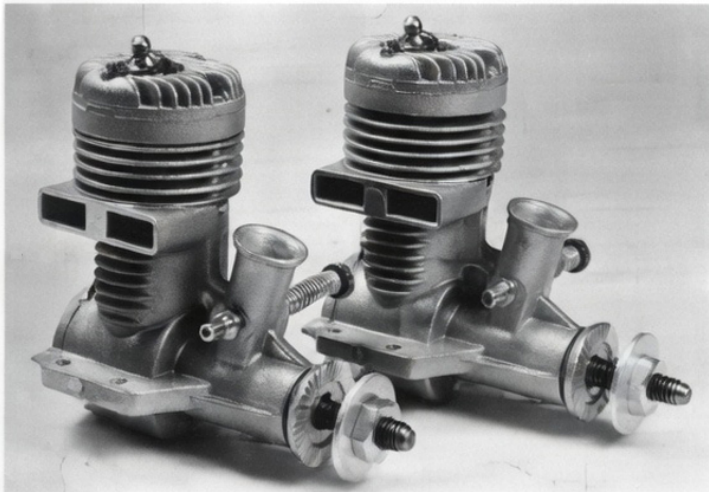
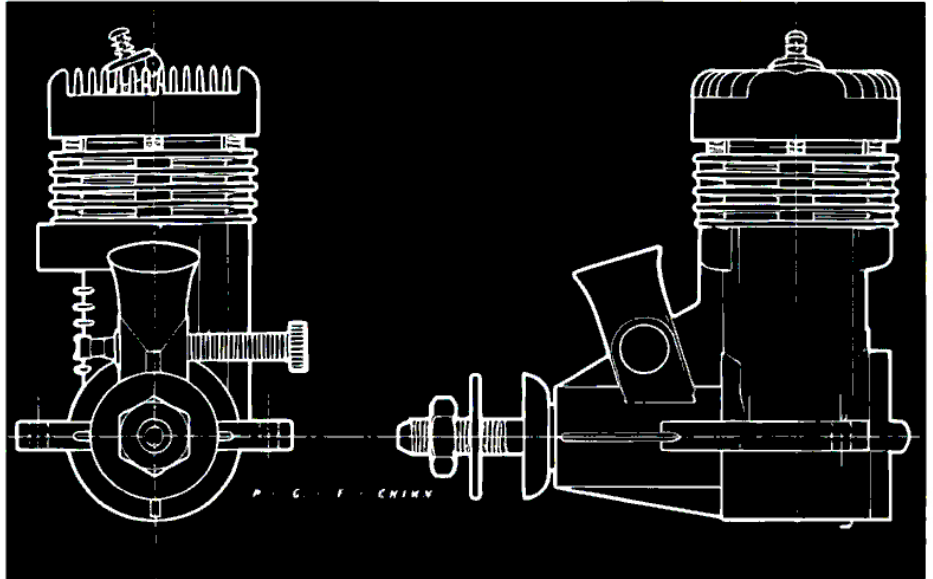


Fox 15X and 15XX

engine review

by P. G. F. CHINN

fox 15X



Fox 15XX contest engine left above and 15X sport engine. Former identified by lowered head, faced off stack and XX stumped under log.

IS THERE A DIFFERENCE BETWEEN SPORT AND RACING ENGINES? THIS MUST HAVE BUGGED YOU FROM TIME TO TIME. THEREFORE, OUR REVIEW OF THE STANDARD AND THE COMPLETION FOX 15's ANSWERS THIS PROBLEM.

► When Fox ads claimed 0.5 horse power for the new Fox 15X, there were more than a few raised eyebrows. We must therefore make clear, immediately, that this figure does not apply to the stock 15X. The 15X is actually being made in three distinct versions.

The first is the standard 15X, selling at a modest \$6.95. Identical in design, but using a lightened piston, machined connecting-rod, super quality main bearing and a higher compression ratio, the 15X is also available in an "XX" competition version selling at \$15. Thirdly, the factory will, in due course, oiler a fully modified racing version at 830.

Our present report deals with the 15X and 15XX models. Our tests revealed a remarkable progression from spoil type performance towards top grade contest performance, as the two engines were tested. Astonishing as it may seem the 15XX, running on a racing grade fuel containing 50 percent nitromethane,

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actually developed 140 percent more power than the 15X running on ordinary 5 percent nitro fuel. In terms of prop speeds, rpm went up by nearly 3.000 on an 8 x 4 Tornado and by 5.700 on a 7 x 3 Top Flite prop.

An illustration of how power was increased through five separate stages is contained in the following prop / rpm extracts from our test notebook.

Rpm on 8 x 4 Power Prop:

15X	using Fox Super fuel:	12.500	rpm.
15X	using Missile Mist:	13.400	"
15XX	using Fox Super fuel	14.700	"
15XX	using Missile Mist:	15.100	"
15XX	using 50% nitromethane:	16.200	"

Owners of stock 15X engines can convert them partially or completely to 15XX specification by the installation of optional replacement parts. First and cheapest modification, is to discard the decompression spacer under the head to increase the compression ratio. This will raise both power and peak operating speed and can be followed by the replacement of the standard die-cast conrod by the special machined rod (part No. 1507XX—\$4.50). This rod is more durable and will permit extremely high speeds (well over 20.000 rpm) to be used without risk of failure. Finally, the lightweight piston, with matched sleeve (Part No. 1504XX—\$6.00) and XX crankcase with super quality bushing (Part No. 1501XX—\$5.50) will complete the transformation. Keen hop up fans will probably want to try opening up or radiussing ports, converting to pressure feed etc. Duke Fox has a word to say about this in his new "Model Flyers Handbook" normally costing 25 cents, but available free of charge by mailing the flap from your Fox 15 carton to the factory. Alternatively, as we have said, a full factory modified racing motor will be available at \$30.00.

The 15X supersedes the earlier Rocket 15 engine. It is virtually a new motor throughout and about the only part that is unchanged is the crankcase cover. The most unexpected development is the abandonment of the Desaxe, or offset, cylinder that has been a trade-mark of

all previous Fox loop-scavenged motors. Unlike the Rocket 15, which had an integrally finned cylinder, the 15X follows the tradition of the bigger Fox motors and employs a one-piece crankcase and cylinder casting with drop-in sleeve.

The cylinder sleeve is of leaded mild steel, ground on the OD and ID and finished with a cross hatch hone. This, Fox tells us, is done with a stone specially prepared by mixing 2.000 mesh natural abrasive with a Bakelite bond and the surface is a duplicate of the Gisholt super finish process. The piston is of Meehanite-E cast-iron. It has a flat crown with a straight fence baffle which is higher at the center than at the sides, a shape that was decided upon after tests on innumerable alternative designs. Internally, the stock piston has a continuous wrist-pin band. The XX piston is lightened by having this band machined away each side, leaving only sufficient material to form adequate wrist-pin bosses, plus an annular rib above the wrist-pin' to resist distortion. The wrist-pin is a fairly modest 1/8 in. dia. and is of hardened steel. It is solid and is pressed into the rear wrist-pin hole, but is free-floating at the front, the object being to prevent any distortion occurring due to unequal thermal expansion. The stock conrod is die cast, but the XX rod is machined from 24 ST alloy. The latter, incidentally, is color-anodized red.

The crankshaft is machined from case-hardening mild steel and is hardened to a Rockwell hardness number of C-58. Both the main journal and crankpin are ground to a high finish. The journal has a diameter of 3/8 in. and a 1/4 in. bore gas passage. It has a full disc web and a crescent counter balance. Ahead of the journal, the shaft steps down to 3/16 in. dia. for prop mounting and carries three short lands to engage the die cast prop drive washer. The valve port in the shaft journal is rectangular, 9/32 in. long and registers with a circular intake aperture in the main bearing. It gives a measured intake timing of approximately 45 deg. ABDC 45 deg. ATDC. Other timing measurements include an exhaust period of 148 degrees and a bypass period of 136 degrees of crank angle.

Fox 15X and 15XX

The die cast cylinder head is interesting in that it carries its short-reach glow plug inclined at 20 degrees to the cylinder axis so that no irregularly shaped pocket is formed in the wedge shaped combustion chamber. Fox has chosen the wedge combustion chamber after countless experiments with all types of head shapes over the years. The head is deeply finned and is secured to the main casting with four Phillips screws, the flange of the cylinder liner entering an annular channel in the head on the XX version and making the gas tight joint via two .010 in. soft aluminum gaskets. On the Stock engine, one of the gaskets is omitted and is replaced by a 1/16 in. thick decompression ring or spacer. This very substantially reduces compression and is recommended for stunt, sport and radio-control flying. Removal of the spacer is recommended for speed, combat, rat racing and contest free flight.

Two 15X and one 15XX engines were received for test. Our first task was to break in the two 15X's. After one hour's break-in time on each engine, the best of the two was picked for further break-in and test. Actually, there was not a great deal of difference between the performance of the two stock engines, the maximum variation being to the order of 300 rpm at around 13,000. Incidentally, the Fox 15 is not an engine that demands a long and tedious break-in. We found that it could lie safely two-cycled almost immediately (taking care not to run the engine too lean of course) which means that in-flight break-in is perfectly permissible after an adequate ground check.

We found the 15X easy to start, using orthodox practice of a prime when cold, or a couple of choked preliminary flips of the prop when hot. Preliminary tests were run on standard Fox Super fuel (5 percent nitro) but in stock low-compression condition (i.e. with head spacer in place) and under the cool climatic conditions prevailing, the engine obviously required a hotter fuel and our power and torque curves for the 15X therefore show the performance subsequently obtained as a result of further tests on the maker's recommended Missile Mist fuel, which is a blend of intermediate nitro rating. Under light loads, this

actually added up to 1,800 rpm and, surprisingly, raised the horsepower peaking speed by nearly 3,000 rpm for an output of 0.23 bhp at 17,000. There was, in fact, a substantial all-round improvement on this fuel, giving quicker starting and steadier running with less critical needle adjustment, especially in the higher rpm bracket.

Preliminary tests on the 15XX after a two hour break-in, were also carried out on Super fuel. Starting was a little less easy than with the 15X, but, due to its higher compression ratio, the 15XX showed a spectacular power increase on this mild fuel. Using a prop matched to the bhp peaking speed of the 15X on Missile Mist, the 15XX actually proved over 2,400 rpm faster on Super fuel, whereas substituting Missile Mist, added only a further 500 rpm. Fox claims, however, that, under suitable conditions, this engine will respond to up to 70 percent nitro and a series of tests were therefore made on hotter fuels, culminating in a full test on a 50 percent nitro mix. On this, prop speeds went up a further 900-1,200 rpm over the useful speed range and resulted in a peak output of 0.415 bhp at 20,500 rpm.

It must be emphasized that the Fox 15 is essentially a high-speed motor and that, to make full use of its performance, it requires smaller props than are normally employed with 15's. The engine, even in XX form, does not develop especially high maximum torque and so does not produce quite such high power, on props larger than 8 x 4, as some other 15's under similar conditions. The 15XX torque curves, however, are very flat and, as a result, the engine, as we have seen, really begins to come alive at 20,000 rpm speeds. It is perfectly happy at these speeds and we ran the 15XX several times for minutes on end at a smooth 22,000 rpm without so much as burning out a plug. It will also go a good deal faster than this on a suitably chopped prop (Duke Fox claims that the full race special will hold together as high as 32,000) although no useful purpose appears to be served by propping for speeds much above 20,000 as in-flight rpm will then be well past the speed at which peak bhp is developed.

Fox 15X and 15XX

To us, testing the 15X and 15XX was an interesting experience and we look forward to trying the factory racing special version in due course.

Summary of Data

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

Weight: 3.6 oz.

Displacement: 0.1476 cu. in. or 2.419 c.c.

Bore: 0.590 in.

Stroke: 0.540 in.

Stroke/Bore Ratio: 0.915:1

Specific Output: 15X

(as tested in Missile Mist fuel): 1.55 bhp/cu. in.
15XX

(as tested on 50% nitro fuel): 2.75 bhp/cu. in.

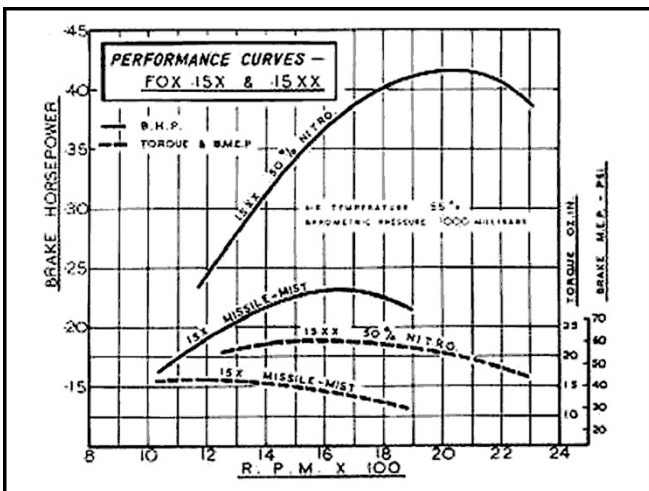
Power/Weight Ratio: 15X

(as tested on Missile Mist fuel): 1.02 bhp/lb.
15XX

(as tested on 50% nitro fuel): 1.84 bhp/lb.

Prices: \$6.95 (15X), \$15.00 (15XX).

Manufacturer: Fox Manufacturing Co., Station A,
Fort Smith, Arkansas.



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