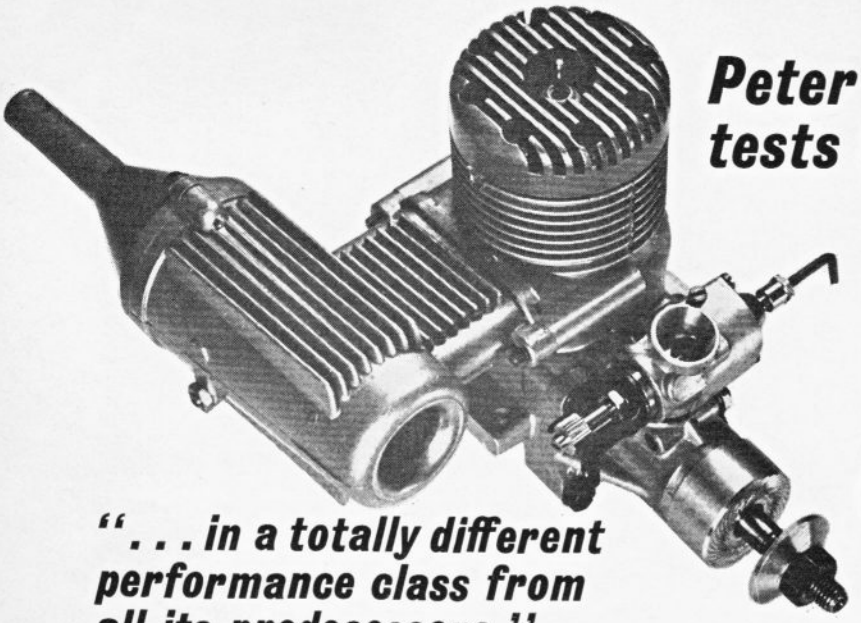
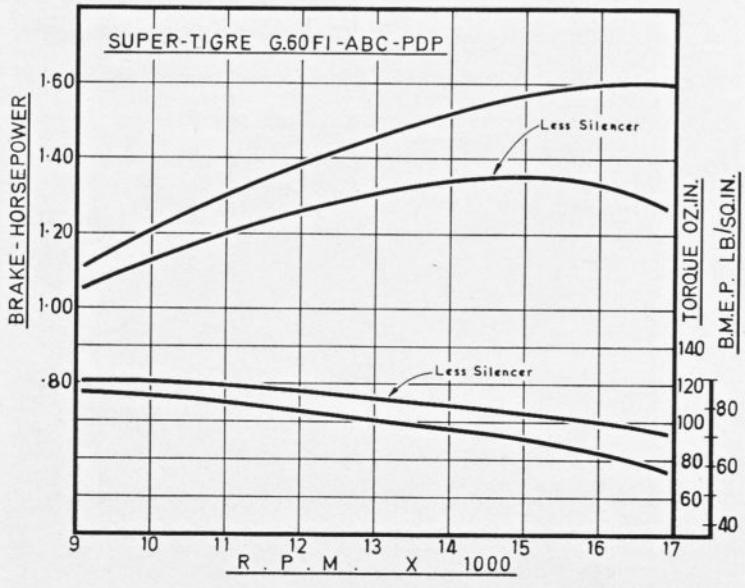


# Peter Chinn tests the SUPER TIGRE G60F1—ABC—PDP

***"... in a totally different performance class from all its predecessors."***

THIS is the fourth report on a Super-Tigre G.60 to be published in the *Radio Modeller* test series. The G.60 series engines first appeared in 1966 as rear rotary disc valve motors. Subsequently a front (shaft) valve model was introduced and this was dealt with in the March 1969 issue. A revised version having, among other modifications, a new carburettor and a twin-plug head, was announced late in 1970 and a report on it appeared in the June 1971 issue. This model, however, was comparatively short-lived and was succeeded in the same year by the first of the so-called "Blue-Head" models, a test on which was published exactly five years ago in the March 1972 issue.

Our present report deals with the very latest version of the Blue-Head G.60FI and it must be said, immediately, that this is in a totally different performance class from all its predecessors. Previous G.60 r/c engines, despite their pedigree and excellent construction, were always slightly disappointing as regards power output. This was to some extent due to the manufacturer's insistence on using excessively restricted carburettor choke areas. Now, with the new model dealt with here, the effective choke area has been increased by approximately 104% and the orthodox crossflow porting has been replaced by Super-Tigre's own scavenging system combined with Perry directional ports (PDP) to give gas flow similar to that of a Schnuerle system. Port timings have been revised and an ABC piston/cylinder assembly (as pioneered by Super-Tigre for their control-line racing engines) replaces the regular ringed piston and steel liner.




Our test of the original Blue-Head model five years ago resulted in a peak output, less silencer, of 1.10 bhp. On the same fuel, the latest model raised this figure by no less than 45% —a quite phenomenal improvement which, if sustained in other production samples (and our test engine was an absolutely stock off the shelf motor), puts this new model on a par with leading examples of recent Schnuerle-scavenged .60 class r/c engines.

### Design and construction

*Main casting* This consists of the crankcase barrel and full length finned cylinder casing in pressure die cast aluminium alloy. The cored and milled transfer passage is now widened by extra milling to allow gas to reach the Perry supplementary ports. The casting also now includes lugs at each end of the exhaust duct

for the attachment of the appropriate ST silencer.

*Cylinder liner* Drop-in brass cylinder liner with 2 mm wall thickness and tapered chromium-plated bore, located by usual top flange. Unbridged exhaust port on right side timed to open and close at 75 deg. each side of BDC. Twin ST type transfer ports diametrically opposite exhaust, steeply inclined to direct gas upward and supplemented by twin Perry vertical slots at each end of main transfers angled to direct gas away from exhaust port. ST and PDP ports timed to remain open for 67 deg. each side of BDC.

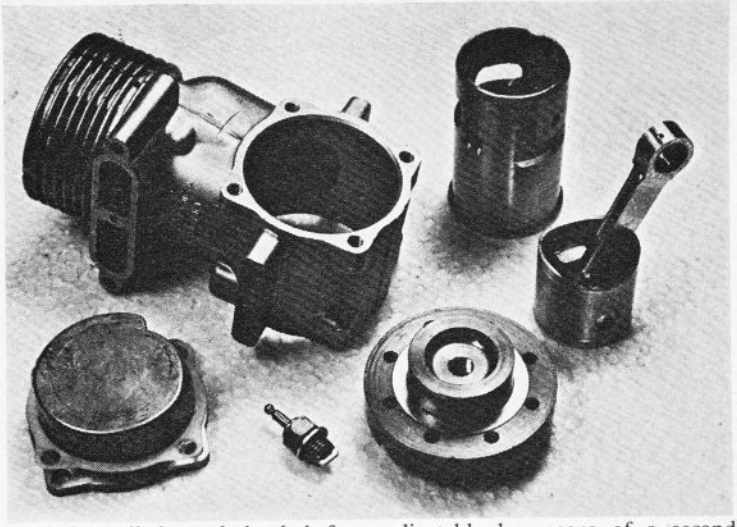
*Crankshaft and front end assembly* Hardened steel crankshaft counterbalanced by peripheral slots in 360 degree crankweb, sealed by aluminium rim. 15 mm o.d. main journal, 7 mm o.d. front journal and short (6 mm) integral hollow crankpin of 7 mm o.d. Rectangular valve port, 15 mm long, timed to open at 30 deg. ABDC and close at 47 deg. ATDC and admitting gas to 11 mm. i.d. gas passage. Shaft supported in one 15 × 32 mm. 9-ball steel-caged ball journal bearing at rear and one 7 × 19 mm. 8-ball brass caged bearing at front.

Pressure die cast aluminium alloy bearing housing with 14 mm. i.d. intake boss and secured to crankcase barrel with four 4 mm. cheese-head screws. Paper gasket. Machined aluminium cup type prop driver mounted on aluminium split taper collet. The shaft terminates in a standard ¼-28 UNF thread for the prop nut.

*Piston and connecting-rod assembly* The ringless aluminium piston is machined from a gravity die casting in high quality piston alloy. It is deflectorless and has an annular oil groove 2.5 mm. below its flat crown. The gudgeon-pin is placed somewhat higher in the piston than was the case with previous G.60 models, enabling a long connecting-rod to be retained while reducing primary compression chamber (crankcase) volume. This has required enlarged cutaways in the piston skirt, fore and aft, to clear the crankdisc and backplate.

Machined aluminium connecting rod, 41 mm. between centres with bronze bushes and oil holes at both ends. Fully-floating 6 mm. o.d. tubular gudgeon-pin with aluminium pads.

*Cylinder-head and backplate* Cylinder-head machined from aluminium alloy bar with deep cooling fins and colour-anodised blue. Shallow bowl shaped combustion chamber surrounded by 3.7 mm. wide flat squish band. Centrally located plug hole for long-reach glowplug. Head secured to cylinder with eight 3 mm. cheese-head screws.



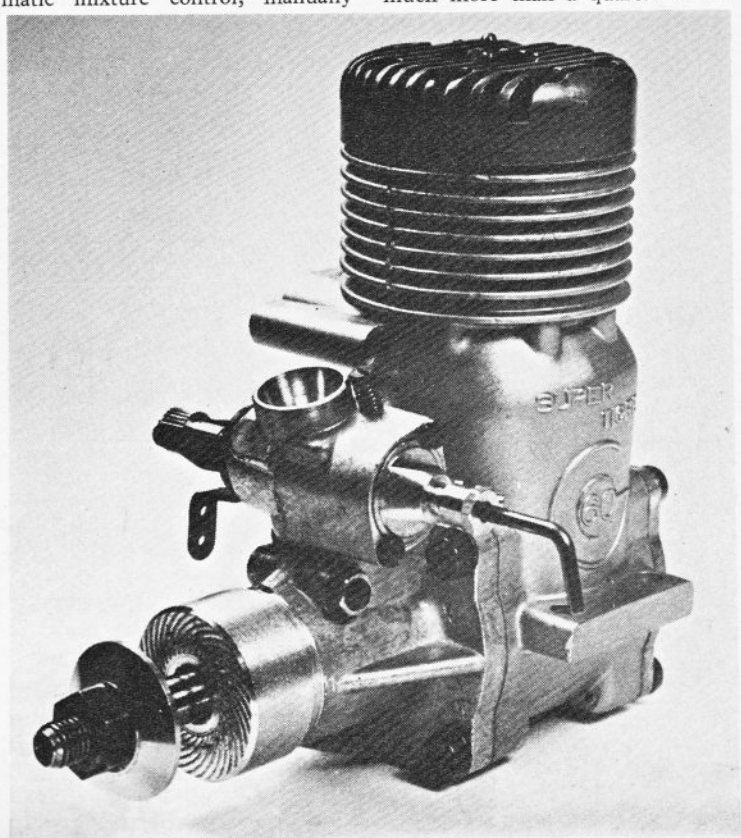
Test unit fitted with 0.2 mm. copper cylinder-head gasket. One 0.5 mm. aluminium gasket also supplied making it possible to use a choice of three compression-ratios. Measured nominal compression ratios of test engine were 11.5:1 (with 0.2 mm. gasket as tested), 10.2:1 (with 0.5 mm. gasket) and 9.5:1 (with both gaskets).

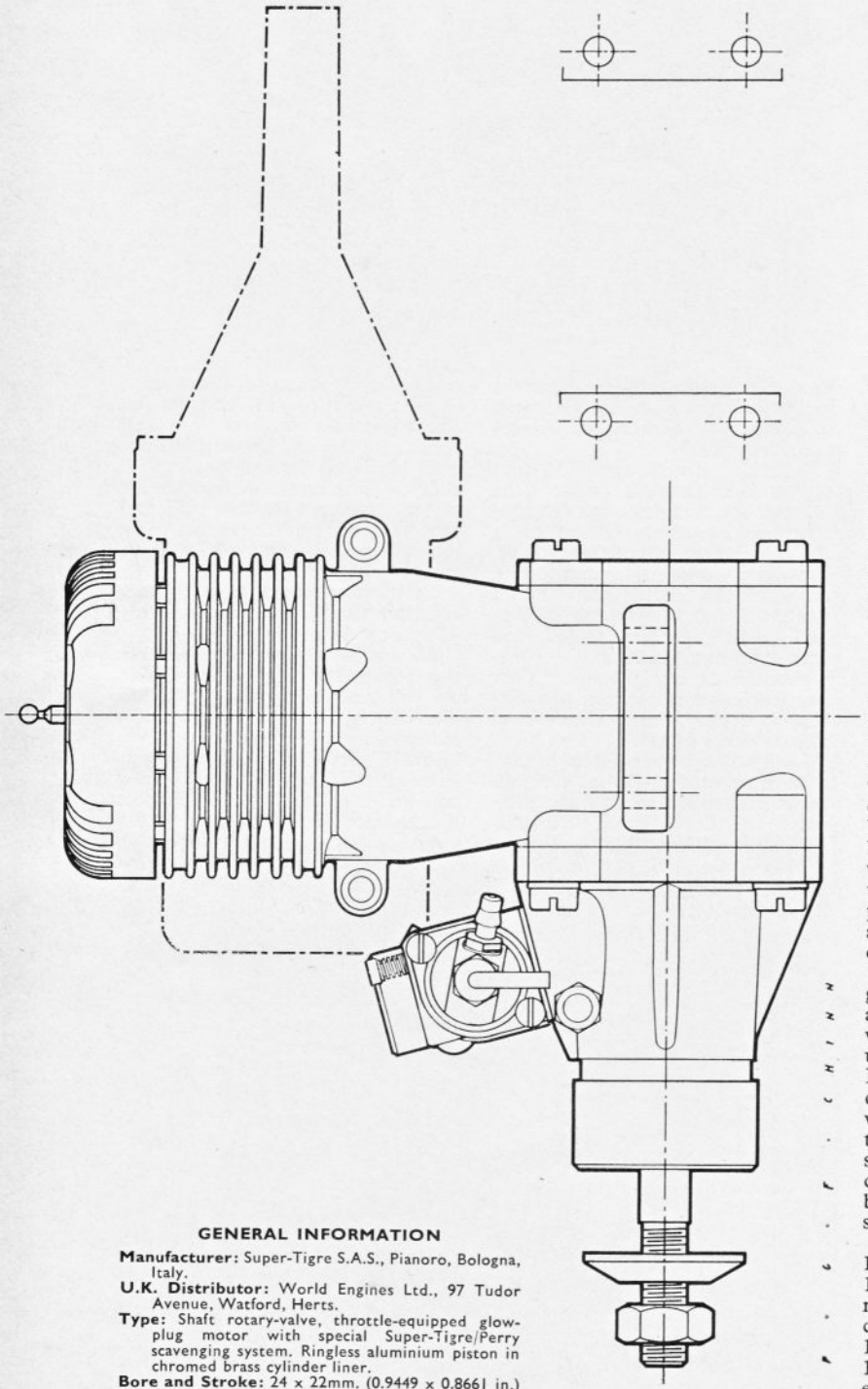
Pressure die cast aluminium alloy crankcase backplate secured to crankcase with four 4 mm. cheese-head screws. Paper gasket.

*Carburettor* Super-Tigre "Mag" type incorporating helical throttle-barrel movement to provide automatic mixture control, manually adjustable by means of a second needle mounted in the barrel. Second needle projects into full width spraybar and controls amount of fuel released through longitudinal slit type jet in spraybar. Pressure die cast aluminium alloy carb body and ground steel throttle barrel. The brass spraybar is flattened on both sides to increase choke area.

Carburettor choke bore 9 mm. Effective choke area approximately 42 sq.mm.

*Silencer* Several types of silencer suitable for the G.60 series engine are available from World Engines Ltd. The type supplied with our test motor was the S.60 Type No. 2520483 shown. This is a vented front unit but with the total escape area restricted to 67 sq.mm. (*i.e.* not much more than a quarter of the





### GENERAL INFORMATION

**Manufacturer:** Super-Tigre S.A.S., Pianoro, Bologna, Italy.
**U.K. Distributor:** World Engines Ltd., 97 Tudor Avenue, Watford, Herts.
**Type:** Shaft rotary-valve, throttle-equipped glow-plug motor with special Super-Tigre/Perry scavenging system. Ringless aluminium piston in chromed brass cylinder liner.
**Bore and Stroke:** 24 x 22mm. (0.9449 x 0.8661 in.)
**Stroke/Bore Ratio:** 0.917 : 1.
**Measured Nominal Compression Ratio:** 11.5 : 1 (10.2 or 9.5 optional).
**Displacement:** 9.953 c.c.—.6073 cu. in.
**Checked Weights:**
(i) 473 grammes—16.7 oz. (less silencer).
(ii) 555 grammes—19.6 oz. (with S.60 silencer).

area of the earlier and very noisy S-71 type offered for the G.60 engines) to cut down noise. It is not exactly quiet but compares reasonably well with the straight expansion-chamber units of similar outlet areas offered for 10 cc. engines by other manufacturers. The silencer is made in two pressure die cast aluminium sections and has tapped lugs by which it is secured to the engine's exhaust duct with a pair of long screws. It also has screw-in brass tube fittings for priming and for a fuel pressurisation system.

**Test performance**

Our test motor came direct from World Engines and was a stock off-the-shelf item. It was run-in initially on a straight 75/25 methanol/castor-oil mixture for 30 minutes after which the fuel was changed to our standard 5% nitromethane r/c test blend for a further period of running. The glowplug used was the standard Super-Tigre long-reach bar type supplied with the engine. Atmospheric temperature at the time of testing was 19°C (66°F) and barometric pressure was 1020 mb (30.12 in.Hg.).

*Starting and running* Brand new, the Super-Tigre responded instantaneously to hand starting when cold and its excellent cold-start qualities were subsequently maintained on a variety of props throughout the running-in and test periods. When the engine was hot and the brass cylinder had expanded somewhat (along with a reduction of oil viscosity) hand starting was less positive and here we found it preferable to rely on an electric starter to obtain a quick re-start.

General running qualities were good. Vibration levels were reasonable and the engine ran steadily and without loss of power on warming up except on the very largest props. Incidentally, the ABC piston/cylinder set-up tolerated a deliberately weak needle-setting with no sign of tightening up: the engine merely slowed down slightly or cut out cleanly if the needle was closed to below the combustible mixture strength.

*Power—less silencer* A torque of 120 oz.in. was recorded at around 10,000 rpm and torque was well maintained as load was reduced, culminating in a peak output of 1.60 bhp at between 16,000 and 17,000 rpm. This, for a standard engine running on 5% nitro is extremely good and is comparable with the best we have recorded for a 10 cc. r/c engine in this series.

Among the prop speeds recorded were 9,400 on a 14 × 6 Top Flite

maple, 11,100 on a 13 × 5½ Top Flite standard, 11,850 on a 12 × 6 Top Flite maple, 11,900 on an 11 × 7¾ Power Prop maple, 13,000 on an 11 × 7½ Power Prop maple, 13,500 on an 11 × 8 Robbe glassfibre-nylon and 14,600 on an 11 × 6 Power-Prop maple.

*Power—with silencer* Adding the silencer reduced the Super-Tigre's gross power output by 16% to approximately 1.34 bhp net at 15,000 rpm on the same fuel.

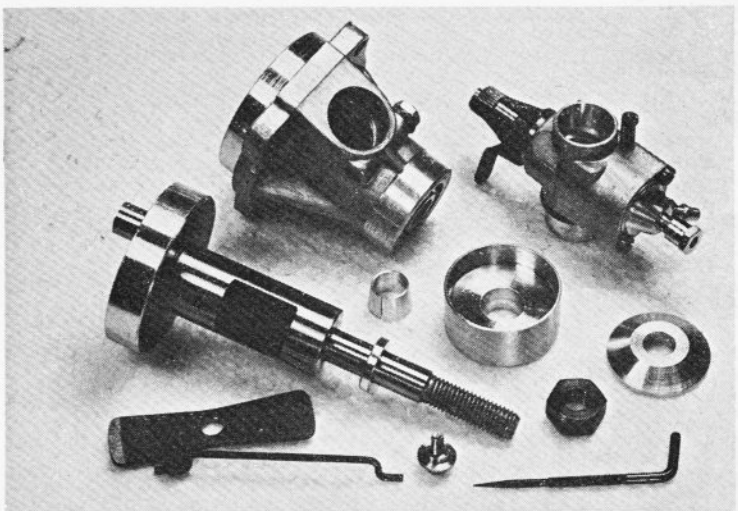
In terms of prop speeds, losses due to the addition of the silencer ranged from about 300 rpm on a 14 × 6 to 750 rpm on an 11 × 6. These are reasonable and much as one would expect from the design of the silencer and the level of noise attenuation obtained.

*Throttling* The Super-Tigre Mag throttle worked very well. Using silencer pressure to feed the large choke carburetter, we were able to get the idling speed as low as 2,400 rpm with reasonable safety on 11 in. diameter props. On the 14 × 6 there was no difficulty in idling the engine at 2,000 rpm on the bench, although a slightly higher idling speed would be advisable under flying conditions.

**Comment**

Unquestionably the best Super-Tigre G.60 series r/c engine to date. The combination of Super-Tigre and Perry porting, revised timing, a vastly bigger choke area and an aluminium piston in a chromed brass cylinder have resulted in a motor that is an enormous improvement on earlier G.60FI r/c engines and one that is quite capable of competing with current Schnuerle type 10 cc r/c units. Powerful, easy to handle and well built.

Above is the S60, Type 2520483 silencer and, below, 'front end' parts and crankshaft.



## RECENT ENGINE TESTS

**Here's a useful list to enable you to find that test report of the motor you are about to buy!**

| | | |
|---|---|---|
| Enya 40 | Aug. | 1975 |
| Enya 60 IITV | June | 1975 |
| Enya 60 IIIBB | Feb. | 1974 |
| Fox 36X R/C | April | 1970 |
| Fox 40 R/C | Sept. | 1972 |
| Fox Eagle 60 | May | 1973 |
| Fox 78 | June | 1975 |
| Fox Hawk 60 | Jan. | 1976 |
| H.P. 61F | April | 1972 |
| H.P. 61FS | Jan. | 1976 |
| H.P. 40F | Nov. | 1974 |
| K & P 40 | Feb. | 1971 |
| K & B Torpedo 40 Series 71F | Jan. | 1973 |
| K & B 15 Series 72 | April | 1974 |
| K & B 61 Ser. 75 | Mar. | 1976 |
| Merco 61 Mk. IV | Dec. | 1973 |
| Meteor 60 R/C | July | 1972 |
| O.S. Max H60 GP | Aug. | 1969 |
| O.S. Wankel | Aug. | 1973 |
| O.S. Max H60 | Aug. | 1971 |
| O.S. Max H60F | Jan. | 1973 |
| O.S. Max 20 | May | 1972 |
| O.S. Max 80 | Mar. | 1973 |
| O.S. Max 40 | Oct. | 1973 |
| O.S. Max 60F-SR | Sept. | 1975 |
| O.S. Max 40F-SR | May | 1976 |
| O.P.S. Ursus 60 | April | 1975 |
| Ross Twin | Dec. | 1970 |
| Ross Four | July | 1974 |
| Rossi 60 RC | Nov. | 1972 |
| Super Tigre 60 SR | Oct. | 1970 |
| Super Tigre G61 FR | June | 1971 |
| Super Tigre G60 RC | Mar. | 1972 |
| Super Tigre G21/46 | Aug. | 1973 |
| Veco 61 | Jan. | 1972 |
| Veco 61 Europe | Jan. | 1973 |
| Webra Blackhead | Oct. | 1969 |
| Webra 40 R C | Oct. | 1971 |
| Webra Speed 61 | Jan. | 1975 |
| Webra Speed 61R | Nov. | 1975 |
| Webra Speed 40 | Oct. | 1976 |