Cox QZ .049

ENGINE TEST

By Peter Chinn

Schh. . . it's the Quiet Zone!

COX ·049 QZ

The latest Cox with built-in fuel tank, spring starter and silencer

The Cox "QZ" .049 is a development of the low priced Cox Babe Bee engine which, for a number of years, has been produced in vast quantities at the L. M. Cox plant in California, primarily for that company's well-known range of ready-to-operate plastic models. "QZ" means "Quiet Zone", a name evidently intended to convey the impression that the engine can be operated in urban areas where the noise level of the ordinary unsilenced model engine is unacceptable. The QZ .049 is equipped with the Cox Muffler, a simple annular expansion chamber, and is, in fact, the first American model engine to be sold with an exhaust silencer as a standard fitting.

Apart from the silencer, the main differences between the Babe Bee and QZ engines are to be found in the cylinder assembly. Hitherto, all Cox engines have featured sub-piston air induction via the exhaust ports i.e. the piston skirt clears the bottom edge of the exhaust port at the top of the stroke, thereby opening the crankcase to atmospheric pressure for more complete charging of the primary compression chamber. The snag here, when an exhaust silencer is fitted, is that, instead of pure air, a proportion of burnt gas will be drawn into the crankcase. This will dilute the existing fuel/air mixture and, at the same time, its residual heat will cause premature expansion of the fresh charge. This can cause a sizeable power loss and such was the case when the Babe-Bee was equipped with the Cox muffler.

Cox engineers Bill Atwood and Dale Kirn therefore set about designing a new cylinder for the QZ. Firstly, they eliminated sub-piston induction by raising the lower edge of the exhaust ports. This, presumably, slightly reduced power compared with the standard Bee and, since the silencer was bound to reduce output still further, two more cylinder modifications were adopted. These consisted of adding an extra transfer flute and fitting a trumpet-type cylinder head in place of the standard hemispherical head. Both these are features of the very high performance Tee Dee 049 contest engine and the overall effect has been to make a very significant difference to the QZ's power output.

The Cox muffler comprises three parts. The body is of machined aluminium, with an outlet slot through which the engine can be primed for starting. It has an internal diameter of If in. and is surrounded by a flat spring steel strap that can be rotated around the body to open or close the outlet slot. The third part is the thin steel top cover plate. The complete muffler is slipped over the lower part of the cylinder and is clamped between the crankcase and bottom cylinder fin when the cylinder is screwed into the crankcase.

The remaining parts of the QZ are mostly identical with those of the Babe-Bee and are, therefore, of somewhat unorthodox design. The engine is of the reed-valve type and the complete induction system is enclosed within a self-contained radial tank mount. The tank back plate, which also carries four lugs for mounting the engine to the front fuselage bulkhead, includes filler and vent tubes and a pressed-in steel thread insert for the needle valve. The fuel inlet to the needle valve is inside the tank. Air is conveyed to the engine,

from a channel in the rear face of the back plate, through a gauze dust filter and, after picking up fuel from the internal jet hole, through an induction tube which passes through the centre of the tank. The induction tube is an integral part of the bell-shaped machined aluminium fuel tank (which also serves as a crankcase back plate) and gas is admitted to the crankcase via a reed-valve assembly consisting of a thin copper-beryllium X shaped reed held in place by an internal wire circlip.

The tank back plate is the only casting used in the engine. The crankcase is machined from extruded aluminium and its nose section supports a hardened crankshaft having the traditional Cox arrangement of a relieved centre section to form separate front and rear ground journals. The ball joint piston/conrod assembly is also typically Cox, incorporating a flat crown piston, hardened only on its working surface, its interior being protected during hardening by a plating of copper so that the small-end socket for the conrod remains sufficiently malleable for swaging after the conrod is inserted.

The engine is supplied complete with a starter spring. This can, if preferred, be discarded but it is necessary to remove the cylinder and silencer to do so. In this event the top cover of the muffler should be inverted before replacement so that its inner rim projects upward. This is to take up the extra clearance created by the removal of the starter spring, the anchorage loop of which is normally clamped between the crankcase and the hexagonal base of the silencer.

Performance

As one would expect of a basic design (the Babe Bee) that has been responsible for successfully introducing a very large number of youngsters to power driven models, the QZ is extremely easy to handle. The maker's recommended starting procedure calls for priming the cylinder by moving the muffler spring, to expose the outlet slot, so that a few drops of fuel can be dropped into one of the exhaust ports. In fact, we found that this

Functional, lightweight parts of the .049 QZ laid out for inspection.

preliminary stage could be dispensed with. Using a squeeze bottle to fill the tank until it overflowed through the vent, the intake, instead was automatically primed and, by using the starter spring, we were then able to obtain, usually, an instant start.

Ordinary hand starting was almost equally effective and there was no difference in ease of starting whether the silencer was open or closed. The slot in the silencer is always partially covered by the spring but the exposed outlet it still of large area. Nevertheless, with the slot completely closed, there is very little loss of power.

On a 7x3 Top Flite wood prop, for example, rpm dropped by only 100 to 9.900 rpm with the silencer completely closed, compared with the fully open position. Similar reductions were recorded on 6x4 Tornado, Power-Prop, Top-Flite wood and Top Flite nylon props, which were turned at speeds ranging from 11.000 to 11.600 rpm. On 6x3 props (static speeds of 13.400 to 14.100 and well suited to the bhp curve of this engine) the loss was only 200 rpm. In contrast, the degree of silencing obtained with the outlet closed was quite good and effectively cut off the harsh crack of the typical glow .049.

Briefly, this is an engine that one can confidently recommend to a young beginner or, equally, to any modeller who wants an economically priced

Cox QZ .049

motor of good performance for small sport type models.
Power I Weight Ratio (as tested): 0.50 bhp/lb.
Specific Output (as tested): 79.5 bhp/litre.

SPECIFICATION

Type: Single cylinder, air-cooled, reverse-flow scavenged two-stroke cycle, glow plug ignition. Reed-valve induction. Plain bearings.
Bore: 0.406in.
Stroke: 0.386in.
Swept Volume: 0.0499cu. in. 0.817 cc.
Stroke/Bore Ratio: 0.951 :1.
Weight: 2.1oz. (including starter spring and silencer).

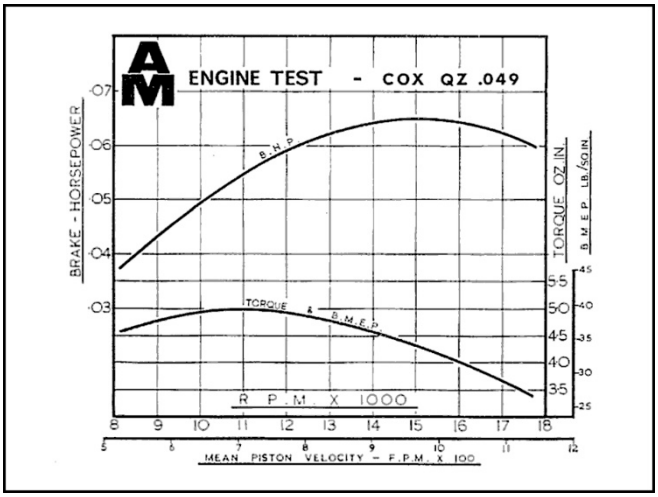
General Structural Data:

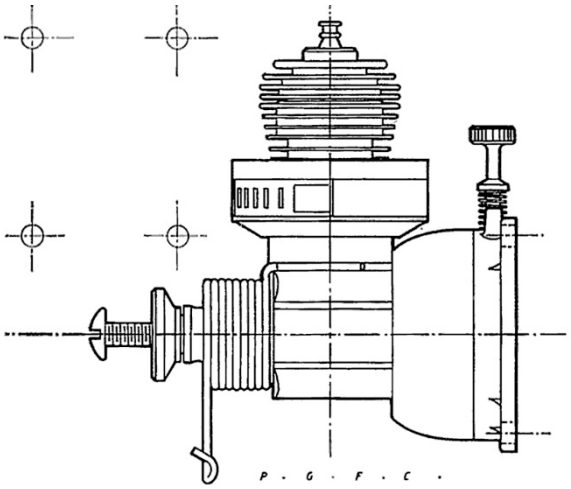
Crankcase and main bearing (unbushed) machined from extruded aluminium bar. Hardened and ground steel, **crankshaft** with full disc web and crescent counterbalance. 0.219in. dia. divided main journal, 0.109in. dia. crankpin Shaft end knurled for pressed-on aluminium **prop driver** and tapped for **prop retaining screw.** Unhardened steel **cylinder** with integral fins and blued finish. Steel **piston** hardened on skirt surface only and fitted to ball ended hardened steel **connecting-rod** by means of swaged cup. Screw in aluminium alloy **glow-head**, seating on soft copper gasket. **Crankcase back plate**, reed-valve housing, induction pipe and fuel tank machined in one piece from aluminium alloy. **Reed valve** of .001in. copper- berrylium. Pressure die-cast zinc-alloy fuel tank back plate with integral **needle-valve assembly**. Complete tank and induction assembly secured to crankcase with four screws and can be re-positioned for inverted or side mounted installations. Radial mounting only.

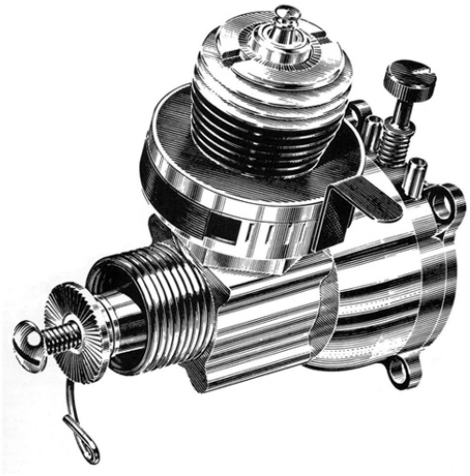
TEST CONDITIONS:

Running time prior to test: Approx. 15 minutes.
Fuel used: Cox Thimble drome glow fuel (approx. 15 per cent nitromethane.).
Air temperature: 72 deg. F (22 deg. C).
Barometer: 29.75in. Hg.

Silencer type: Cox Muffler (expansion chamber) as supplied.







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