded glassfibre reinforced nylon, fitted with o-ring seal instead of gasket and retained by four Phillips screws.

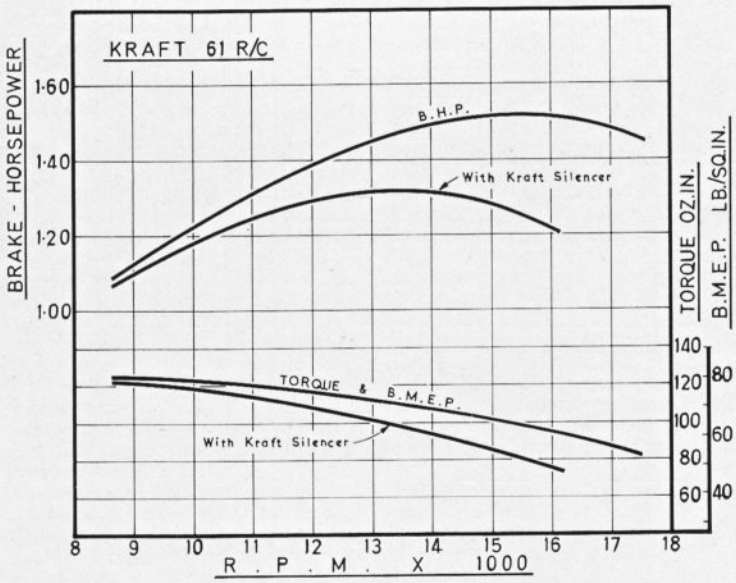
Carburettor. Kraft automatic fuel metering barrel-throttle type with separate main and idling jets each with its own needle-valve. Diecast aluminium alloy carburettor body. Ground steel throttle barrel. Fuel enters carburettor body via angled inlet nipple on left side immediately above idle mixture needle-valve. From here fuel takes two routes: (a) via idle needle-valve to idle jet located below throttle barrel and (b) via cross-hole in throttle barrel to main jet in barrel choke. Fuel fed to main needle-valve is automatically reduced by tapered groove in surface of throttle barrel as latter rotates toward closed position and is entirely cut off at idle setting, when engine runs on idle jet only.

Adjustable throttle arm on right side of engine. No throttle stops. (Adjustment of throttle range must be fixed by servo travel.)

Carburettor choke bore 6.75sq. mm. Effective choke area 35.8sq. mm.

Silencer. The Kraft 61 is supplied complete with an aluminium alloy expansion chamber type silencer. This attaches to the engine's exhaust duct with two Allen cap screws. It has a vertical brass-tube fitting that doubles as a priming nozzle and pressure outlet for a pressurised fuel





system. The silencer has a brass tailpipe of 12.9mm. i.d., giving a generous outlet area of 130sq. mm.

Test performance

Two examples of the Kraft 61 have been tested. The first, tested some nine months ago, was one of the first batch of engines made. This is the engine shown in our photographs. It ran well indicating high static rpm, especially on the larger prop sizes but fell slightly short in terms of peak power output. As previously mentioned, some small modifications were incorporated shortly afterwards by the manufacturer and a new production model was subsequently submitted for test. It is with this model that our present report deals.

The engine was run in on straight methanol/castor-oil fuel, after which tests were carried out on our standard R/C test fuel containing 5 percent pure nitromethane. Glow-plugs used were Fox standard long-reach bar type. Atmospheric temperature at the time of testing was 19 deg.C (66 deg.F) and barometric pressure was 1016mb. (30.00in.Hg.).

Starting and running. Starting was trouble-free. The Kraft had very good piston seal from new, ensuring good compression for an easy hand-start at all times. Running qualities were also good with a relatively low level of vibration and even firing on mild fuels (0-5 percent nitromethane) as well as on the higher nitro fuels often used in the U.S.

Power—less silencer. A gross power output exceeding 1.5 bhp. at approximately 15,500 rpm. was determined on the standard test fuel. Equally good was the engine's high maximum torque, which means that it has a very useful power band width enabling it to cope impressively with the larger prop diameters if called upon to do so.

Among the prop speeds we recorded were 9,600 rpm. on a 14x6

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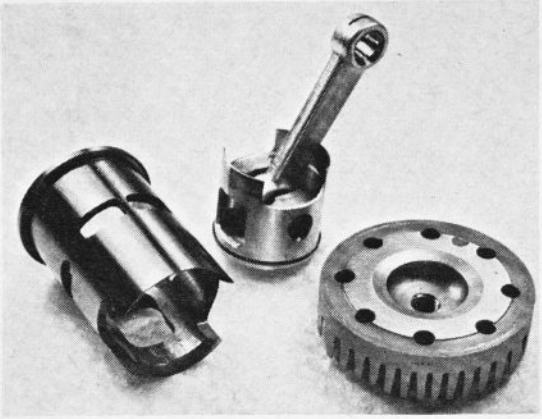

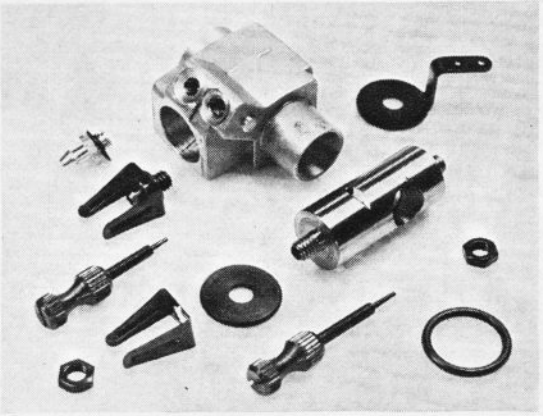

ENGINE TEST

—*continued from page* 38

Top Flite maple, 11,800 on a 12x6 Top Flite maple, 11,800 on an 11x7¾ Power-Prop maple, 12,950 on an 11x7½ Power-Prop maple, 13,400 on an 11x8 Robbe glassfibre-nylon and 14,400 on an 11x6 Power-Prop maple.

Power—with silencer. The silencer had little effect on the maximum torque developed by the 61 but, when the engine was loaded for higher speeds, torque fell off rather more sharply and, as a result, the power curve levelled off much earlier with a peak of approximately 1.32 bhp. at 13,500.

In terms of prop revolutions, this meant losses in the 200-600 rpm. range on most props, rising to perhaps 800 rpm. in the air. For example, a 12x6 Top Flite maple was turned at 11,500, an 11x7½ Power-Prop maple returned 12,500 and an 11x6 Power-Prop maple was turned at 13,800 rpm.

Throttling. For bench testing, the lack of throttle stops was slightly inconvenient but we obtained safe idling at around 2,500 rpm. without difficulty and, with the carburettor properly adjusted, the response to the throttle at all intermediate settings was entirely satisfactory. Adjustment of the idling mixture is made simpler by the rearward rake of its idle needle which can safely be set while the engine is running.

Comment

A fairly expensive but well built engine of excellent all-round performance. Silencer, which reduces peak output by about 13 percent, yet is rather noisy, could be improved; otherwise an impressive beginning for Kraft Systems Inc. in the model engine field.