

DRIVING DYNAMICS

ENGINES

In brief:

A powerful five-cylinder petrol and diesel engine range, topped by a six-cylinder, petrol 2.9-litre T6 model, the S80 has a generous choice of power units available.

The five-cylinder petrol engines include turbo-powered (2.0T, 2.5T) as well as normally aspirated – the 2.4 (140bhp) and 2.4 (170bhp) models - while the extra economy, flexibility and refinement of Volvo’s modern, 163bhp D5 turbodiesel engine is now proving the most popular choice in the range.

In full:

With normally aspirated and turbo variants of its five and six-cylinder petrol engines, a modern and refined 'D5' turbo-diesel, plus Bi-Fuel engines that run on both petrol or gas (LPG or CNG) available, the S80 offers one of the biggest and most powerful choice of engines in the Volvo range.

Engine	2.4 (140)	2.4 (170)	2.0T	2.5T	T6	D5
Type	2435cc 5cyl/20v turbo	2435cc 5cyl/20v turbo	1984cc 5 cyl/20v turbo	2521cc 5 cyl/20v turbo	2922cc 6 cyl/24v twin-turbo	2401cc 5cyl/20v turbo
Fuel	Petrol	Petrol	Petrol	Petrol	Petrol	Diesel
Power	140 bhp	170 bhp	180 bhp	210 bhp	272 bhp	163 bhp
Torque Nm at rpm	240 Nm at 1850rpm	225 Nm at 1750rpm	240 Nm at 1850rpm	320 Nm at 1500rpm	380 Nm at 1800rpm	340 Nm at 1750rpm
0-62mph manual/auto	10.5 man 11.4 auto	9.0 man 9.9 auto	9.1 man 9.8 auto	7.3 man 7.7 auto	- 7.2 auto	9.8 man 10.2 auto
Top speed manual/auto	127 man 124 auto	137 man 134 auto	140 man 134 auto	146 man 140 auto	- 155 auto	130 man 130 auto
CO2 g/km	212 man 229 auto	214 man 232 auto	214 man 234 auto	219 man 239 auto	- 268 auto	172 man 204 auto
MPG man/auto						
Urban	22.8/20.9	22.8/20.6	22.6/20.3	21.7/20.0	-/17.7	31.4/26.2
Extra urban	41.5/38.7	40.4/38.7	40.9/38.2	40.4/36.7	-/34.0	55.4/47.1
Combined	31.7/29.4	31.4/29.1	31.4/28.8	30.7/28.2	-/25.4	43.5/36.7
Emissions standard	Euro IV	Euro IV	Euro IV	Euro IV	Euro IV	Euro III

Service intervals: 18,000 miles/1 year for 2.4 (140), 2.4 (170), 2.0T, 2.5T; 12,500 miles/1 year for D5 and T6.

The T6 is only available with Geartronic transmission.

Steering/tyres	Rack and pinion with 215-235 (17in-18in) section tyres.
Turning circle, m (ft)	11.9 – 12.0 (38ft 9in – 39ft 4in).
Transmission	5 speed manual (2.4 (140), 2.4 (170), 2.0T, 2.5T, D5). Automatic: 5 speed (2.4 (140), 2.4 (170), 2.0T, 2.5T, D5). Geartronic: 4 speed (T6).

Brakes: Front discs	15in – 286mm Ventilated (2.4 (140), 2.4 (170), D5).
Rear discs	16in – 305mm Ventilated (2.0T, 2.5T, T6). 288mm (all models).
Fuel Tank litres (gallons)	80 (17.6) – (2.0T, 2.5T, T6). 70 (15.4) - (2.4 (140), 2.4 (170), D5).
<u>Load capacity:</u> litres (cu ft)	460 (16.2)
Rear seats down	902 (31.9)
<u>Dimensions:</u> (mm)	
Length	4850
Width (excluding mirrors)	1833
Unladen height	1454
Wheelbase	2791
Front track width	1570
Rear track width	1548

Service intervals: 18,000 miles/1 year for 2.4 (140), 2.4 (170), 2.0T, 2.5T; 12,500 miles/1 year for D5 and T6.

Full technical data and prices are available in price list or at www.media.volvocars.co.uk.

For 2006 the engine range has been streamlined, and the 2.9 straight six petrol and Bi-Fuel engines have been discontinued.

All engines are transverse with four valves per cylinder and multipoint fuel injection (multipoint direct fuel injection on D5 and T6). High torque figures at low engine speeds provide plenty of smooth flexibility, and the S80 engine line-up provides a range of power outputs from 140bhp to 272bhp to suit all customers.

With a choice of 140bhp or 170bhp, the normally aspirated 2.4-litre engine starts the S80 range with a comfortable and refined power delivery and some of the lowest CO2 emissions of the range.

The 2.0T, 2.5T and T6 engines are all turbocharged petrol engines using variable valve timing – on the inlet side on normally aspirated 2.4 engines, the exhaust side for the 2.0T, and both inlet and exhaust sides for the 2.5T and T6.

The 180bhp 2.0T engine joined the new S80 range for the 2004 model year at the same time as the 210bhp 2.5T replaced the former 200bhp 2.4T. Both engines offer surprisingly quick (low pressure) turbo power with generous torque figures at low engine speeds making them capable of reaching 62mph 9.1 and 7.3 seconds, respectively, yet still deliver good fuel economy of just over 30mpg on the Combined cycle.

The T6, clearly the most powerful engine in the S80 range and available in both SE Lux and Executive variants, delivers outstanding, smooth performance using responsive dual turbochargers and variable inlet and exhaust valve timing to deliver maximum torque of 380 Nm from as low as 1800rpm, as well as meeting the strict European 2005 emission requirements.

The D5 is the first diesel car engine Volvo has produced in-house. It is available in the S80 range in both SE Lux and Executive models and offers refined performance with low fuel consumption of up to 43.5mpg on the Combined cycle. It has 163bhp of power with 340 Nm of torque from just 1,750rpm more than the 320Nm of torque offered by the 210bhp, 2.5T petrol engine. It has instantly proved extremely popular and represents over 81 per cent of S80 sales in the UK.

Volvo's D5 engine is a turbocharged diesel made of lightweight aluminium using the latest variable nozzle turbine with movable guide vanes for optimum flow conditions for high turbine efficiency at all engines speeds. A fast-acting Exhaust Gas Recirculation system increases engine efficiency and reduces Nox emissions while retaining high fuel efficiency, all combined with second generation common rail direct fuel injection technology that electronically controls fuel and injection timing. Fuel is injected directly into the cylinders under high pressure – up to 1600bar. The result is extremely finely atomised fuel, ensuring efficient combustion while minimising emissions of nitrogen oxides (Nox) and particulates.

All five-cylinder engines (petrol, diesel and Bi-Fuel) are available as SE Lux models, while the Executive model is offered with just the six-cylinder T6 and the D5, fitted with Geartronic transmission as standard (respectively).

DRIVING DYNAMICS

CHASSIS

In brief:

The Volvo S80 has been designed for a harmonious balance between response and comfort.

Better still, Volvo's advanced active 'Four-C' (Continuously Controlled Chassis Concept) chassis. This is the same chassis concept used in Volvo's high-performance, AWD S60 R and V70 R, and has now been adapted for the front-wheel drive S80 offering the driver the choice of 'Comfort' and 'Sport' chassis settings.

In full:

The Volvo S80 has been designed for a harmonious balance between response.

A long (2791mm) wheelbase, highly torsionally stiff body and an advanced chassis ensure the S80's stable road behaviour. Front wheel drive and independent suspension are combined with sophisticated multi-link rear suspension for first class ride comfort and to help the car turn in and out of curves smoothly and effectively.

Volvo's DSTC (Dynamic Stability and Traction Control) is standard on all models and detects and counteracts any tendency to skid by braking the wheels necessary to retain control. Its anti-spin system ensures that the driven wheels get the right amount of power to retain a firm grip on the road.

Sports Handling Pack

For more responsive handling and some added 'cool' appearance there is an optional Sports Handling pack available for SE Lux and Executive models. This includes:

- Larger 18in alloy wheels (Nebula (BBS), or Capella – black chrome for SE Lux, Silver for Executive) on 235/40 R18 tyres.
- Active 'Four-C' chassis.
- Speed dependent steering.

Active 'Four-C' Chassis

Volvo's active 'Four-C' (Continuously Controlled Chassis Concept) active chassis was introduced as one of the dynamic enhancements available for the new S80 in mid-2003, and is available as a separate option or as part of the Sports Handling Pack.

The 'Four-C' chassis borrows the same advanced technology and chassis concept as Volvo's high-performance S60 R and V70 R, but adapts it for the S80's front-wheel drive and offers the driver the choice of 'Comfort' and 'Sport' chassis settings.

Dampers and suspension settings are monitored about 500 times a second and instantly and constantly adjusted to provide the driver with the appropriate choice of ride and handling combination. The sensors constantly monitor the following parameters:

- The car's speed and acceleration
- Lateral acceleration during cornering
- Suspension movements
- The steering wheel's position and how fast it's being turned
- The engine's current (calculated) torque

- The degree of braking

The system is designed to help counteract the cars natural dynamic tendencies:

- TAKE OFF: When accelerating away from standing start, the rear dampers are set to maximum stiffness to help prevent acceleration squat and optimise front wheel traction.
- BRAKING: When braking the front dampers are stiffened to reduce 'brake dive'. This allows greater rear end grip so more rear braking effort can be used.
- CORNERING: When cornering the outside dampers are stiffened to reduce roll and provide extra grip and traction.

When in 'Comfort' setting, the Four-C chassis makes for an extremely comfortable ride, particularly on poor surfaces. Damping settings are continuously adjusted in response to the quality of the road surface to provide as comfortable a ride as possible, and make the S80 an ideal car for travelling long distances.

Alternatively, at the touch of the 'Four-C' button on the dashboard the S80 can instantly change to 'Sports' setting and the dampers become firmer, together with quicker steering responses, to provide better body control.

For example, when driving round a bend damping is adjusted so the pressure on the road surface is distributed optimally between all four wheels, while at higher speeds and during lateral acceleration, or if the car is heavily laden, damping is also increased automatically for more controlled roadholding and stability.

In addition, the Four-C system will automatically strive to keep the car's body level during braking and acceleration without excessive dipping at the nose or squatting at the rear, and no matter which setting is chosen the car is always ready for the worst. For instance, in a sudden emergency avoidance manoeuvre the Four-C system takes control and adjusts the dampers to provide the safest possible driving characteristics for the situation – i.e. minimum roll, effective road grip and the shortest possible stopping distance.

DRIVING DYNAMICS

STEERING, BRAKES, TRANSMISSION

In brief:

The Volvo S80 has always been a rewarding and comfortable car to drive and travel in. Dynamic enhancements for the new S80 in 2003 included new ZF steering for more direct and sharper steering responses with better handling. ZF also supply a new, optional speed-dependent steering available on the new S80, which is designed to give more assistance at very low speeds, when parking for instance, and less at higher speeds.

In addition, the greater and constant control provided by Volvo's optional 'Four-C' active chassis concept also benefits the S80's steering responses and braking.

A four-speed adaptive Geartronic transmission is standard with the six-cylinder T6 engine, which allows sequential manual changes for added control, while a standard five-speed automatic transmission is available on all other models. Both transmissions adapt their shift points to suit individual driving styles.

DSTC (Dynamic Stability and Traction Control) and a powerful anti-lock braking system with EBD (Electronic Brake Distribution) mean braking power is automatically distributed between the front and rear wheels for quick, sure stops regardless of the car's load. EBA (Electronic Brake Assistance) helps shorten braking distances in emergency situations.

In full:

- Power-assisted rack and pinion steering tuned to optimise feedback and response. Speed sensitive steering also available (optional).
- Anti-lock brakes (ABS) with Electronic Brakeforce Distribution (EBD) and Electronic Brake Assistance (EBA) standard on all models.
- DSTC standard on all models.
- Five-speed manual standard on 2.4 (140), 2.4 (170), 2.0T, 2.5T and D5; Five-speed adaptive automatic available (optional).
- Four-speed adaptive Geartronic automatic with sequential manual shift facility standard on T6.

With front-wheel drive, independent suspension combined with sophisticated multi-link rear suspension the Volvo S80 has always been a rewarding and comfortable car to drive and travel in.

The standard DSTC (Dynamic Stability and Traction Control) anti-spin system ensures the driven wheels retain a firm grip on the road and also detects and counteracts any tendency to skid by braking the wheels necessary to retain control.

One of the dynamic enhancements for the new S80 includes the introduction of ZF rack and pinion steering for more direct, sharper steering responses and better roadholding. The steering feel has been improved through careful tuning of the torque build-up during cornering. This helps the driver place the car accurately on the road and to assess the available grip.

At the same time, a speed sensitive power steering option was also introduced as an option for the new S80, and is designed to match the amount of power assistance to the driving circumstances. It will maximise assistance at low speeds and gently reduce the level of assistance as speed rises to improve steering precision and enhancing road feedback.

An anti-lock braking system is fitted as standard, of course, together with DSTC (Dynamic Stability and Traction Control), joined by Electronic Brakeforce Distribution (EBD) and Electronic Brake Assist (EBA).

EBD constantly distributes braking power between the front and rear wheels to ensure maximum retardation regardless of the road conditions or how the car is laden. EBA automatically senses when an emergency stop is required and adjusts the braking pressure so that the car comes to a halt in the shortest possible distance.

Three different transmissions are available on the Volvo S80. All models except the T6 have a five-speed manual gearbox or the option of a five speed adaptive automatic. However, the T6 is exclusively available with a four-speed adaptive Geartronic transmission which allows sequential manual changes for added control: Gears are selected sequentially by tipping the lever forwards to change up and backwards to change down.