

K&B .40R/C Torpedo Series 66

ENGINE REVIEW K&B .40R/C SERIES 66

HOTTEST GOODYEAR CLASS UNIT TO DATE
IS OUR REVIEWER'S VERDICT ON LATEST
OFFERING FROM K&B ENGINE DEPARTMENT.

► K&B's line of Torpedo "Series 64" engines, the 15R, 29R, 29F and 35, are among the foremost control-line and free-flight motors produced in the world today. The 35, with the addition of a throttle type carburetor has, by virtue of its high power output, also proved to be a very good motor for Goodyear type R/C pylon racing.

Now, to take full advantage of the .40 cu. in. displacement limit effective in Goodyear (and also in the Class I Navy Carrier C/L event) K&B have introduced their "Series 66" Torpedo 40 R/C, based on the Series 64 Torpedo 35 R/C, but with swept volume upped to .399 cu. in. and a number of interesting modifications.

The most obvious outward change is in the cylinder block, which has the external shape of the bypass widened at the top to resemble that of the 15R model. On the 15R, this modification was made in order to permit the internal dimensions of the bypass to be increased for improved breathing at ultra high rpm. On the 40 R/C, the internal bypass width has not been altered and we therefore assume that the new shape is to allow for future development more probably with certain other models using the same basic casting, rather than with the 40 R/C which would probably not benefit by such a modification for Goodyear racing at the present time.

Internally, the most marked change, between the Series 64 (and the preceding Series 61) models and the new 40, is in the adoption of a ringed aluminum piston. Moreover, this is of an unconventional type, using a single L section Dykes type low-pressure piston ring, the top edge of which is flush with the



Series 66 looks same as Series 64 except for externally widened bypass.

piston head. The piston is machined from bar stock, rather than cast, and has a straight baffle with smooth fillet radii on both the exhaust and bypass sides. The piston ring is of centrifugal cast-iron and, incidentally, should not be detached from the piston unless it is to be replaced by a new one, since removal is almost certain to distort the ring which will then cause loss of compression when the engine is reassembled.

The use of a ringed piston has dictated a change in cylinder and piston porting and, as with all other engines having unpegged piston-rings, the bypass and exhaust ports are now of the multiple type: four bypass and five exhaust. These, according to measurement of our test engine, are timed to give a bypass period of 122 degrees and an exhaust period of 140 degrees.

The rotary intake valve is timed to remain open for approximately 195 degrees, opening quite early at 30 deg. after bottom dead center and closing at 45 deg. ATDC. These, again, are figures from actual measurements of our test sample.

When new, the engine has an unexpectedly stiff and "springy" feel, which is quickly diagnosed as being in the shaft assembly and suggests, quite correctly, the use of an oil seal. The seal is installed immediately behind ¼ in. i.d. x 5/8 in. o.d. front ball bearing. At the rear, the shaft is carried in a ½ in. i.d. x 1 1/8 in. o.d.

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40-R/C parts display usual K&B design ingenuity, precision and quality.

Fafnir ball journal bearing which, as on the 35 and 29F, also serves to locate the separate front housing with the crankcase. This housing is basically the same as on the 35 and 29F, but has a shortened intake boss into which the R/C type carburetor is fitted. The holes through which the spray-bar is normally inserted, are tapped and fitted with a pair of set screws which secure the carburetor body.

The carburetor is of typical K&B design with barrel throttle and co-axial spray-bar inserted from the right hand side. The carburetor body is of machined aluminum and is bored .432 in. for the steel throttle barrel. This latter has a ground finish and a .290 in. choke diameter. A cranked throttle arm is attached to it with a single screw. The throttle barrel is retained, in the usual way, by the idling adjustment screw, which is provided with a locking nut. On the other side, the carburetor body is sealed with an aluminum plug carrying the brass spray-bar and needle valve assembly with tee-fitting fuel inlet. This plug is secured with a small pin through the back of the body, presumably to provide protection against its pulling out if subjected to shock.

No provision is made for adjusting idling mixture strength, but there is a small bleed hole in the front of the carburetor body which comes into effect when the throttle is approximately half closed. This takes the place of the notch in the barrel featured by the Torpedo 45 R/C. Incidentally, the choke diameter on the 40 R/C is



Prominent design feature is aluminum piston with special single L section ring.

quite a bit bigger in area (about 25 percent in fact) than that of the Torpedo 45 R/C.

As supplied, the engine has the throttle arm on the left hand side. It is, however, possible to reverse the whole carburetor assembly so that the throttle arm is on the right. This will mean slackening the locknut on the spray-bar and positioning it so that the fuel inlet points downwards in order to suitably re-locate the spray-bar jet hole in the choke.

The rest of the engine follows the general pattern of the front rotary Series 64 engine. It has, in fact, the same stroke as the 29F and 35 employs the same crankshaft. The cylinder head uses a wedge shaped combustion chamber on the exhaust side of the piston baffle while the bypass side is shaped to provide maximum squish effect for improved turbulence. The glow plug is a long-reach idle-bar type, located centrally in the head.

As received, our 40 R/C slatted well, but was even better after 30 or 40 minutes running, which was approximately the time required to reach the point where the engine could be safely leaned out. Incidentally, hot starting, especially, was improved after the nominal break-in period. We found that the 40 liked to be fairly wet for starting.

Signs that the 40 R/C was going to emerge as an extremely powerful contender in its class were evident as soon as we began preliminary prop/rpm checks where, even on 11x6 and 12x6

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props, it was appreciably more powerful than the now venerable Torp 45 R/C. On smaller props, as expected, the 40 bettered any of the regular R/C 45's tested to date, reaching 11.750 on an 11x5 Power Prop, 13.500 on an 11x3 and 14.900 on a Top Flite wood 10x3 ½. In order that further comparison could be made, we then ran torque tests using standard 5 percent nitromethane R/C test fuel and from these obtained curves shown on performance graph.

As yet, there are relatively few R/C .40 class engines on the market and, prior to testing the K&B, the most powerful we had handled was the O.S. Max-H 40 R/C, an engine that has already made its mark in the Goodyear type event. On test, our Max-H 40 R/C put out a highly impressive 0.70 bhp at 13.500 rpm on 5 percent nitro and we felt that it would be a very good engine indeed that would better this. Nevertheless, the K&B did so quite convincingly, reaching 0.75 bhp at just on 14.000 rpm.

This, of course, refers only to the 40 R/C's performance on a relatively mild fuel, whereas, in addition to such fuels, K&B approve the use of Supersonic 1.000 or even Supersonic Speed Fuel for the 40 R/C where maximum all-out performance, without regard to engine life, is required. Prop checks indicated that up to 1.000 rpm extra may be expected on suitable props with such fuels.

Since we have drawn attention to the Torp 40 R/C's superiority to the Max 40 R/C in regard to power, it is only fair to remark that it did not quite come up to the latter as regards throttling ability. Unlike the O.S., the K&B does not have any means of adjusting idling mixture strength and the lowest speed we could achieve without readjustment of the needle-valve was 6.800 rpm. Attempts to bring the 40 below this resulted in the engine running excessively rich and cutting out. On the other hand, readjustment of the needle-valve allowed the throttle to be closed down to a steady 3.500 - 4.500 (according to prop size) and we feel that, by opening up the small bleed hole in the front of the carburetor body, the throttle range could be extended to include a low idle.

The bleed hole size for best performance, may vary a little between individual engines and this, obviously, is something that can only be done by careful step-by-step experiment. As the Torpedo 40 instruction leaflet rightly points out, for Goodyear racing, the low speed operation can be maintained at a slightly higher level than that necessary for other types of R/C flying and, since the engine has been ported for maximum horsepower, one should not expect to obtain a 2.000 rpm idle such as might be achieved with a regular "aerobatic" type multi R/C engine.

The general handling and running qualities of this K&B were excellent with particularly smooth running in the 12.000 – 15.000 rpm speed range where the engine is developing its best performance. There appears to be every reason to expect some winning performance from the K&B 40 R/C in Goodyear racing in the immediate future. The engine's specific output of 1.88 bhp/cu.in. and power/weight ratio of 1.32 bhp/lb are the highest to date for an R/C engine, irrespective of size.

Summary of Data

Type: Loop-scavenged two stroke cycle with shaft rotary valve and twin ball bearings. Throttle type carburetor without exhaust restrictor.

Weight: 9.1 oz.

Displacement: 0.3990 cu.in. = 6.539 C.C.

Bore: 0.840 in. Stroke: 0.720 in.

Stroke/Bore Ratio: 0.857 : 1

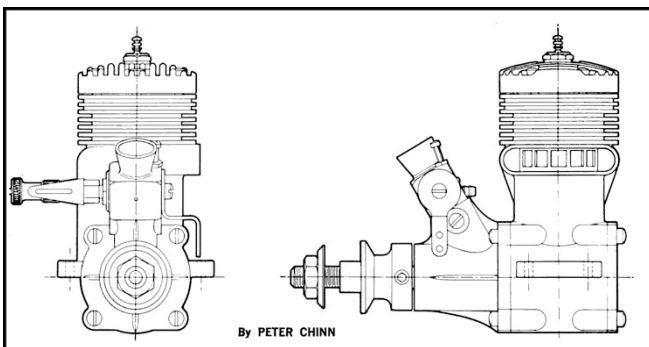
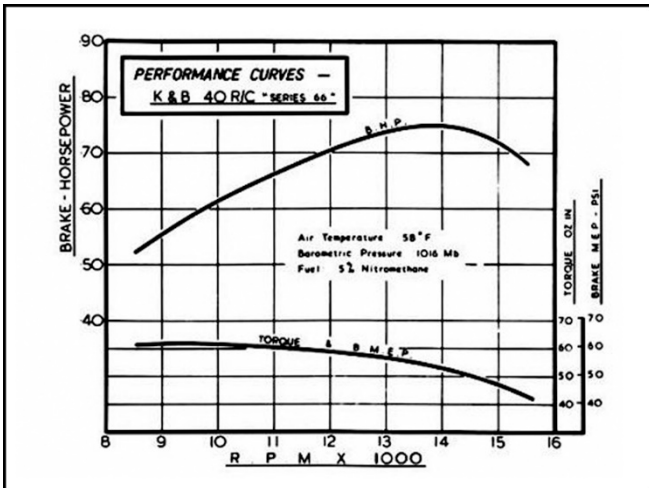
Specific Output (as tested): 1.88 bhp/- cu. in.

Power/Weight Ratio (as tested): 1.32 bhp/lb.

Price: \$28.95.

Manufacturer: K&B Manufacturing Corporation, 12152 S. Woodruff Avenue, Downey, California 90241.

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