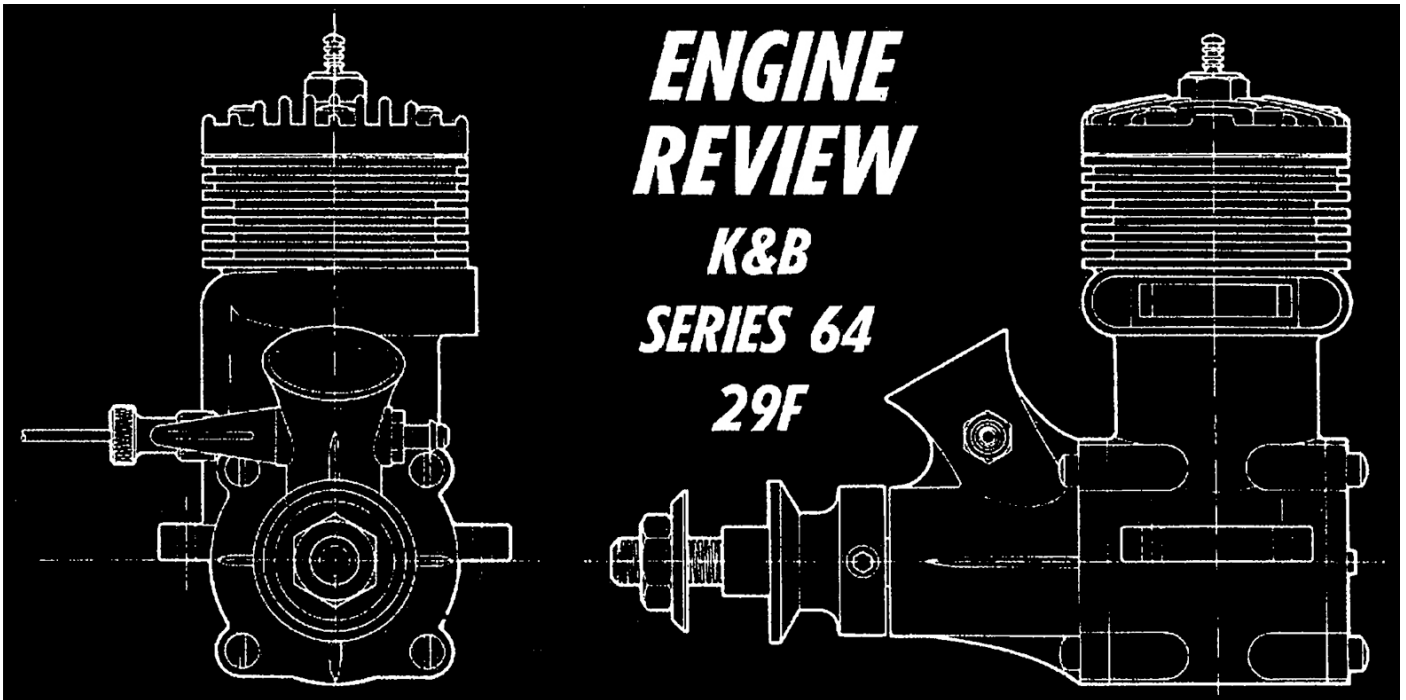


## K&B 29F Torpedo Series 64



**SUPPLEMENTING SUCCESSFUL SPEED TYPE TORP 29R, NEW 29F K&B'S LATEST HIGH QUALITY OFFERING TO FREE FLIGHT. By PETER CHINN**

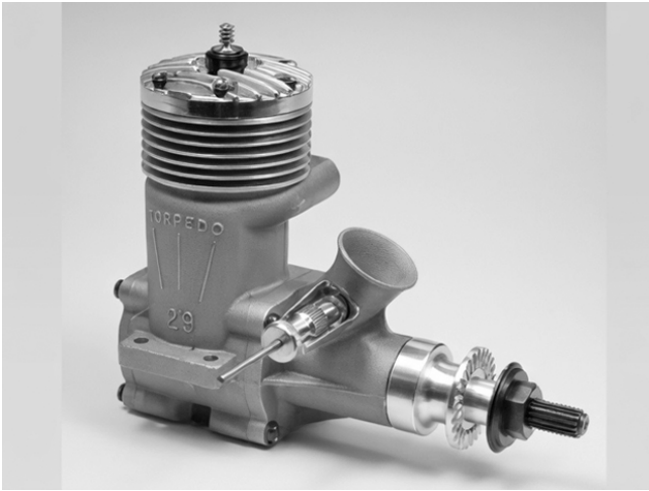
► K&B's line of high-quality, ball-bearing equipped competition engines, introduced four years ago in the shape of the three Torpedo "Series 61" models, was updated a few months ago with the announcement of the improved "Series 64" engines. At the same time, the range was expanded to four models with the introduction of a front rotary valve 29, the 29F supplementing the existing disc-valve racing 29R.

We have to confess to a personal liking for these K&B engines. They start and run well, call for a minimum of break-in time, are powerful without being fussy and, in fact, are a pleasure to test. This view was in no way diminished by our experiences with the 29F, which were, for us, further enlivened by the engine reaching a new high in 29 performance at the medium-to-high r.p.m. level.

As can be seen from the accompanying photo and drawing, the 29F is readily identified as belonging to the Series 61/64 family of engines. It is not, however, merely a shaft-valve conversion of the 29R. It has a longer stroke, a different type of combustion chamber and none of its parts (ignoring assembly screws) can be interchanged with those of the 29R. In appearance, the engine closely resembles the Torpedo 35 "Series 64," the most obvious external differences being the shallower cylinder head (having one less fin than the 35) and the absence of a central dividing bar in the exhaust port.

K&B have not commented on their reasons for supplementing the existing 29R with the 29F but we would assume that their object was to meet the demands of modelers who need a high-performance, high-quality .29 suitable for contest free-flight and possibly for team-racing. Many modelers prefer a front rotary engine for such applications and, at the same time, look for high power at lower revolutions than those associated with a pure C/L speed engine. If such were the manufacturer's objectives, we can only comment that the 29F shows ample indication that these will be achieved. On test, our 29F (enjoying more favorable atmospheric conditions, an advantage, however, which was nullified by the use of a less potent fuel) actually out-performed, up to 16,000 rpm, the 29R tested in MAN two years ago. On mild fuels, it was way ahead of the Series 61 29R and had the prop-slipping capabilities, on an 11x5 or 11x6, of many an R/C 45.

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**Immense power at below racing rpm characterize 29F. Engine, with shaft intake and longer stroke, differs extensively from the 1961 29R series.**

The general layout and structural design of the 29F follows that of the other Series 64 and 61 engines. The crankcase is in unit with the cylinder block and is machined from a high-pressure die-casting that is common to the 29R and 35. The front bearing housing is a separate component containing a  $\frac{1}{4} \times \frac{5}{8}$  in. Fafnir ball-bearing at the front and a  $\frac{1}{2} \times 1 \frac{1}{4}$  in. Fafnir ball-bearing at the rear. The outside diameter of the latter projects  $\frac{3}{16}$  in. beyond the rear face of the front housing and serves to align the housing accurately with the crankcase. Four screws through a strong flange on the housing and into lugs on the crankcase, unite the two components. The back of the case is sealed by a deep rear cover attached in the same manner.

The crankshaft is identical with that used in the 35 engine and includes the special design features originated in the Series 61 engine aimed at achieving maximum crankcase compression without impairing counterbalance. Only the crank-pin—which is made separately and then pressed into the .300 in. thick web is hardened (since this is the only actual working surface) and the risk of the shaft becoming too brittle through overall hardening is thereby eliminated. Main journal of the shaft is a full  $\frac{1}{2}$  inch diameter, is bored  $\frac{11}{32}$  in. for gas passage and reduces to  $\frac{1}{4}$  in. dia. at the front end. The shaft end does not carry the usual propnut threads: instead it extends only a short distance ahead of the front ball race and is then fitted



**Series 64 29F features twin ball-bearings, rugged three-piece and specially counterbalanced shaft and with a new keyed-in propeller driver.**

with a machined dural drive hub into which a 14 in. dia. stud, carrying the usual hex and steel washer, is screwed. An improvement has been made to the method of keying this drive hub to the shaft. Formerly, this depended merely on an Allen set-screw engaging a flat milled on the shaft end. This was satisfactory if the hub was properly aligned and the screw kept really tight, otherwise slippage and damage to the shaft end could result. Now, a  $\frac{1}{8}$  in. dia. steel ball is inserted in a hemispherical depression in the shaft and this engages a U-section keyway in the hub. This keys the complete drive assembly in position on the shaft and the set-screw merely serves to retain it.

The 29F uses a hardened iron piston running in a normalized iron drop-in cylinder sleeve. The piston has an internal annular stiffening web above the wrist-pin bosses and its skirt diameter is relieved approximately .0005 in. for the lower  $\frac{5}{16}$  in. of its length. The thick-walled (.070 in.) sleeve is quite short and when the piston is at the bottom of its stroke, the entire relieved section of the piston skirt is below the bottom of the liner. Incidentally, after preliminary running, the piston of our test 29F was found to be just touching the top of the crankcase back-plate at BDC. A few strokes with a smooth file quickly restored the required clearance. The cylinder liner is located in the block via the usual flange at the top where it is firmly clamped by the cylinder head with its six screw

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fastening. In contrast to the 29R's hemihead to borrow dragsters' jargon—the 29F uses a wedge combustion chamber. A centrally located KB-1L (long reach) glow-plug is fitted.

A check on port timing indicated that the cylinder ports are timed approximately the same as for the 20R (our measurements: exhaust 140 degrees, bypass 125 degrees) but that the rotary-valve period has been extended about ten degrees to a full 200 degrees. Our measurements were: valve opens 28 degrees after BDC, closes 48 degrees after TDC. Bore and stroke of the engine are virtually “square” at .725 x .720 in., compared with the 0.9/1 stroke/ bore ratio (.750 x .675 in.) of the 29R.

As on the 35, a conventional spraybar type carburetor is used without a venturi restrictor, the engine being intended for operation only on a pressurized fuel supply either from a bladder tank or a metal tank pressurized from the crankcase. The crankcase back-plate is drilled and tapped for pressure take-off and a brass outlet nipple is supplied. A screw is provided for sealing oil the crankcase outlet when a bladder tank is used.

For our tests, we used a Veco T-31 pressure tank, along with Veco's synthetic rubber fuel tube for the plumbing. Break-in was conducted on a straight 3/1 mixture of methanol and castor-oil and was accomplished in our usual manner, consisting up to the point where the engine runs, gradually leaning these out as the engine improved and allowing a cooling off period between runs and finally working up to the point where the engine would hold a steady leaned-out high-speed on Supersonic-1000 fuel. This took only about one hour of accumulated running time on our test engine. The engine was then given another 30 or 40 minutes running time before any test readings were taken.

Purely from a point of interest, since the Series 61 29R had been tested on both straight and high-nitro fuels, we first ran a series of tests on a straight three to-one methanol/castor-oil mix. The results were rather illuminating. The 29R had not been happy on this mix and had developed only about two-thirds of its true

potential. In contrast, the 29F was out-standingly good on this mild fuel, developing 0.69 bhp at its peak compared with 0.53 bhp for the Series 61 29 R. The maximum torque recorded by the 29F on this fuel was equally remarkable—30 percent higher at 53 oz. in. and equivalent to a bmep of 70 psi.

While the average American user may not be too interested in an engine's performance on straight methanol and castor-oil, the high output of the 29F, under such conditions, is commendable for two reasons. Firstly, it does mean that the 29F will give the average user ample performance on milder (and cheaper) fuels than he might otherwise use. Secondly, since nitromethane fuels are either unobtainable or extremely expensive outside the American continent, the appeal of the 29F to export customers should be much enhanced.

Following tests on straight fuel, we switched to K&B Supersonic-1000 contest fuel and ran a further series of tests, the results of which are to be seen on our performance graph. Note the extremely high maximum torque recorded, which topped 60 oz. in. at 10,000 rpm—the highest yet for a .29 and equivalent to the unsurpassed brakemean effective pressure of 80-plus psi. As an example of what this means in prop rpm, we would add that the 29F turned a 12x5 Power-Prop at a steady 10,000 rpm and an 11x5 at just on 12,000 rpm. Further up the scale, the engine reached 15,000 on a 10x3 ½ Top-Flite, 15,500 on a 9x5 and 18,200 on an 8x5. The peak bhp of nearly 0.80 at between 16,000 and 16,500 rpm should, incidentally, approximately correspond with the inflight rpm on a 10x3 1/2, 10x4 or 10x5 (depending on make and type) free-flight prop.

Handling and running qualities of the 29F on test were excellent throughout. Hand starting was easy on all prop sizes down as far as 8 in. diameter, where, naturally, a little more caution needed to be exercised. Needle settings were critical to within about 15 degrees of needle rotation on straight fuel (which required a needle setting of approximately 216 turns open) but were O.K. over about 90 degrees of needle movement on Supersonic-1000 fuel (average setting 3 ¼ turns open). The engine ran smoothly and

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evenly at all speeds tested. The original KB-IL plug incidentally, lasted through a good three hours of break-in and test running.

Climatic conditions at the time of testing may have slightly flattered the 29F's bhp rating, the combination of cold air and high pressure being equivalent to a bhp correction factor of approximately 0.95, but it is also worth remembering that even higher outputs may well be possible when using, under suitable conditions, the new Supersonic Speed Fuel and other fuels containing very high percentages of nitromethane.

The Torpedo 29F series may not be the cheapest 29 on the market, but we would rate it one of the most impressive we have tested to date.

## Summary of Data

**Type:** Loop-scavenged two-stroke cycle with shaft rotary valve induction.

**Weight:** 8.8 oz.

**Displacement:** 0.2972 cu. in. (4.870 c.c.)

**Bore:** 0.725 in.

**Stroke:** 0.720 in.

**Stroke/Bore Ratio:** 0.993 : 1

### Specific Output (as tested):

2.32 bhp/cu. in. on 75/25 methanol/ castor-oil.

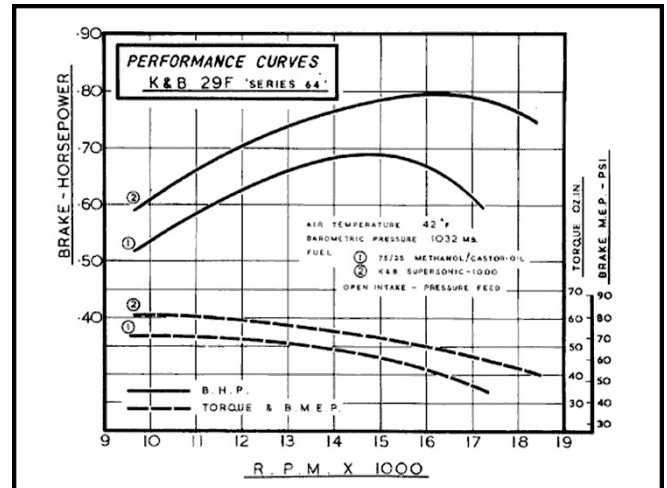
2.68 bhp/cu. in. on K&B Supersonic- 1000.

### Power/Weight Ratio (as tested):

1.26 bhp/lb on 75/25 methanol/castor- oil.

1.45 bhp/lb on Supersonic-1000.

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



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