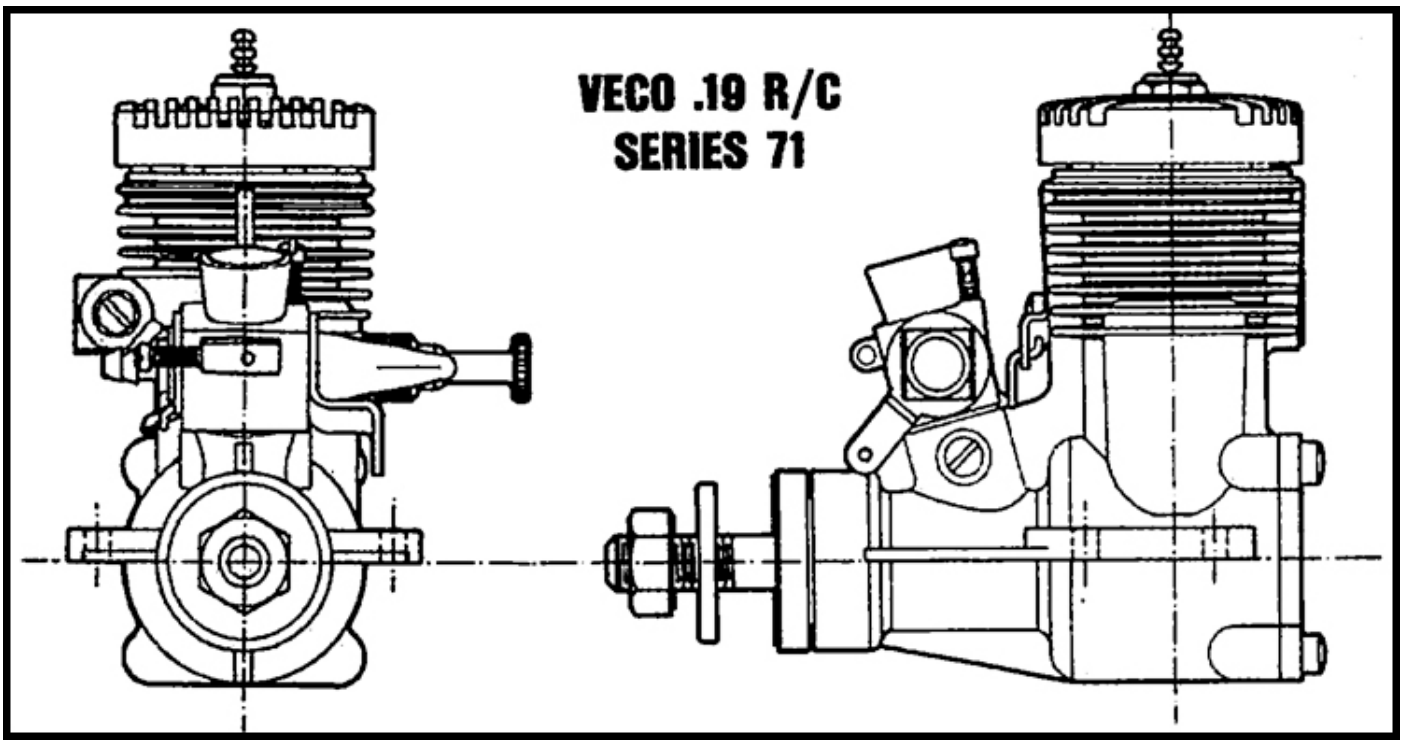
Veco 19 BB R/C Series 71



ENGINE REVIEW

BY PETER G. F. CHINN . . . revised Series 71 model confirms Veco 19 in top bracket of current R/C engines. A highly regarded power plant for both aircraft and car use.

• It is just 16 years since the original (Veco built) Veco 19 was put on the market. This, the plain bearing “Series 100" model, was eventually succeeded in the mid-sixties by the completely redesigned “Series 200" model having a dual ball bearing shaft and available in standard or R/C versions.

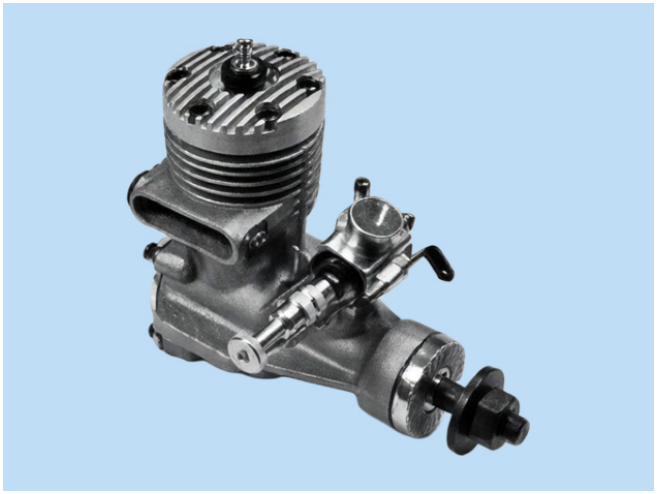
Now, in the recently introduced "Series 71" model as manufactured by K&B. the Veco 19 has been further updated with a revised main casting, two new cylinder- heads, some new accessories and a choice of standard, R/C and car versions.

Outwardly, the “Series 71" is distinguished by a machined (but matt-finished) head with central glow plug instead of the previous pressure-cast tumbled head with offset plug. The old type head gave a completely flat combustion chamber shape on the exhaust side of the piston baffle and was channelled to take an aluminum gasket plus the flange of the cylinder sleeve. The flange rested on top of the cylinder block with another aluminum gasket between the joint faces. The new heads have shallow hemispherical combustion chambers, no channel and no gaskets above or below the sleeve flange.
Instead, the flange drops into a recess in the top of the main casting.

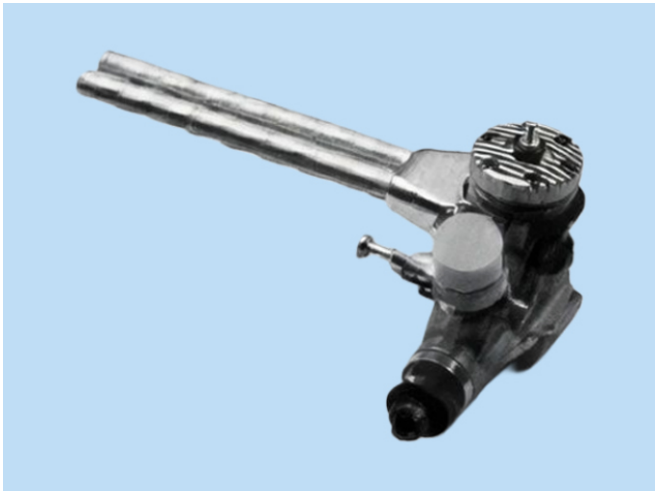
To accommodate this change, the height of the cylinder casing has been raised above the top fin. This also enables the Series 71 piston and sleeve assembly to be supplied as replacement parts common to both Series 71 and Series 200 engines.

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Side mount car version (known as Veco 19 R/C SM) has lateral head fins and needle valve control loco led on exhaust side. Servo horn opposite.



Optional extras for cars include intake filter and exhaust manifold with twin tail pipes.

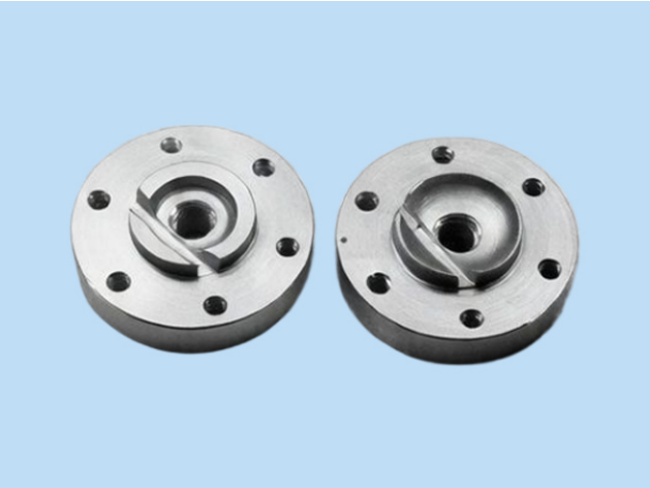
(Incidentally, we checked these Series 71 parts in a 1965 Series 200 model and found that, in order to maintain the standard port timing, it was desirable to continue to fit the original .012 in. aluminum sleeve gasket under the cylinder flange. On the other hand, retaining the sleeve gasket reduced compression ratio somewhat because the flange of the new sleeve is thicker and thereby raised the cylinder-head. There are also other slight variations, such as a reduction in the height of the piston head above the wrist-pin center and this caused a further reduction in compression ratio. On balance, it would probably be better, in this instance, to omit the sleeve gasket and reduce the bypass and exhaust periods slightly rather than suffer too much compression loss but we would suggest that any owner of an early Series 200 engine who intends to fit a new piston and sleeve might find it worthwhile to try the engine both with and without the sleeve gasket. We would guess that with the later (K&B) Series 200 engines, this problem will not arise.

The rest of the engine is basically the same as the original Series 200. One of the Veco 19's more interesting design points is its crankshaft and bearing assembly. This features a 12 mm. shaft journal, which is very large for a ball-bearing equipped .19 cu. in. motor and b made possible by the use of special Fafnir 9 ball steel caged bearing of an o.d. (24 mm.) small enough to be accommodated within the 19 crankcase.
This has allowed a large bore (11/32 in.) gas passage and sizeable rotary-valve port areas for high performance. The measured valve timing on our engine was 34 deg. ABDC to 43 deg. ATDC. At the front end the shaft runs in a 1/4 x 5/8 in. 8 ball shielded bearing. The crankshaft itself is hardened and is heavily counter balanced by means of a machine-in crescent counterweight plus cutaway flanks each side of the 3/16 in. dia. crankpin. At the front end, a pressure cast prop driver b fitted to the shaft by means of a 1/16 in. square sunk key.

Al with all other current Veco engines, the crankcase, front housing and cylinder casing arc made in a single pressure cast unit of sturdy dimensions with well-proportioned beam mounting lugs and a strongly webbed front end. The engine is of the orthodox open-loop or cross-flow scavenged type, the cylinder sleeve having exhaust and bypass ports of equal area, centrally divided and providing measured timings of 140 deg. and 126 deg. respectively. The lapped cast-iron piston is of conventional design with a flat head and straight baffle (rather thinner than on the earlier model) and has the skirt relieved .001 in. below the wrist pin holes to reduce drag. There is an annular stiffener above the piston bosses and the skirl hat a cut- away at the front to clear the crankshaft counterweight at BDC.

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Hi-performance cylinder head with squish bond it optional extra. On right, regular 71 head.

The con rod is machined from extruded aluminum alloy, has a bronze bush and oil-hole at the lower end and is coupled to the piston by a fully floating 5/32 in. dia. hardened tubular wristpin with PTFE pads.

The carburetor fitted to the Series 71 Veco 19 R/C is basically the same as that of the earlier model and is of the conventional barrel throttle type with an adjustable air bleed for controlling the idling mixture. One slight modification compared with the early Series 200 R/C is the omission of the notch in the entry side of the barrel. The barrel has a choke diameter of 15/64 in. or 6 mm. and an effective choke area of approximately 10 sq. mm. The throttle is coupled to a semi rotary exhaust valve.

In stock trim, the Series 71 19 R/C comes with a standard shallow hemispherical head, but an optional extra is a “high- performance” head of the squish-band type which also gives a slightly higher compression ratio. The squish band is 2.4 mm. or just under 1/10 in. wide.

The Veco 19 is one of the most popular power plants for R/C racing cars and the 19 R/C SM variant of the Series 71 engine is intended for sidewinder type car installations. In most respects this version is identical with the throttle-equipped aircraft engine, the only differences being that the car version has (a) the head fins running across the head instead for fore and aft, and (b) the carburetor assembled with the needle-valve on the right instead of the left side of the engine. A squish-band type head is also available for the car engine and a couple of additional car engine accessories are an air filter and an exhaust manifold with dual tail pipes.

The air filter is a cylindrical polyurethane foam cap that is simply slipped over the carb intake and retained with a small rubber band. Filters are supplied, four to a packet.

The exhaust fitting consists of a pressure cast manifold into which are fitted two 3/8 in. o.d. aluminum tubes. The manifold fits over the engine’s exhaust stack and enables the semi-rotary exhaust valve to be retained, the complete unit being held on by two light coil springs around the cylinder. The pipes extend the exhaust approximately 5 1/8 in. beyond the stack outlet.

The manufacturer's recommendation regarding breaking in the Veco 19 is that it should be operated "on the rich side for the first few hours of running or until the engine is broken in." The engine is considered to be broken-in when it will "hold a lean setting without sagging.”

This is, of course, sound advice and applies to all engines. The mention of "the first few hours" may, however, cause some surprise, as most modern engines, including lapped piston motors of up to .20 cu. in. displacement, are sufficiently broken-in to hold a leaned out setting after no more than one hour (often less) of accumulated running time. From past experience of Veco 19s, we believe that many purchasers will discover that the engine h sufficiently broken-in within an hour or so of running time, but others may find that a longer break-in is necessary. Our test motor did, in fact, require a good three hours’ total running lime to reach the point where, even on mild fuel with added castor-oil, it would hold a fully leaned out maximum rpm under load. Well before this, however, it was quite feasible to run the engine at a fast two-cycle provided that the needle was not leaned out to the optimum rpm setting. On an 8x5 prop, for example, where 14.000 rpm were available on five per cent nitro fuel, this meant opening the needle-valve just enough to drop rpm to 13.500 – 13.600.

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One way of helping the break-in ix to fly the engine in a model und make Sequent use of the throttle to give cooling-off periods between spells of high-speed running. The fact that In an R/C racing ear the throttle is being used constantly on the track, will also help in the case of Ore car version. However, since lire car version has a normal prop drive assembly, it might be a good idea to conduct the initial break- in on the bench using an aircraft propeller.

Our test model responded well to orthodox starting techniques. Primed cold starts could be obtained equally well with the throttle open or closed. Hot restart* seemed best with the throttle open, following a single choked flip of the prop. Running qualities were good with no bad vibration periods that we could detect.

Although the carburetor is the same as on the Series 200 model tested earlier, we obtained a far better throttle response with the Series 71. The idle was among the best in the 19 group, permitting a steady 2.600 rpm on a 9 x 5 prop and a safe recovery. We actually got bench idling speeds down as low as 2.000 on some props but. of course, it would be unwise to attempt this under actual flying conditions.

K&B recommend the use of a reasonably mild fuel (such as Supersonic "100") until the engine is fully broken in. For initial tests we used our standard R/C test fuel containing five percent pure nitromethane. This same fuel mixture had been employed for our test of the Series 200 and it was soon noticed that the Series 71 showed slightly higher maximum torque and a less severe falling off of torque under heavy loads. This, of academic interest only to most aircraft modelers, is of some value to the racing car fan, for whom an improvement in low-speed torque means more punch when accelerating hard.

Prop revolutions obtained on this fuel (and with the standard cylinder head) included 11.000 rpm on a 10 x 3½ and 9 x 5 Top Flite wood prop. 12.900 rpm on an 8 x 6 Power Prop, 14.000 on an 8 x 5 Power Prop and 16.100 on an 8 x 4 Power Prop. We then switched to the squish-band head and encountered our one and only spot of bother, lack of compression. Removing the head and examining it closely, we discovered that a very slight machining error had caused the slot for the piston baffle clearance to penetrate the joint face. The tiny groove that this had left was almost imperceptible but it was enough to cause a leak. It h more than probable that our defective head was a completely isolated example but if anyone else should have similar trouble we are sure that K&B will be anxious to provide a replacement. Fortunately we had a spare squish head and this gave a perfect seal.

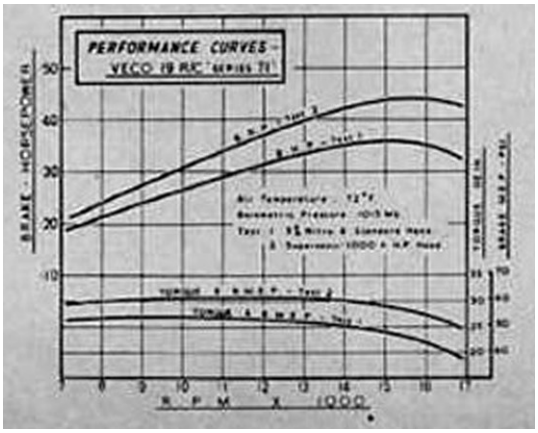
Strangely enough, the squish head did not make very much difference to the engine's power output on rest only a matter of about five percent more brake horsepower at the peak. However, by alto using a substantially higher nitro content fuel (namely K&B Supersonic 1.000), power over the whole load range was substantially increased and peak bhp was raised by about 21 percent. Prop rpm figures were improved by between 600 and 1.100 rpin.

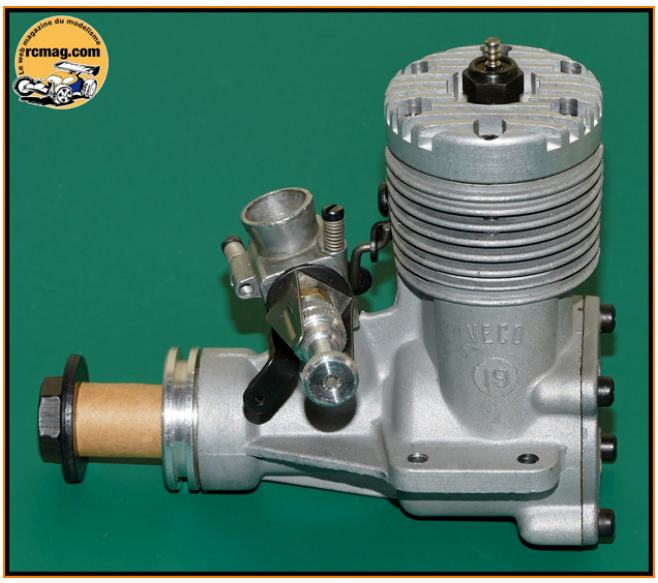
The bhp figures obtained for the Series 71 Veco 19 R/C are the best we have recorded to date with a throttle-equipped "19" class engine. Add to this the fact that the Veco handles well and has a good throttle and it is not difficult to see why this well-designed American engine, while more expensive than (he imported competition, continues to find favor with discerning model flyers. For the R/C racing car fan, it has many attractions, not the least of which is its use of a twin bail bearing shaft, an obviously desirable feature, and its robust construction.

Summary of Data

Type: Single cylinder two stroke cycle with twin ball-bearings and crankshaft type rotary valve. Throttle type carburetor with coupled exhaust restrictor.
Checked Weight: 6.84 oz. (7.95 oz. with car exhaust pipes).
Displacement: 0.1998 cu. in. (3.274 c.c.)

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More: https://flyinghlsat.com/search.php?search_keywords=Veco-Tests

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