

## Driving Dynamics

### Engines

The all-new Volvo V50 sportswagon is available with a range of high-tech petrol and diesel engines. To reflect its role as a premium alternative, the Volvo V50 can be specified with a choice of transversely mounted five cylinder petrol engines, the most potent of which is the 2.5-litre T5.

The four cylinder engines in the Volvo V50 range include a 1.8-litre petrol engine, and a new 2.0-litre turbodiesel, which boasts second generation common rail technology, plenty of torque, and is also Euro IV compliant (from 2005 model year), which is great news both for tax-conscious company car drivers and the environment.

Engine	No of cylinders	Power	Torque	Availability
<b><u>Petrol:</u></b>				
<b>1.8</b>	<b>4</b>	<b>125 bhp</b>	<b>160 Nm</b>	<b>Q3 2004</b>
<b>2.4i</b>	<b>5</b>	<b>170 bhp</b>	<b>230 Nm</b>	<b>Q1 2004</b>
<b>T5</b>	<b>5</b>	<b>220 bhp</b>	<b>320 Nm</b>	<b>Q1 2004</b>
<b><u>Diesel:</u></b>				
<b>2.0 D</b>	<b>4</b>	<b>136 bhp</b>	<b>320 Nm</b>	<b>Q1 2004</b>

The new Volvo V50 sportswagon is available with a range of high-tech engines that reflect its role as a premium sporting alternative. Uniquely in this class, the Volvo V50 can be specified with a choice of two transversely mounted five cylinder engines, providing an unrivalled combination of power and refinement. These are joined by a 1.8-litre four cylinder petrol engine and a 2.0-litre 136bhp turbodiesel, which boasts second-generation common rail technology and Euro IV compliant emissions (from 2005 model year).

Accommodating the five cylinder powerplants within the Volvo V50's compact structure was no mean feat. Although the engines are based on the low-friction units

found in larger Volvo saloons, they have been extensively revised and repackaged. The new generation is called RNC, with the C indicating Compact. Most of the engine's external components have been redesigned - the exhaust manifold outlets are now angled down towards the engine block, for example, and the manifolds on the T5 model are cast together with the turbo unit housing to reduce space.

These changes result in a series of engines that are 200mm slimmer and 25mm shorter than those found in larger Volvos. They are also substantially lighter, to the benefit of both the driving dynamics and fuel consumption. Despite the changes, the technical merits of the engines are undiminished. Both the 2.4-litre and the 2.5-litre T5 boast four-valves per cylinder and dual overhead camshafts, together with Variable Camshaft Timing (CVT), which works to maximise the torque at low engine speeds and to reduce exhaust emissions.

The (2.4i) 2435cc engine is normally aspirated and boasts 170bhp. This peak occurs at 6000rpm, while the maximum torque of 230Nm is on offer at 4400rpm. The manual version takes just 8.3sec to reach 62mph from rest and the top speed is 137mph. The fuel consumption is also excellent - the 2.4i consumes a gallon of unleaded petrol every 32.8 miles.

The performance flagship of the all-new Volvo V50 range is the 2521cc T5. Equipped with a light-pressure turbo, it generates a potent 220bhp at 5000rpm. The peak torque output of 320Nm is available all the way from 1500-4800, proving that top-end thrust need not be achieved at the expense of mid-range flexibility. The manual T5 rockets from 0-62mph in just 6.9sec and will reach 149mph. But despite its high-performance, it still achieves an excellent 32.1mpg on the combined cycle.

Performance and economy are also words closely associated with the new 1998cc turbodiesel engine. Developed in conjunction with Ford Motor Company and PSA Peugeot Citroen, it features second generation common rail technology with moving rails, delivering an unbeatable combination of power and refinement. The 2.0D has a maximum power output of 136bhp, while the peak torque of 320Nm is available at just 2000rpm. The diesel-engined Volvo V50 covers the 0-62mph increment in a 9.6sec and reaches 130mph.

But while the 2.0D's acceleration is petrol-like, its economy underlines the value of diesel power. The Volvo V50 sportswagon returns an outstanding average of 49.6mpg and its carbon dioxide emissions are just 153g/km. This is not only great news for the environment, it also provides company car drivers with useful tax savings. The introduction of a particulate filter has enabled the engine to comply with Euro IV emissions regulations and qualify for a lowly 16% Benefit in Kind tax rating.

Completing the Volvo V50 sportswagon range for now, is a new 1798cc four cylinder petrol engine. Offering 125bhp and 160Nm of torque, it combines sprightly performance with low running costs.

## **Chassis**

- **34% greater torsional rigidity than previous Volvo V40**
- **Dynamic Stability Traction Control (DSTC) fitted as standard**
- **Sophisticated multi-link rear suspension**
- **Wheelbase increased by 78mm to 2640mm (compared to V40)**
- **Front track increased by 63mm, rear by 57mm (compared to V40)**

**The engineers tasked with developing the all-new Volvo V50 sportswagon were asked to invoke the spirit of the awesome Volvo V70 R and to create a sporty car with a high level of active safety. It was a tough remit, but the engineers surpassed even their toughest targets.**

**The torsional rigidity of the new model is 34% greater than that of its predecessor, which helps maximise the performance of the new multi-link rear suspension. The front and rear tracks are also been increased to improve stability and the all-new Volvo V50's active safety is enhanced by the standard fit Dynamic Stability and Traction Control system (DSTC).**

The engineers brief for the all-new Volvo V50 sportswagon was to develop a car that would invoke the spirit of the awesome Volvo V70R and combine an engaging, dynamic driving experience with a high level of active safety. It was a tough remit

but with the development of a sophisticated new suspension system, a high level of torsional rigidity, a wide track and the latest electronic stability systems, Volvo's engineers have achieved their targets.

"A modern Volvo should obey the driver's slightest command – immediately and without fuss," says Peter Ewerstrand, the Volvo V50 project manager. "It should be as enjoyable to drive as it is safe. We had particularly high ambitions for the all-new Volvo V50 and we're more than pleased with the result. This is a car you'll truly look forward to driving whenever you get the chance."

The body of the new model is 34 per cent stiffer than its predecessor thanks to advanced body design and the use of high strength materials, including Ultra High Strength Boron Steel. This high level of torsional rigidity allows the suspension to do its job properly and its provision was integral to the Volvo V50's design. It benefits not only the ride and handling characteristics of the Volvo V50, but also its crash-worthiness.

The advanced, independent suspension system employs spring struts at the front, the geometry of which has been carefully calculated to provide quick and precise steering response, enhancing the car's sports appeal. The rear suspension is a sophisticated multi-link system, which permits a small degree of passive rear wheel steering when cornering. This helps to maximise stability and control. Anti-roll bars also feature at both ends.

A further contribution to the Volvo V50's exceptional stability is provided by the wide track and long wheelbase. The front track of the new model is 63mm wider than that of the previous Volvo V40, while the rear track has grown by 57mm. This helps improve the car's balance, enabling it to cope with high cornering forces, while providing clear and consistent feedback to the driver. The wheelbase has also grown by 78mm to 2640mm and this contributes to a balanced weight distribution with a low minimal moment of inertia. In practical terms, this enhances the steering response and helps ensure that the Volvo V50 responds in a controlled, predictable manner in all circumstances, making a major contribution to active safety.

A Sport trim, with a more dynamic chassis set-up, is due to join the Volvo V50 range later in 2004. The Sport's chassis is lowered by 20mm compared with that of the standard car, and the spring and damper settings have also been revised to ensure that the V50 Sport is even more responsive and the striking exterior looks are further enhanced with the addition of side skirts and rear spoiler.

The carefully honed mechanical set-up is supported by the Dynamic Stability and Traction Control (DSTC) system, which is standard on every model. An array of sensors monitor the car's behaviour and if it starts to skid, DSTC will automatically brake individual wheels to help the driver regain control. The traction control element also works to alleviate the problems of wheelspin, ensuring that the all-new Volvo V50 delivers a safe, positive driving experience in all weather conditions.

For drivers seeking the ultimate in all-weather traction, though, Volvo offers the Volvo V50 T5 AWD. "We want to give our customers the widest possible range of choices irrespective of car size," says Peter Ewerstrand. The all-wheel drive system fitted to the Volvo V50 is the same as that found in larger AWD models. Engine power is automatically distributed between the front and rear wheels with the help of a fast responding electrically operated hydraulic clutch, which was developed by Haldex. The clutch can transmit torque to the rear wheels even before the front wheels have had time to rotate a quarter of a revolution.

The addition of a propeller shaft has necessitated a small increase in the ride height of the Volvo V50 AWD, but the addition of a stiffer anti-roll bar and revised damper settings compensate for the higher centre of gravity and help to ensure a consistency of response throughout the V50 range. The Volvo V50 AWD is only available with the T5 engine option and it cannot be specified in conjunction with the sports chassis.

### **Steering, brakes and transmissions**

- **Electro-hydraulic power steering system delivers optimal driver feedback and response**
- **Ventilated disc brakes all-round**

- **Anti-lock brakes with Electronic Brake Force Distribution (EBD) and Emergency Brake Assist (EBA) fitted as standard**
- **Volvo V50 T5 uses six-speed manual gearbox from Volvo V70 R**
- **Volvo V50 2.0D fitted with six-speed manual**

**The Volvo V50 sportswagon's electro-hydraulic power steering system has been tuned to maximise driver feedback and control, which helps the driver place the car accurately on the road.**

**As you'd expect from Volvo, an anti-lock braking system is fitted as standard, and the ventilated disc brakes are also equipped with Electronic Brakeforce Distribution (EBD) and Emergency Brake Assist (EBA). EBD varies the braking performance between the front and rear wheels to minimise stopping distances, while EBA automatically applies maximum braking performance when an emergency stop is required.**

**Normally aspirated Volvo V50's are fitted with a five-speed manual gearbox, but the flagship T5 and 2.0-litre turbodiesel models boast six forward ratios.**

The all-new Volvo V50 sportswagon uses an electro-hydraulic power steering system that has been developed to optimise driver feedback and response. This helps the driver place the car accurately on the road and to assess the available grip.

Ventilated disc brakes are fitted at the front and rear. The disc size is adapted to the engine power and wheel rim size, up to a maximum diameter of 16.5in (320mm). As you'd expect from Volvo, an anti-lock braking system is fitted as standard and this is joined by Electronic Brakeforce Distribution (EBD), which constantly distributes braking power between the rear wheels to ensure maximum retardation regardless of the road conditions or how the car is laden. Every Volvo V50 model is also equipped with Emergency Brake Assist (EBA). This system 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.

Four different transmissions are available on the Volvo V50 sportswagon. The normally-aspirated petrol engines are mated to a new generation of Volvo's five-speed manual gearbox. This unit has been modified with the introduction of a triple synchromesh to provide faster, more positive changes.

The Volvo V50 T5 uses the six-speed manual gearbox that was developed for the awesome Volvo S60 R and V70 R. The ratios have been carefully matched to the engines characteristics so as to combine strong acceleration with a high top speed. The gearbox has a triple synchromesh and a reassuringly direct shift action.

All the five cylinder petrol engines can also be specified with Volvo's Geartronic five-speed automatic transmission that is used in Volvo's larger models. The system is fully adaptive – it automatically adjusts its shift patterns according to an individual's driving style.

The Volvo V50 2.0D also offers six forward ratios, but this gearbox is not the same unit as that fitted to the T5. The ratios have been chosen to complement the diesel's 320Nm of torque and to provide effortless pull throughout the engine range.