

Fox 35 Rocket

ENGINE REVIEW

ROCKET 35

by P. G. F. CHINN

Fox first to popularize the .35 size for stunt and combat work, continue progressive design effort in this popular series.

► Think of Fox 35 and you cannot help but think of control line stunt. Duke Fox can be said to have started the present trend of stunt design when he introduced the first Fox 35 in January 1949. Up to that time, top stunt fliers almost invariably favored a .60 size power plant. The smaller, lighter Fox was the first of the modern stunt 35's, quickly became the choice of stunt experts and has remained one of the most popular 35's to this day.

Until the introduction of the Rocket series (19, 15 and 35) however, Fox motors were not numbered among the industry's low-priced products. The Rocket 35, \$4 cheaper than the Stunt 35 and \$8 less than the Combat 35, brings a Fox 35 within the reach of still more would be Fox users.

The Fox Stunt 35 has gone through several minor design changes over the years, but the first major re-design of this basic layout came with the black-head Combat-Special announced in January 1957. It is on this model that the Rocket 35 is based.

Side-by-side examination of the two models reveals that the main differences are to be found in the crankshaft, cylinder-head and valve timing. The same main casting is used, but the Rocket has a smaller bore carburetor and no separate restrictor. The induction aperture through the main bearing is correspondingly smaller, reducing the intake period by about 10 degrees of crank rotation. The crankshaft, unlike that of the Combat 35, is not hardened and is of the disk web, crescent counterbalance type. The gas passage through the shaft is reduced in area by



Almost identical externally with the Combat 35, the Rocket is distinguished by its Red Head. One difference is small bore carburetor.

approximately 35 per cent to 5/16 in. dia., although the journal diameter remains a full 1/2 inch. The cylinder-head has modified internal contours, giving a lower compression ratio than that of the Combat 35 and, instead of the black finish, is painted red.

The basic design of the Rocket 35 is, of course, traditional Fox: shaft induction, Desaxe type (offset) loop scavenged cylinder, short frontal overhang and one-piece crankcase / main bearing / cylinder block construction. The body of the engine is a well-produced pressure casting with a long carburetor intake and strong beam mounting lugs. Noteworthy is the manner in which efforts have been made to provide added resistance to crack-up damage. The bearing housing, for example, features a full length lower web, while the intake is strongly webbed to tie lower cylinder block section to increase stiffness.

The crankshaft, ground on tire working surfaces, has a 7/32 in. dia. crankpin and, as already mentioned, a generous 1/2 in. dia. journal. It is stepped down to 1/4 in. dia. for the prop shaft section. Prop drive is conveyed through four short splines which engage a 1 in. dia. hardened steel drive disk with the usual serrated face. The shaft runs in a bronze bush bearing 1- 3/32 in. long. A shallow, longitudinal oil groove extends to

Fox 35 Rocket



Rocket .35 parts. Features include ½ in. shaft, special needle valve and special piston designed to resist ovality in manufacture.

within 3/8 in. of the front end of (lie bearing, to ensure adequate lubrication ahead of the valve port.

A drop-in cylinder sleeve of leaded steel is used. This is quite light, with a wall thickness of only .037 in. and is flanged at the top where it is locked against vertical and rotational movement by the cylinder head. An aluminum blow-out-proof head gasket, recessed into a channel in the head, is used and six Phillips screws tie tire head to the main casting, screwing into vertical ribs formed between the cooling fins. The pressure die-cast head is generously finned and has a centrally located long-reach O.K. plug.

The piston is of Meehanite, machined from bar stock with normal flat crown and straight baffle. It has a narrow annular rib inside, immediately above the wristpin bosses. This is an additional complication for the manufacturer but one which should pay dividends in helping to maintain piston roundness piston ovality being frequently encountered in engines of this size and type, especially where the piston skirt is machined to minimum thickness in the interests of reduced reciprocating weight. A hardened steel 5/32 in. dia. full-floating wrist-pin, with brass eyelet end pads, is used and a 24ST aluminum alloy connecting rod couples the piston to the shaft. To facilitate fitting and removal of the piston assembly from the engine, a 3/16 in. dia. hole is

bored through the back of the main casting to line up with the wrist-pin at bottom dead center. Removing the cylinder sleeve then allows a thin stick of soft balsa to be forced into the wrist-pin end to withdraw it and release piston and rod.

The needle valve is of the current Fox improved pattern in which the needle is supported at both ends. In this, the needle, instead of being tapered off to a point, has a small knob on the end which fits into the small bored section of the spray bar. The knob is flattened on two sides to allow the passage of fuel which is regulated, in the normal way, by tire tapered section of the needle. The back plate is also different from orthodox practice in that the upper two retaining screws are wider spaced than the bottom pair, thus ensuring that the back plate cannot be replaced incorrectly.

On test, our Rocket 35 delivered a maxi-mum horsepower of just over .53 at a shade under 14.000 rpm, following a total logged time of five hours. Fuel was in accordance with the maker's recommendation. Although this figure of .53 is below the maker's claims, it is nevertheless a satisfactory level and could doubtless be bettered under ideal weather conditions permitting the further addition of Fox Hi- Nitro to the fuel. Maximum torque was 46 oz. in. at 8.000 – 9.000. Plotted course of the power curve was as follows:

At 8.000 rpm	.365 bhp.
At 9.000 "	.410 "
At 10.000 "	.450 "
At 11.000 "	.482 "
At 12.000 "	.510 "
At 13.000 "	.527 "
At 14.000 "	.532 "
At 15.000 "	.523 "

Typical prop speeds represented by these figures include 10.500 on all 11 x 4, 11.900 on a 10 x 6 and 12.400 on a 10 x 5. For starting, the Rocket seems to like to be reasonably wet, although care should be taken not to flood the motor. When re-starting the motor warm, our Rocket responded best to a port prime as for cold starting rather than choking the in-take. In this respect starting was not, perhaps, quite so foolproof as with the Stunt 35 engine.

Fox 35 Rocket

Running on all props was even and free from excessive vibration and response to the needle valve adjustment was positive and progressive. The only criticism here is that the short frontal overhang and small control knob did tend to make needle adjustments a trifle uncomfortable when the motor was running, but this would be less critical with the engine installed in a model, where one's hand can be steadied against the fuselage while the needle is operated between forefinger and thumb.

Summary of Data

Type: Loop-scavenged two-cycle with shaft rotary valve induction.

Weight: 7.5 oz.

Displacement: 0.3519 cu. in.

Bore: 0.800 in

Stroke: 0.700 in.

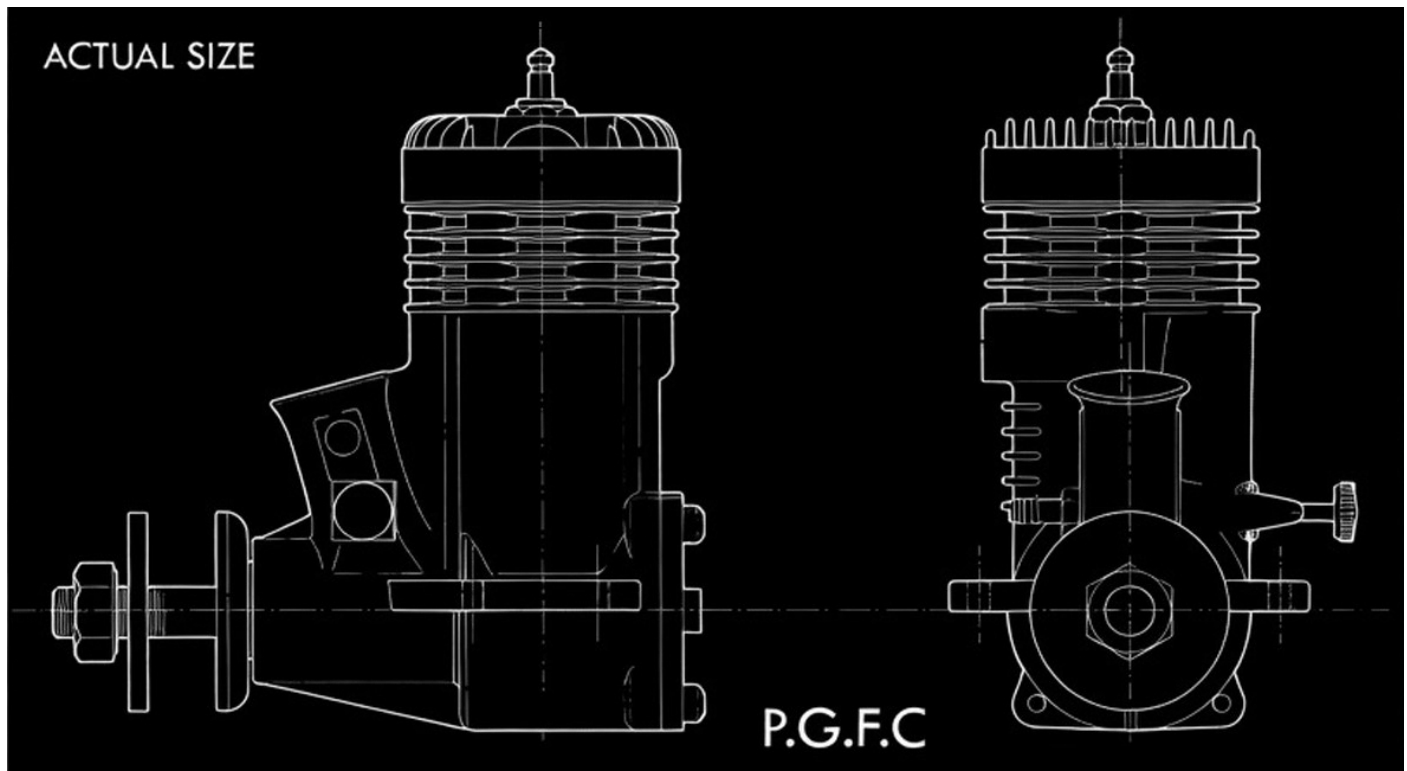
Stroke/Bore Ratio: 0.875:1

Specific Output (as tested): 1.54 bhp/ cu. in.

Power/Weight Ratio (as tested): 1.13 bhp/lb.

Manufacturer: Fox Manufacturing Company Inc., 5305 Towson Avenue, Fort Smith, Arkansas.

Price: \$11.95.



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