K&B Allyn .09

K&B Allyn .09 Engine Review

Huge port areas and hefty crankshaft pay off in this short-stroke .09. Resembles older .15

Potent .09 has almost 60°/o more power than early postwar great, the Arden .09. What is the magic formula? by E. C. MARTIN

► This new addition to the highly successful Torpedo range evokes the same comment as the appearance of the .15 three years ago. The smaller they get the prettier they look. Rather surprisingly, one can also add that the smaller they come the more powerful they get, because for its displacement the .09 is the hottest Torpedo of them all, giving roughly the same performance as the best .19 engines of six years ago.

Basically, the design of the .09 stems from its immediate predecessors, the .15 and 29R, incorporating many of the lessons learned from those engines, and becomes the first regular all-purpose Torpedo to feature a very short stroke. The other Torps have various stroke-bore ratios but none, apart from the 29R, depart very far from the square arrangement. This is interesting because stroke-bore ratio, in common with porting arrangements and ringed or lapped pistons, has long been a matter of controversy among

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model engine designers. The performance of the Torp .15 and several other notable engines, including the Series 20 McCoy .60, seemed to indicate that ultra short stroke was a lost cause. The Doolling and Atwood machinery said otherwise, and when you live through the experience of seeing your latest-up-to-the-minute pride and joy, a short-stroke .19, being successfully dragged by a long- stroke .15 you begin to doubt the laws of nature. The law in question, which is self evident, is simply that power ultimately depends on piston area. The bigger the area, the bigger the bore and circumference, and therefore the bigger the possible port area. Power is in direct proportion to volumetric efficiency which depends on port area, so that a big bore with large piston area has to give the most power if the rest of the engine will allow, and if it does not, then the bottleneck is elsewhere in the engine.

The Torpedo .15 has a bore of .580 and a stroke of .555 giving a ratio of .957. The .09 with .521 bore and .465 stroke has a ratio of .892. The .15 was outstanding for two reasons, one because of its rigidity and low friction, and, two, because of its very large port area in relation to bore diameter and piston area. The same ratio of port area to piston area built into the short-stroke .09 therefore logically produces a more powerful engine. The K&B engines have several times shown that the old story is still the right one after all. Remember lapped versus ringed pistons, and opposed versus radical porting? By careful testing and observation, and practical refinement, these engines have frequently separated the wheat from the chaff, and while on the subject of port area, it is interesting to see that the bypass port on the .09 takes up all the available space, whereas the exhaust port could easily be made bigger, and in fact does not utilize the full width of the stack. Many authorities claim that a large exhaust is unnecessary and even desirable but that, within the bounds of reason, the bigger the bypass the better. Their argument is that the exhaust gases escape at high pressure and consequently attain a high velocity. The resulting momentum leaves a slight depression in the cylinder adjacent to the exhaust port, and also in the stack, which tends to divert the upward path of the incoming charge so that some of it goes straight across and out of the exhaust port thus causing lost power. If the exhaust port of an engine in which this was happening was reduced in area by the correct amount to suit the RPM, at which maximum power was reached, then this charge loss would be avoided and power would be increased accordingly. It is one of the inherent disadvantages of the two-cycle engine, in its conventional form, that the exhaust port always closes after the bypass, thus making some degree- of charge loss unavoidable at all speeds lower than that for which the port areas were designed. Obviously if the exhaust port is too small the exhaust residue will resist the incoming charge and also cause lost power, and therefore the dimensioning of the ports is a very critical matter where optimum results are desired at any one speed. It seems virtually impossible to calculate these dimensions because no one really knows what goes on in the cylinder at high speed. All one can do is work on a hypothesis until it is proved wrong, or, better still, keep filing the holes bigger until the power stops increasing, which is what we suspect Johnny Brodbeek did with the .09.

Comparison of the K&B .09 with the famous Arden .09 of yesteryear is irresistible as they each represent the peak of development of their day in this displacement. The Arden turned out about .14 bhp against .24 bhp from the new K&B. The Arden exhaust port area is the greater by far, and many will remember its penetrating voice, whereas its bypass port opening is relatively small against that of the K&B. thus illustrating the previous paragraph. However, the most significant difference of all is in bearing areas and the trend towards greater rigidity. Shaft diameters are all exactly 25% larger, and lengths increased by almost the same amount. The rotary' valve port area is nearly doubled and intake cross section up by half. On the other hand, overall height is reduced so that weight has only increased by 25% for almost twice the power. There are still a few old timers around who recall the great days of the Arden and will vouch for its stamina, and though they may tear out their beards at such sacrilege, we cannot pay the K&B .09 any greater compliment than by saying it is a better, stronger, hotter engine.

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Constructionally, the .09 is similar in every way to the .15 apart from the piston, which has a very shallow converging taper along its axis, starting just below its upper edge and providing a lead for the baffle and sharp edges of the piston crown as they pass the ports, thus preventing abrasion.

Handling and Performance

If you have occasion to strip and reassemble the .09, take particular care to insert the cylinder into the main casting gently. The bypass passage is very large and the cylinder can be easily distorted if tilted into this passage during assembly.

Starting the .09 presents no difficulties and the needle valve has a very wide tolerance both for starting and maximum power. An exhaust prime is usually necessary for surefire starts, but is no indication that suction is poor. On the score of vibration, this engine is exceptionally smooth at all speeds and will make many friends for this reason alone.

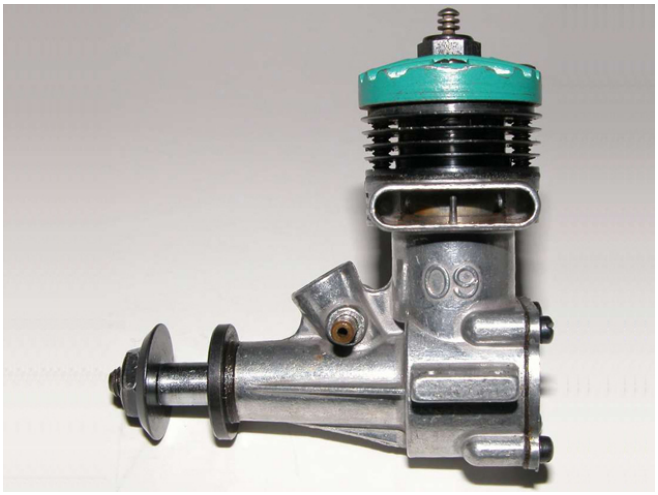
The instructions stress the need for a gentle rich mixture break-in of at least forty-five minutes, and judging from the development of the piston wear pattern on the test engine during break-in, we suggest you obey this religiously. One should watch for the disappearance of the slight scuff marks on the piston before turning up the wick. Lack of tightness is not the only sign with this type of piston and cylinder.

Test.

Plug: K&B Torpedo 3/4-32 Short Reach as supplied.
Running Time prior to test: 1 ½ hours.
Bore: .521
Stroke: .465
Weight: 2 ¾ ounces.

Power	*Prop R.P.M.*	*TopFlite*	*R.P.M.*
7x6	11.900	7x6	10,500
7x4	13.000	7x4	11.800
6x5	13.550	6x5	13.000
6x4	15.000	6x4	14.300
6x3	16.200	6x3	15.300
5 ¼ x 5	14.900		

Editor's Note.
Future engine reviews will include K&B Allyn .049 **Sky Fury:** O & R .049 Mite: and the new McCoy .35 The May issue will include another Import Review.



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