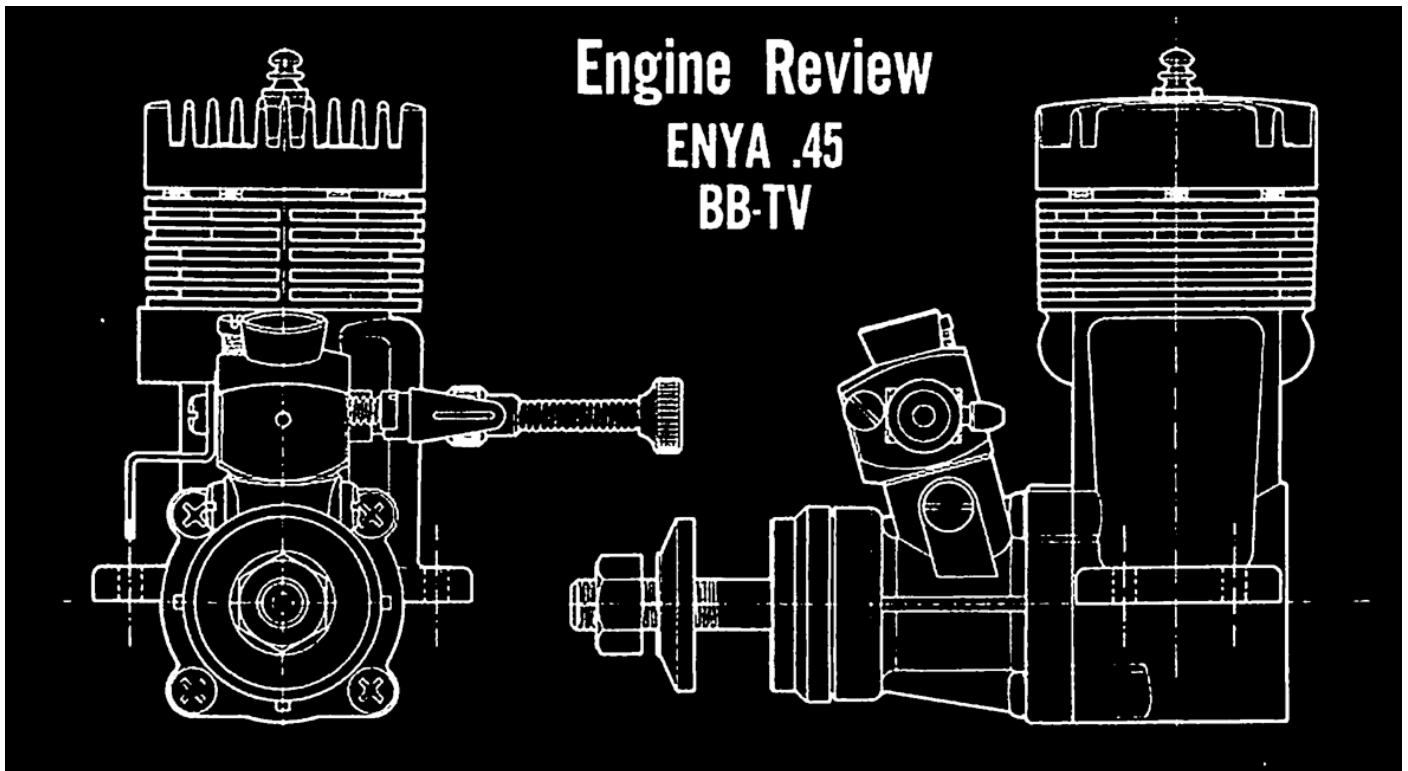


Enya 45BB-TV R/C



► Although this new Enya engine bears a family resemblance to the plain bearing Enya 45 and employs a modified version of the original 45 main casting, it would be more accurate to describe it as a completely new model and not merely as an improved version of the standard model. The more costly 45BB is actually supplementary to the standard 45. It does not supersede it. The aim of the manufacturer has been to offer, to those modelers who favor a smaller and lighter type of multi model, an engine having the refinements normally associated only with the better .60 class R/C motors.

Many of the features used on the popular Enya 60-II TV are, in fact, incorporated on the 45BB-TV. These include the ring-equipped machined aluminum piston, bronze-bushed piston bosses, skirt bypass ports, forged connecting-rod and, of course, twin ball-bearing shaft. Comparing the 45BB with the standard 45, numerous small improvements are to be found in the newer model and there is an all-round improvement in the finish and appearance of the engine. None of the component parts of the new engine is interchangeable with the corresponding part in the older model.

It may be recalled that the earlier type 45 was covered in the Engine Review series some three years ago and put up an exceedingly good performance, including the best power output of any engine in the .45 cu. in. R/C class. At the time, we pointed out that the actual bhp recorded on test might be slightly above the average for Enya 45 TV's in general, partly because atmospheric conditions existing at the time of testing were favorable and partly because the test model, having been supplied direct by the factory and partially broken-in, could be assumed to be a reasonably "good" one.

On test, the 45BB TV recorded almost the same maximum power output as the 45-TV had done in our earlier test but, bearing in mind the foregoing remarks, it is reasonable to assume that, on average, the new model is more powerful than the plain bearing engine. We would estimate that up to 10 percent would separate typical examples of the 45 TV and 45BB TV. Apart from this, we found the handling qualities of the 45BB TV to be better than the already quite good characteristics of the 45-TV.

As we have said, the only part which the 45BB inherits from the standard 45 is the main casting. This has been modified and is also machined a little differently.

Enya 45BB-TV R/C



Just over 10 oz. compact Enya is light for ball bearing .45 R/C engine note polished head.

The engine has a slightly bigger cylinder bore than the lapped piston 45. The bore is now 22.3 mm. instead of 22.2 mm. which, with 0.1 mm. increase in crank throw also, raises the piston displacement from 7.354 c.c. (0.4488 cu. in.) to 7.499 c.c. (0.4576 cu. in.).

Although the cylinder bore is greater, the cylinder liner actually has a slightly smaller outside diameter, reducing cylinder wall thickness from 1.4 mm. to 1.2 mm. The liner, very well finished inside and out, is much longer than that of the lapped piston engine and also has smaller port areas. The ports are, of course, now subdivided (four exhaust and four bypass) in order to avoid trapping the piston rings. Port timing is substantially modified. The exhaust period now occupies 122 degrees of crank angle compared with 132 degrees and the bypass period is 102 degrees instead of 118 degrees.

In the traditional Enya style, the front bearing housing is detachable from the cylinder crankcase casting to which it is secured by four 3.5 mm. Phillips screws via a substantial flange. The o.d. of the rear ball-bearing serves to align the two components.



Quality no components from older model used.

Both ball-bearings, incidentally, are English measurement rather than Metric sizes; $\frac{1}{2} \times 1\frac{1}{8}$ in. at the rear and $\frac{3}{8} \times \frac{7}{8}$ in. at the front, and have steel cages.

The hardened crankshaft has a $\frac{1}{4}$ in. dia. crankpin and a crescent counterbalance. Ahead of the front bearing, it has two flats onto which the machined dural prop driver is keyed. The prop driver fits over a machined run on the front bearing housing and thereby gives some protection to the ball-bearing against dirt. The shaft is bored a generous 9.7 mm. and the rectangular valve port is timed for a 194 degree induction period, opening at 38 degrees ABDC and closing at 52 degrees ATDC.

The alloy piston is machined from bar stock, has a flat head, a thin straight baffle and is fitted with two cast-iron rings. Ample precautions against rapid small end wear are evident in the use of a large diameter (6 mm.) wristpin, closely fitted to bronze bushes in the piston bosses and to an 11 mm. wide con rod eye. The con rod is a well proportioned alloy forging and is bronze bushed at the crankpin end. The piston also incorporates two V4 in. dia. skirt ports on the bypass side which register with similar ports in the cylinder liner, as on recent models of the Enya 60-II. In addition to aiding gas flow to the bypass passage this, too, should be helpful in keeping the piston cool (excessive heat being one of the contributory causes of small end wear) by preventing hot stagnant gas from collecting under the piston head.

The cylinder head has a shallow hemispherical internal contour surrounded by a flat band which

Enya 45BB-TV R/C

is not, strictly speaking, a squish band since there is rather too much clearance between it and the piston at TDC. The head has a centrally located brass bushed plug hole and a machined joint face where it meets the raised rim of the cylinder liner. No gasket is employed. Deep cooling fins are used and the head is retained with six screws.

Replacing the large and complex twin needle carburetor of the original 45-TV, the 45BB-TV carburetor is much the same as that fitted to the 60-II TV except for a smaller diameter choke (5.8 mm. instead of 6.5 mm.). It features a machined aluminum body, a finely ground steel throttle barrel and the usual throttle stop and airbleed adjustment screws. The needle-valve assembly is firmly mounted on the left side of the carburetor body with the jet protruding into the center of the throttle barrel. This, incidentally, permits a certain amount of adjustment to be made in the effective choke area, by screwing the jet in or out. On the opposite side, a cranked throttle arm is fitted and this can be connected to a coupled plate type exhaust restrictor (normally supplied with the engine as an optional fitting) or the engine can be operated, like all earlier Enya R/C motors, without any form of exhaust restrictor.

Our tests on the Enya 45BB TV were carried out with the exhaust restrictor fitted and a repeat series of tests were also made with the appropriate Enya muffler substituted. Glow plugs used were Enya No. 5 (medium heat rating) and No. 3 (hot type). Little or no difference in performance or throttling was detected under the prevailing conditions on these two plugs and all performance tests were therefore made with the somewhat more robust No. 5 plug fitted.

The first thing that impressed us was the easy starting. We primed the engine once for the first start. Thereafter, we found that we could invariably obtain a start without exhaust priming. If the engine was cold, the necessary rich starting mix could be induced merely by choking the intake for two or three preliminary flips of the prop. When warm, the engine would usually restart, without choking, on the first or second flip.



Muffler effective, slightly above overage power loss.

Very little break-in time was called for. We ran the Enya for no more than 20 minutes aggregate running time on a rich setting. At the end of this period it would hold a steady two-cycle leaned out to maximum rpm without overheating or losing power. A total of one hour of running time was accumulated before tests were undertaken. At the end of this period, the Enya was picking up about 500 revs in the course of 30-40 seconds warming up from cold when propped for speeds around the peak.

Prop rpm recorded on our standard R/C fuel of 5 percent (pure) nitro rating and without muffler fitted, included 8.600 on a 13 x 5½ Top Flite wood, 9.500 on a 12 x 6 Power Prop wood, 10.000 exactly on an 11 x 6 Top Flite wood, 10.300 on an 11 x 6 Power Prop wood, 11.100 on an 11 x 5 Top Flite wood and 11.450 on an 11 x 5 Power Prop wood.

As with the earlier model, the 45BB-TV was notable for its relatively high torque and, in consequence, good low speed pulling power. Torque declined steadily as load was reduced, giving a nice flat peak to the power curve. Maximum power recorded on test was just over 0.66 bhp at around 11.700 rpm but prop selection should not be unduly critical. One might envisage propping the Enya for level in flight rpm of, say, 12.000. The loss of revs as more load is put on the prop in climbing maneuvers should then make

Enya 45BB-TV R/C

little or no difference to the actual power delivered.

The medium size Enya muffler intended for use with the 29-45 Enya engines resulted in a rather more severe loss of power particularly at high rpm than we have encountered with other Enya engine/muffler combinations tried so far. This, as the graph shows, accounted for a drop of nearly 20 percent in peak power. More important, as the graph also shows, the peaking speed is much lower and it would be desirable therefore, to match the prop to this new peak when the muffler is used i.e. to use a slightly larger prop so as to hold rpm at around the 10.000 mark. A prop chosen to produce an "un muffled" rpm of, say, 12.000, will lose only about 800 revs when the muffler is fitted, i.e. it will turn at about 11.200 rpm, which is more than 1.000 revs beyond the new peak and will result in a greater power loss than if a larger, slower prop (e.g. an 11 x 6, which, with muffler, the Enya will turn at 9.400-9.600 rpm static) were used.

The muffler had no other adverse effect on the performance of the Enya. In no way did it complicate starting and, although the muffler is merely a simple expansion chamber without any form of baffling, a useful degree of silencing was obtained with it.

The throttle worked well and, with careful adjustment, we were able to get a reliable idling speed as low as 2.000 rpm on a 13 x 5½, or 2.200 on a 12 x 6, rising to 2.500 – 2.800 rpm on 11 x 6 and 11 x 5 props. The airbleed needed to be opened approximately 3 ¾ turns on our test engine to obtain these figures.

The final assessment of any model engine, of course, can only be made after a reasonable number of production models have been through the mill at the hands of purchasers, but on the strength of its general design and construction and on its bench performance, we would venture to rate this motor very near the top of the .45 cu.in. R/C engine class.

Summary of Data

Type: Loop scavenged two-stroke cycle with twin ball-bearings and shaft rotary-valve induction. Throttle type carburetor and coupled exhaust restrictor. Muffler optional.

Weight: 10.1 oz. (12.6 oz. with muffler)

Displacement: 7.499 c.c. = 0.4576 cu.in.

Bore: 22.3 mm. (0.8780 in.)

Stroke: 19.2 mm. (0.7559 in.)

Stroke/Bore Ratio: 0.861:1 Specie

Output (as tested):

1.44 bhp/cu.in. (less muffler)

1.18 bhp/cu.in. (with muffler)

Power/Weight Ratio (as tested):

1.04 bhp/lb (less muffler)

0.68 bhp/lb (with muffler)

Price in U.S.A. \$36.50

(muffler \$3.50 extra)

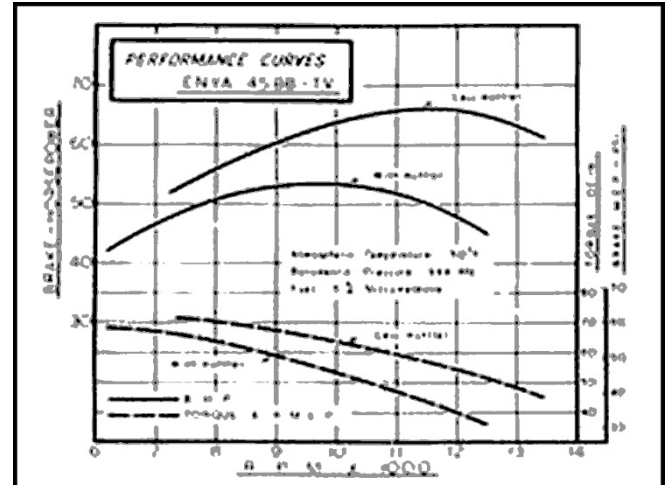
Manufacturer:

Enya Metal Products Co. Ltd. Tokyo Japan.

U.S. Distributor:

MRC-Enya Co. Inc.

5300 21st Avenue, Brooklyn, New York 11204



Enya 45BB-TV R/C



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