



122-S COMPETITION



In full racing trim, the 122-S is the most accurate sort of guided missile

A racing Volvo? Yessir, and how! Everything about it just shouts about the joy of being a racing car. It has that mean and purposeful look, it smells like a racing car, it sounds like two or three racing cars, and boy, it goes like a racing car!

We have tested race-tuned versions of other cars, mainly British sports cars, but none has been tuned to the pitch of this Volvo. The transformation from a sporty sedan is so complete that one almost begins to doubt that any of its mechanical components can have the remotest connection with the standard parts.

With a stripped body, it's stark in the extreme, and a couple of minutes at the wheel of this thing will bring out the Walter Mitty in the best-adjusted man alive. Now we know what Collins and Hawthorn and Musso felt like when driving the Grand Prix Ferraris back from the Reims circuit to the garage through traffic on open roads. It's pretty exhilarating. The engine doesn't want to idle and has no inhibitions about letting you know it. Power comes in at about 2500 rpm and peak torque is reached between 3500 and 3700 rpm. It reaches peak power at about 6000 rpm but revs up to over 7000 with an ecstatic scream. But the car isn't just a hot-rod. The chassis has been worked over as religiously as the engine, with phenomenal results.

It rides very flatly and the springs are fairly stiff, with hard damping. Body roll is non-existent, and wheel travel is severely restricted. Yet, incredibly, its ride comfort is superior to some standard sports cars, and our wives had no fear of going on long trips.

It wants to go straight. The front wheels are set to

resist any deviation from a straight path, and self-centering action is very strong. The cornering characteristics are strongly neutral, and its behavior is always uncannily predictable. For all its smooth and unspectacular way of going very fast on fast bends, it's quicker on sharp turns to hang the tail out in good dirt-track fashion and steer more with the throttle than with the wheel. It also makes the driver feel mighty heroic.

The racing successes of the Volvo PV-544 are legendary, but the racing career of the 122-S is more interesting, because this model began its life with a less obvious competition potential and is, in fact, still under development. From tentative beginnings in European rallies it has become a leading contender in production touring car races all over the world. This is all the more remarkable as the engine started out as a highly conventional non-sporting unit. It was originally a 40-bhp 1.4-liter, and its output was almost doubled before it was enlarged to 1.6-liters, when the production engine put out 85 bhp. The current 1.8-liter gives 108 bhp in its highest-performance version as supplied in the P-1800-S. As raced in the most competitive areas of Europe and America, the 1.8-liter puts out about 120 bhp. And they are strong, healthy horses!

In the preparation of the Volvo engine, all the usual stuff was done—opening up the ports and polishing them, matching the manifolds, balancing piston-and-con-rod assemblies, and so on. But race preparing Volvo engines is easier than some other power plants—the combustion chambers, for instance, are fully machined as installed in all their production cars. No further work was needed there. Factory experience indicates three highly rewarding fields for the engine tuner: breathing, compression, and balance. Improved breathing and higher compression will raise the thermal efficiency, and better balance will improve reliability and durability. In addition, displacement can be increased by boring out the block to 0.040-in oversize (using oversize pistons with a 0.003 to 0.0035-in skirt-to-wall clearance). This results in raising the displacement from 1780 to 1860 cc.

The car has a lightened flywheel and a standard P-1800 clutch. The complete crankshaft with clutch assembly is balanced, and it runs in the standard P-1800 bearing shells. For drastically raised compression ratios, Volvo can supply a special head gasket. Standard P-1800 valve timing is satisfactory for rally work, but for racing a special camshaft is needed. Volvo has developed an optional camshaft with 0.203-in lift and greater overlap:

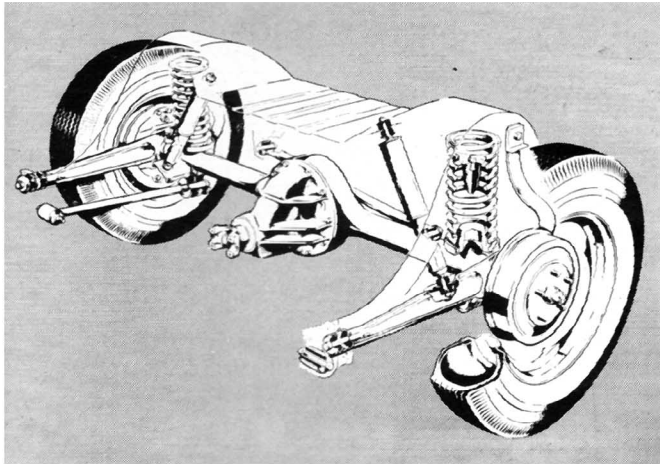
Intake opens	32° BTC
Intake closes	72° ABC
Exhaust opens	70° BBC
Exhaust closes	34° ATC

The valve springs are special, and are installed without the rubber gaskets and steel shims used on the production engines. Valve clearances are increased to 0.020-0.022 in. The P-1800 engine has an oil/water heat-exchanger as standard, and this can be fitted to all current Volvo car engines. The racing car has proper gauges for both oil pressure and oil temperature, while the production car makes do with a simple warning light for the oil pressure. Until last year, Volvo's racing cars had the standard SU HS-6 carburetors with TZ needles and a new type of spring-loaded fuel needle, but in 1963, Webers twin-choke sidedraft units were fitted for a dramatic gain in power. Total engine weight is 352 pounds.

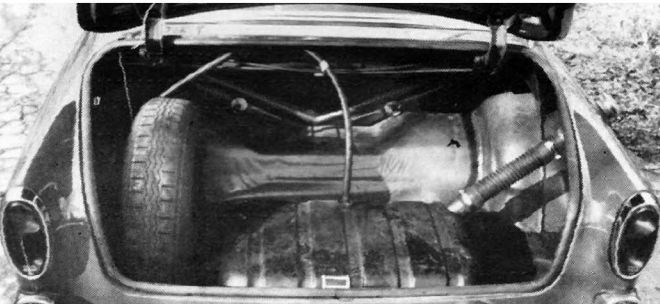
Volvo uses Spicer axles, and consequently a wide range of final drive ratios is available. The car can be geared for any circuit, and we tested it with the 4.88-to-one ratio used for Lime Rock, Thompson and Marl-



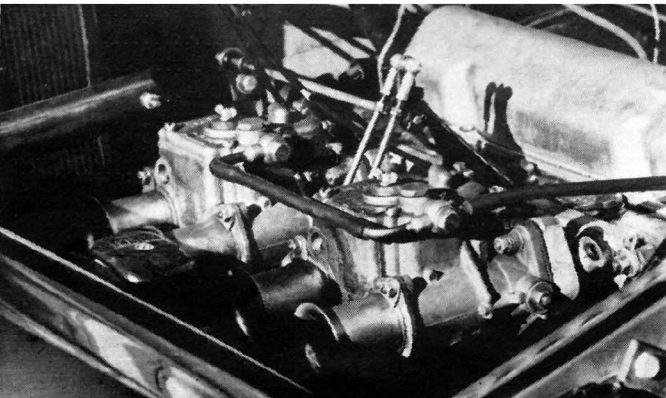
Steering wheel spokes are drilled for lightness; instrument panel is fully reworked, with great VDO dials for everything.



Volvo has one of the best attachment systems for a rigid axle, with radius arms, torque rods, panhard rod, and coil springs.



Special fuel tank with large-diameter filler neck and a long breather pipe severely limits use of the trunk for luggage.



Beautiful bell-mouthed Weber carburetors gape as eagerly as a cuckoo in a thrush's nest, but actual consumption is modest.

boro. On faster circuits, the standard 4.56 ratio is preferred, and in Europe the 122-S is often raced with the optional 4.10 to one ratio. Bob Perry of Volvo GmbH in Frankfurt claims that their cars with 4.10 final drives will reach 6500 rpm in top gear (with 165 x 15 tires), equivalent to 112 mph. Goodyear Blue Streaks are preferred for American race tracks, but the car was fitted with Dunlop SPs for street use during our test. The wheels are 5½-in Dodge, which offer a better support for racing tires than the 4½-in rims of the P-1800.

Chassis modifications went in two directions: lowering the center of gravity, and stiffening the suspension. The front coil springs were shortened by two inches; three inches were cut off the rear leafs. The standard Delco shock absorbers were replaced by Konis, with the fronts set at maximum hardness and the rear ones at medium. With the standard ¾-in front anti-roll bar, cornering at racing speeds will inevitably lift the inside rear wheel, so the racing car has a 1½-in diameter bar, which effectively keeps the rear wheels down and totally eliminates body roll. The front roll center is at ground level, and the basic understeering tendency is counteracted by giving the front wheels two degrees of negative camber.

Volvo's 122-S began life with 9-in brake drums all around, with two-leading shoes front. In 1958 the front brakes were enlarged to 10-in diameter and the duo-servo system was adopted. By that time, however, the standard cars were so fast that they really deserved disc brakes. Girling and Lockheed both developed disc systems for the front wheels of the P-1800, and Volvo chose the Girling one when the car was ready for production. The same system was adapted for the 122-S and introduced concurrently with the 1.8-liter engine in 1961. The only change undertaken in the brake system on the racing car is the fitting of cerametallic front pads and rear linings. Pedal pressures are high, but the car can also be brought to a standstill in amazingly short distances. And the brakes never get tired, never overheat, and do not need frequent adjustment.

Lightening the car did not involve putting the drivers on a diet, but stripping the car has been very thorough. The entire rear seat, upholstery and panelling, was thrown out, and the bumpers were removed. Other big weight factors were the heater unit, the floor mats and the window winding mechanisms. Only one windshield wiper is retained, one sun visor is kept, and plexiglass was substituted for the rear window and rear side windows. The standard front seats are replaced by lightweight bucket seats fitted on the standard rails. The result is a curb weight of 2110 lbs. against 2665 for the standard model.

For actual racing, Volvo uses a special exhaust pipe with a mouth on the side of the car, in front of the rear wheels; but for street use the car had a muffler and a single tail pipe, looking very standard.

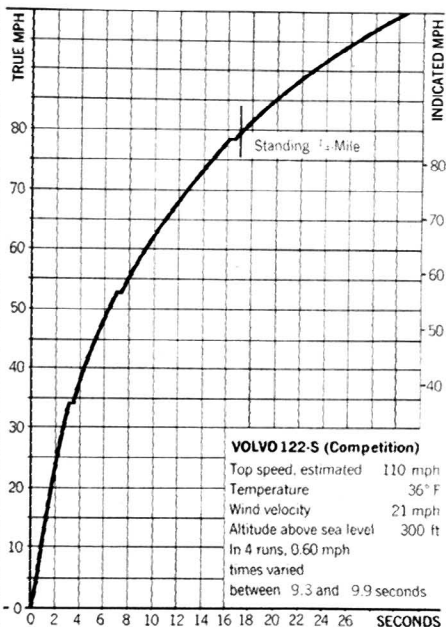
Nobody in their right minds would want this kind of car for everyday use. However, it contains several modifications that can successfully be undertaken on "civilian" Volvos by handling-conscious and performance-oriented owners. Some of the most pleasant and memorable privately owned Volvos of our experience have had standard engines but were greatly improved by the use of braced-tread tires, Koni shock absorbers, and stronger anti-rolls bars. Those who feel they need more power can easily get it by milling the head (up to 0.080 in) and installing the special camshaft and valve springs. Volvo co-operates by carrying the racing options in stock, but they are not available as factory-installed options on a new car. We hope the factory will be interested in exploring this field, for better customer satisfaction as well as higher profits.

VOLVO 122-S COMPETITION

Importer: Volvo Import, Inc.,
452 Hudson Terrace, Englewood Cliffs,
New Jersey

ACCELERATION

Zero to	Seconds
30 mph	2.7
40 mph	4.4
50 mph	6.5
60 mph	9.6
70 mph	13.0
80 mph	17.5
90 mph	22.9
100 mph	31.2
Standing 1/4 mile	7.9 mph in 17.1



ENGINE

Water-cooled in-line four, cast iron block, 5 main bearings
Bore x stroke 3.35 x 3.15 in 85 x 80 mm
Displacement 113.3 cu in, 1860 cc
Compression ratio 11.0 to one
Carburetion Two Weber side-draft 42 DCOE/8
Valve gear Pushrod-operated overhead valves.
Power (SAE) 120 bhp @ 6000 rpm
Torque 127 lb-ft @ 3600 rpm
Specific power output 1.06 bhp per cu in,
64.8 bhp per liter
Usable range of engine speeds 2000-7000 rpm
Electrical system 12-volt, 60 amp-hr battery
Fuel recommended Super premium
Mileage 20-30 mpg
Range on 25-gallon tank 500-750 miles

DRIVE TRAIN

Clutch Borg & Beck 8.5-inch single dry plate
Transmission 4-speed all-synchro
mph/1000 Max
rpm
Gear Ratio Over-all
Rev 3.25 15.87 -4.72 -33.0
1st 3.13 15.16 4.95 34.5
2nd 1.99 9.75 7.69 53.7
3rd 1.36 6.63 11.30 79.0
4th 1.00 4.88 15.36 105.0
Final drive ratio 4.88 to one

CHASSIS

Unit-construction, all-steel body.
Wheelbase 102.6 in
Track F 51.75 R 51.75 in
Length 170 in
Width 64 in
Height 54 in
Ground clearance 3 1/2 in
Curb weight 2110 lbs
Test weight 2330 lbs
Weight distribution front/rear 54.0/46.0%
Pounds per bhp (test weight) 19.45
Suspension: F Ind., unequal-length wishbones
and coil springs, anti-roll bar.
R Rigid axle, trailing arms and
torque rods, panhard rod, coil
springs.
Brakes Girling 10 7/8-in discs F, 9-in drums R,
350 sq in swept area
Steering Cam and roller (15.5 to one ratio)
Turns lock to lock 3 1/4
Turning circle 32 ft
Tires Dunlop SP 165 x 15
Revs per mile 820

CHECK LIST

ENGINE

Starting Good
Response Excellent
Noise Terrible
Vibration Good

DRIVE TRAIN

Clutch action Good
Transmission linkage Excellent
Synchromesh action Excellent
Power-to-ground transmission Excellent

BRAKES

Responsiveness Good
Pedal pressure Poor
Fade resistance Excellent
Smoothness Average
Directional stability Excellent

STEERING

Responsiveness Good
Accuracy Good
Feedback Average
Road Feel Good

SUSPENSION

Harshness control Poor
Roll stiffness Excellent
Tracking Excellent
Pitch control Good
Shock damping Fair

CONTROLS

Location Fair
Relationship Fair
Small controls Fair

INTERIOR

Visibility Fair
Instrumentation Good
Lighting Good
Entry/exit Fair
Front seating comfort Average
Front seating room Fair
Rear seating comfort —
Rear seating room —
Storage space Poor
Wind noise Fair
Road noise Average

WEATHER PROTECTION

Heater —
Defroster —
Ventilation —
Weather sealing Excellent
Windshield wiper action Poor

QUALITY CONTROL

Materials, exterior Good
Materials, interior Good
Exterior finish Average
Interior finish Poor
Hardware and trim Average

GENERAL

Service accessibility Excellent
Luggage space Poor
Bumper protection —
Exterior lighting Good

