

## K&B 35 Allyn Torpedo



# The K & B Allyn TORPEDO-35

5.8 c.c. GLOWPLUG  
MOTOR

The "Torpedo-35" was introduced in June, 1954, and since that time has become accepted as one of the leading American engines in the 0.35 cu. in. (5.7- 5.8 c.c.) class. Motors of this size first became popular for C/L acrobatic work some six or seven years ago and, more recently, have been widely used also for combat and for multi-channel radio-controlled models.

Most engines of the 0.35 glow-plug class (and there are six American 35s at the present time, plus four others of foreign manufacture) adhere strictly to a proven formula, namely: shaft valve induction, loop-scavenged cylinder, lapped piston and plain bushed bearings. The Torpedo is no exception to this rule and, structurally, is a simple and logical translation of these design essentials.

It goes without saying that a high power output is one of the accepted requirements of the 0.35 class. However, a high power-weight ratio without excessively high r.p.m., rather than ultra-high specific output, is obviously the desired characteristic in a 35. This, in fact, would appear to provide the clue to the rise of the 0.35 cu. in. engine as a class on its own, for the 0.35 size began as a distinctly odd capacity under both American and European systems of cylinder capacity classification.

The 0.35 emerged and, in many instances continues to be recognizable as a 0.29 size engine externally, with the cylinder capacity increased 15-20 per cent. In most cases this has been achieved merely by increasing the cylinder bore; in others the stroke has been increased too. The general effect has been to raise the torque by an almost equal percentage at up to around 10,000 r.p.m. Since the carburettor choke area is deliberately reduced in order to increase fuel suction for acrobatic work, however, the 35 power curve usually levels off earlier, so that the peak b.h.p. occurs at somewhat lower revolutions than would be the case with a 0.29 intended for team racing or speed work on 7 and 8 in. diameter props. A 35 may not, in fact, deliver much greater peak b.h.p. than a modern 0.29 of similar design, but it has the advantage of delivering this power on the prop size (to X 6) almost universally employed for competition stunt work with the size and type of model currently favoured. Useful output at medium-high revolutions, a good power-to-weight ratio and the ability to keep running evenly despite the large variations in fuel head that occur during manoeuvres, now also favour the typical 35 for multi R/C and for C/L combat.

K & B's interpretation of the 35 is, as one might expect, modelled on other recent engines in the Torpedo range. The Torpedo 35 followed a year after the well-known Torpedo 15 and, in construction and appearance, it closely resembles the smaller engine.

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It is based on an integral crankcase/main bearing casting, with one-piece steel cylinder and detachable alloy head. The crankshaft, which is not hardened, is an easy fit in a steel bushed main bearing, its lubrication being assisted by two minute longitudinal grooves in the bearing surface, which extend forward to just short of the front end of the bush. The shaft has a rectangular admission port, 3/8 in. sq., communicating with a 5/16 in. dia. gas passage, and a crescent counter-balance which balances all rotating mass including a proportion of the conrod weight. Induction timing is the widely used 45 deg. after dead-centre, 180 deg. period.

The cylinder is machined in one piece with integral cooling fins. The bore is not especially highly finished and one may assume that the manufacturers have considered this adequate, and perhaps preferable, with a relatively soft surface, by reason of its allegedly improved ability to hold an oil film. The cylinder has the usual large exhaust and transfer ports and these have radiused corners. The bore is opened out, slightly, below port level to reduce piston drag. Only two long screws tie the complete cylinder assembly to the crankcase and, to eliminate gas leakage between the crankcase and base flange, the latter is made especially thick and rigid and the joint is sealed with a composition gasket. A gasket of similar material is used under the cylinder head and it is advisable to renew these should the engine be dismantled for servicing or parts replacement. Failure to do so may result in trouble with gasket blowing.

## Specification

**Type:** single-cylinder, air-cooled, loop-scavenged, two-stroke cycle. Glow-plug ignition. Crankshaft type rotary-valve induction. No effective sub-piston supplementary induction period. Baffle piston. Central ignition plug.

**Swept Volume:** 0.3529 cu. in. (5-783 C.C.).

**Bore:** 0.790 in.

**Stroke:** 0.720 in.

**Stroke/Bore Ratio:** 0.911 : 1.

**Weight:** 7.5 oz.

## General Structural Data

Pressure die-cast aluminium alloy crankcase unit, tumble-finished, with steel bushed main bearing. Alloy steel counterbalanced crankshaft with 7/16 in. dia. journal and 7/32 in. dia. tubular crank-pin. Blued steel drive washer fitted on shaft taper. One-piece cylinder with blued, corrosion-proof external finish and die-cast green-enamelled cylinder head. Six cylinder head screws, including two extra-long screws securing complete cylinder assembly to crankcase. Ultra-lightweight Meehanile lapped piston with skirt section relieved below gudgeon-pin centres. Tubular full-floating gudgeon-pin with aluminium end pads. Drop-forged alloy connecting-rod (bronze-bushed at lower end on latest models). Spraybar type needle-valve assembly with 1/4 in. choke detachable venturi. Beam mounting lugs.

## Test Engine Data

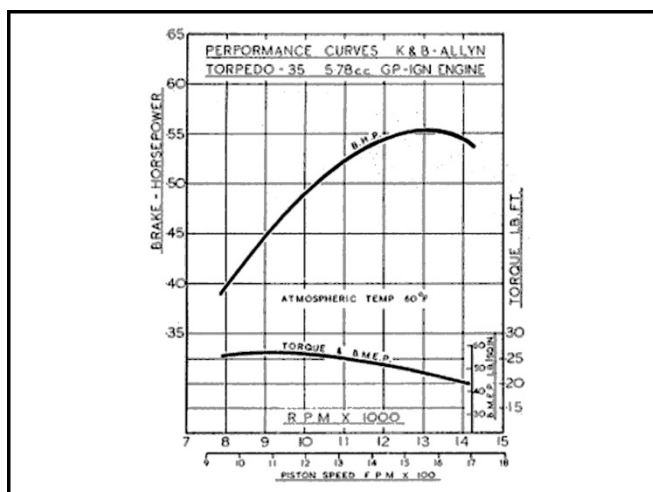
**Running time prior to test:** 11 hours.

**Fuel used:** 10 per cent. B.D.H. nitromethane, 65 per cent, methanol 25 per cent. Castrol "M" castor base oil.

**Ignition plug used:** K & B standard short reach as fitted. 1.7 volts used to start.

## Performance

With the Torpedo is packed a small warning slip which advises one hour of rich mixture bench running on a 10 X 6 prop prior to installing the engine in a model. There is some danger of piston seizure if this care is not exercised, but it is only fair to remark that, of two of these engines we have tested during the past three



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years, neither showed these tendencies and, after some exploratory test runs totalling about 10 min. duration, they were found to hold an even speed with the needle valve at the optimum power setting. This is, of course, dependent somewhat on the fuel used and (as with many other engines of this size and type) fuels of low (5 to 10 per cent.) nitromethane content are recommended.

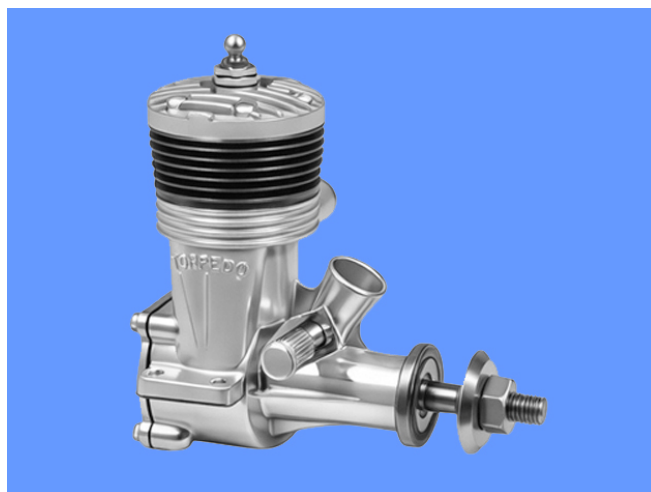
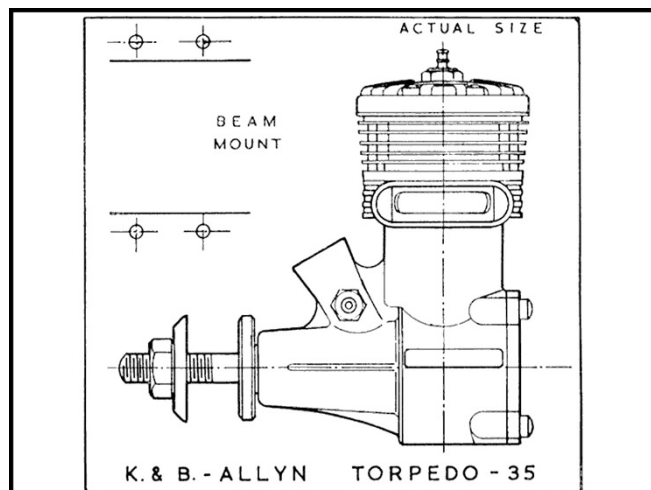
Starting characteristics of the Torpedo 35 are orthodox. Fairly generous priming through the exhaust port is required for a start from cold, but thereafter the engine can be restarted with one or two choked preliminary flicks and without altering the needle-valve from its running setting. The needle valve itself is responsive and positive in operation.

On the torque reaction dynamometer, the Torpedo 35 delivered its maximum torque at a shade over 9,000 r.p.m., a figure of just over 0.26 lb. ft. being obtained, equal to a b.m.e.p. of 57 lb./sq. in., which, of course, is very satisfactory.

The manufacturer's claimed horse-power rating for the Torpedo-35 is 0.6 b.h.p. at 14,000 r.p.m. Our test engine delivered a peak output of approximately 0.56 b.h.p. at a little over 13,000 r.p.m., which, having regard to the variables introduced by air temperature, humidity and fuels—not to mention the inevitable slight differences between individual motors is sufficient to suggest that a stock engine may, in fact, quite closely approach the maker's claim.

**Power/ Weight Ratio (as tested):** 1.19 b.h.p./lb.

**Specific Output (as tested):** 97 b.h.p./ litre.



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