

VOLVO S60

MARKET POSITIONING

The arrival of the Volvo S60 prompted a shake-up in the compact sports saloon market. Customers, who had traditionally looked to BMW or Mercedes, are now presented with a Volvo that combines elegant, coupe-like styling with a range of powerful engines and a higher level of standard specification.

It's a fresh departure for the brand, but it also remains true to Volvo's core values. All five occupants are protected by a comprehensive safety package that includes SIPS, WHIPS, Inflated Curtain (IC) airbags and seatbelt tensioners. The security equipment is first rate and the arrival of Bi-Fuel and D5 turbodiesel engines, confirms Volvo's commitment to improving the environment, and reducing fuel costs.

The arrival of the Volvo S60 in 2000 prompted a shake-up in the compact sports saloon market. Customers, who had traditionally looked to other premium brand rivals from BMW, Mercedes and Audi, were now presented with a Volvo that combined elegant, coupe-like styling with a range of powerful engines and a higher level of standard specification.

Designed under Volvo's British Executive Design Director, Peter Horbury, the Volvo S60 mixes sporting design with real-world practicality and executive levels of luxury, comfort and driving pleasure.

The sloping roofline, for example, deliberately echoes that of the Volvo C70 Coupe, but there's still ample headroom for a triplet of adults in the rear. The strident egg-crate grille, strong curved shoulder lines and distinctive rear lights also provide a strong visual link with the rest of the latest Volvo range.

The style of the logically laid-out, uncluttered fascia also follows Volvo's typically simple, Swedish style, but in the Volvo S60, it's angled towards the driver, reflecting the car's sporting intent. A high level of luxury equipment is

fitted as standard to every model, including Electronic Climate Control with Volvo's Air Quality System (AQS), a premium audio system with CD player and at least eight speakers, plus cruise control.

And as you'd expect from Volvo, there's a comprehensive safety package. Dual-stage front airbags, SIPS (Side Impact Protection System), WHIPS (Whiplash Protection System), IC (Inflatable Curtain) and five three-point safety belts combine to offer outstanding occupant protection. Little wonder that it achieved a full EuroNCAP crash test rating when first tested, and a maximum 100% score for side impact protection.

The Volvo S60's active safety is equally impressive and it combines a range of powerful, five-cylinder engines with a sophisticated chassis. There are four turbocharged petrol engines, from the entry-level, 180bhp 2.0T, to the awesome 300bhp Volvo S60 R.

These have since been complemented by Volvo's acclaimed, 163bhp D5 turbodiesel, which uses common rail direct injection technology to combine 340Nm of mid-range pull from 1750rpm, with low emissions and an average consumption of 43.5mpg on the Combined fuel test cycle.

Another newer engine to the range is the 2.4 litre Bi-Fuel, built on the same production line as the rest of the range, fully crash tested and with the usual Volvo Car UK three year warranty. These can be specified to run on either (cheaper) LPG or CNG, with a smaller petrol tank as the reserve fuel.

The Volvo S60 shares its basic suspension layout with the larger S80 saloon. There are MacPherson struts with lower wishbones at the front and an independent, multi-link set-up at the rear. This sophisticated system, coupled with exceptional torsional rigidity and the widest track in the compact executive class, ensures that the Volvo S60 offers the best handling in the Volvo range.

DESIGN CONCEPT

The Volvo S60 was designed from the outset to be a sports saloon and the most dynamic vehicle in the Volvo range. Peter Horbury, now Executive Design Director at the Premier Automotive Group, describes it as “a four-door coupe” and admits that the styling was inspired by the C70 coupe.

It also pioneers a ‘cockpit-forward’ look, which Horbury describes as “a new way of doing sports saloons”. By moving the top of the car forwards to sit between the front wheel-arches, the designer has created a shape of unique balance and proportion. It asserts a strong, fresh identity, but the egg-crate grille and prominent shoulder lines ensure that it’s also instantly recognisable as a Volvo.

- Designed as a ‘four-door coupe’ under Peter Horbury
- Cockpit-forward styling – a new way of designing a sports saloon
- Incorporates the latest Volvo styling cues
- Volvo S60 R matches style with function

The Volvo S60 was designed from the outset to be a sports saloon and the most dynamic vehicle in the Volvo range. Peter Horbury, the then Vice President and Chief Designer at Volvo Cars, describes it as, “a four-door coupe or a two-plus-two door.” Its strident, distinctive appearance has enticed customers who might otherwise have chosen other premium brand rivals such as BMW (3 series), Audi (A4) or Mercedes (C-class).

Much of the inspiration for the shape came from the Volvo C70 Coupe. “In the studio, the day we started the project,” explains Horbury, “we had a Volvo C70 parked and when the designers were talking about what the car should look like, I put a piece of styling tape on the Volvo C70 to create a second door.”

Horbury's moment of inspiration is reflected in the Volvo S60's roofline, which tapers elegantly into the boot. It's a coupe-like detail that gives a clear indication of this car's sporting intent. That it has been achieved without robbing rear passengers of headroom is a tribute to the designer's clever blend of form and function.

There was also another underlying influence in determining the Volvo S60's shape and one that sets it apart from the opposition. Horbury explains: "If you look back at the history of car design, it started very much in the days of the horses and carriages, where the horse – or the engine – was out front and the people were sitting in the carriage, over the rear axle."

"But then, later on, aircraft changed when the engines went onto the wings and the pilot came up front in his cockpit. Eventually cars, with Ferrari's 250LM, changed – they put the engine behind the driver."

"And suddenly the new layout of the car looked right, it performed well and it looked good. All the design exercises since that day followed that track – the sort of cockpit-forward look. And that is what we've tried to do with the Volvo S60. This is a new way of doing a sports saloon."

In keeping with this design philosophy, the cockpit of the Volvo S60 has been brought forward so that it sits between the front wheels, creating a strong, dynamic, homogeneous appearance. "We brought the top of the car in-between the wheels, in-between the overhangs to create what I feel is one of the best-balanced looking cars there is," says Horbury.

The Volvo S60 therefore manages to assert its own, distinct identity in a competitive class, but it's also instantly recognisable as a Volvo. The prominent egg-crate grille and V-shaped bonnet are classic Volvo and so too is the strong shoulder line, which emphasises the car's strength and durability. The manner in which the rear tail lamps integrate beautifully into the boot also echoes the larger S80 and reflects what Horbury describes as "a very

Swedish design simplicity.” It’s also a shape that works exceptionally well, as the drag coefficient of 0.28 testifies.

Another crucial element of the Volvo S60’s design is its understatement, which Horbury believes is crucial to the brand’s appeal. “A Volvo buyer displays terrific self-confidence,” he says. “Nobody’s allowed to show off in Sweden and a Volvo’s not a show off’s car. People buy Volvo’s because they know what they want and they’re happy if nobody notices them apart from other Volvo owners.”

This philosophy is even reflected in the new Volvo S60 R. Despite its awesome performance potential, the styling changes are modestly restrained. “There is nothing which doesn’t fulfil a function, no unnecessary design clutter,” Horbury explains. “Some people might think the rear spoiler is too discreet, but its task is to reduce the rear lifting forces by 20 per cent – and it does precisely that.”

Other subtle tweaks include a new front nose design incorporating matt silver bi-xenon headlights and a lowered grille, a front sports bumper with a deeper spoiler and larger air intakes for the two intercoolers. The R range also offers 18in alloy wheels carrying a discreet ‘R’ logo and shod with Pirelli’s P-Zero Rosso 235/40.

DRIVING DYNAMICS

ENGINES

The Volvo S60 is available with a range of aluminium, five-cylinder, 20-valve engines that combine the performance expected of a sports saloon with low fuel consumption and exhaust emissions. A range of four turbocharged petrol engines is now topped by the awesome 300bhp Volvo S60 R, while the addition of the D5 common rail turbodiesel and Bi-Fuel engines confirms Volvo’s commitment to the environment and ensures that there’s now a power source to suit every motoring need.

- Range of aluminium, five-cylinder, 20-valve engines

- Four turbocharged petrol engines with power outputs from 180 to 300bhp
- D5 163bhp turbodiesel uses direct-injection and common rail technology
- Bi-Fuel models available with CNG or LPG. Built on same production line as standard car with full type approval and three year Volvo Car UK warranty.

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All four of the petrol engines are turbocharged and boast Continuously Variable Valve Timing (CVVT). CVVT permits a dynamic variation in the outlet timing (up to 20 degrees), improving low-end torque and cutting fuel consumption. The system works on the exhaust camshaft and makes it possible to close the inlet valves earlier in relation to opening the outlet valves. This generates more torque at lower engine speeds.

The first two petrol engines in the range feature a low-pressure turbo. The 1984cc, 2.0T version offers a healthy 180bhp of power and 240Nm of torque, resulting in a 0-62mph sprint of 8.8sec and a 140mph top speed. By contrast, the larger 2435cc unit in the 2.4T develops 200bhp and 285Nm of torque, which is available at just 1800rpm. The 2.4T sprints from 0-62mph in just 7.6sec and reaches 143mph. But despite their impressive performance, both these engines return 30.7mpg in manual form on the official Combined test cycle.

The high-performance T5 and R-concept models in the range employ a high-pressure turbo to deliver exceptional performance.

The T5's 2319cc unit produces a mighty 250bhp at 5200rpm, while 330Nm of torque is available all the way from 2400-5200rpm. It enables the Volvo S60 T5 to sprint from 0-62mph in 6.8sec, but it still returns over 30mpg on the Combined cycle representing 'normal' driving conditions.

The five-cylinder, 2.5 litre turbo engine in the new Volvo S60 R provides extremely dramatic performance, capable of seriously worrying rivals such as the BMW M3 and Mercedes C32 AMG. The peak power output is 300bhp and there's 400Nm of torque available from just 2100rpm, ensuring that the engine is as flexible as it is potent. This exciting performance flagship rockets from 0-62mph in just 5.8sec and on to an electronically limited top speed of 155mph.

Another successful addition to the Volvo S60 range is the 2.4, five-cylinder D5 turbodiesel, which features the latest variable nozzle turbine, Exhaust Gas Recirculation and common rail and direct injection technology. A second generation common rail system enables the fuel to be distributed under very high pressure via a single 'common' fuel line or 'rail'. The combustion can be controlled very precisely, reducing emissions and ensuring maximum performance and refinement.

The D5 engine develops 163bhp and 340Nm of torque, providing excellent mid-range thrust, a 130mph top speed and a 0-60mph time of 9.5sec. But despite its strong performance, the Volvo S60 D5 manages 43.5 miles on a gallon of diesel on the official Combined test cycle, and its carbon dioxide emissions of 171g/km ensures a low tax bill for company car drivers.

Low emissions and running costs are also a major benefit of the Bi-Fuel engine that runs on (cheaper) gas or petrol. In contrast to some of its rivals, Volvo's Bi-Fuel cars are built on exactly the same production line as the petrol and diesel models and enjoy full type approval and three year Volvo Car UK warranty. The provision of Bi-Fuel power was also integral to the Volvo S60's original design and so the additional fuel tank has been accommodated without any diminution of luggage capacity. What's more, grants are available

from the Energy Savings Trust 'Powershift' programme towards the additional purchase cost of these models, which may also be exempt from congestion charging regulations.

The 2435cc Bi-Fuel engine is the only normally aspirated engine in the S60 range and can be specified to run on either LPG (Liquefied Petroleum Gas) or CNG (Compressed Natural Gas), with petrol as the reserve fuel. The power output is unchanged at 140bhp, whether the car is running on petrol or gas, but the torque figures do alter. In petrol form, the Volvo S60 develops 220Nm of torque, which compares with 214Nm for LPG and 192Nm for CNG. This is reflected in the performance figures. Equipped with a manual gearbox, the Volvo S60 Bi-Fuel sprints from 0-62mph in 10.2sec in petrol mode, while it takes 10.3sec when powered by LPG. The CNG version covers the same increment in 10.7sec. However, the lower running costs and environmental savings offer ample compensation.

CHASSIS

The Volvo S60 was designed from the outset to be an engaging sports saloon, delivering driving pleasure with a high level of active safety. And the combination of a sophisticated suspension set-up, exceptional torsional rigidity, a class-leading track width and the latest electronic stability systems has enabled Volvo's engineers to meet their ambitious target.

The fundamentals of the system are pushed to a new extreme with the addition of the awesome and exciting Volvo S60 R. This 300bhp flagship model is All Wheel Drive (AWD) and uses Volvo's unique active 'Four-C' (Continuously Controlled Chassis Concept) technology to maximise driver enjoyment without sacrificing safety or control.

- Engaging sports saloon with high level of active safety
- Exceptionally high torsional rigidity of over 20kNm/degree
- Sophisticated Delta multi-link rear suspension

- Long wheelbase and widest front track in the class provide stability and control
- Stability and Traction Control (STC) standard on every model. Dynamic Stability and Traction control (DSTC) standard on 2.4T and T5.
- Volvo S60 R uses 'Four-C' active chassis technology to maximise driver enjoyment and control

The Volvo S60 was designed from the outset to be an engaging sports saloon, delivering driving pleasure with a high level of active safety. And the combination of a sophisticated suspension set-up, exceptional torsional rigidity, a class-leading track width and the latest electronic stability systems has enabled Volvo's engineers to meet their target.

High torsional rigidity allows the suspension to do its job properly and its provision was integral to the Volvo S60's design. Extensive use of High Strength Steel (HSS) in the car's construction has resulted in a torsional stiffness in excess of 20kNm/degree, compared with a typical rating for a four-door saloon of between 6 and 14kNm/degree. This benefits not only the ride and handling characteristics of the Volvo S60, but also its crash-worthiness.

The Volvo S60 shares its basic suspension set-up with its big brother, the Volvo S80. All UK specification S60s (except Bi-Fuel) have Volvo's sports chassis settings. An independent, MacPherson strut arrangement at the front incorporates anti-lift and anti-dive technology to enhance the car's stability in all conditions. At the rear, the Volvo S60 employs a sophisticated Delta multi-link system, mounted in a chill-cast aluminium subframe. This permits a small degree of passive rear-wheel steer when cornering, to maximise stability and control. Anti-roll bars also feature at both ends.

The class-leading front track width and long wheelbase provide a further contribution to the Volvo S60's exceptional stability. The wide track helps improve the car's balance, enabling it to cope with high cornering forces, while providing clear and consistent feedback to the driver. Likewise, the long

(2715mm) wheelbase 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 S60 responds in a controlled, predictable manner in all circumstances, making a major contribution to active safety.

This carefully honed mechanical set-up is backed by sophisticated traction control systems. Stability and Traction Control (STC) is standard on every model and prevents wheelspin by either braking the wheel that has lost traction (up to 25mph) or, at speeds above 25mph, by reducing engine power. It ensures that the driven wheels get exactly as much power as they can transfer to the road.

Standard on the 2.4T and T5 (and an option on other models) is Dynamic Stability and Traction Control (DSTC). This features all the benefits of standard STC but also uses an array of extra sensors to detect the onset of a skid. The system then automatically slows the appropriate wheel to restore control.

The fundamentals of the Volvo S60's suspension set-up are taken to a new extreme with the arrival of the exciting new Volvo S60 R. Its 'Four-C' active chassis technology maximises driver enjoyment and control, without compromising safety, and brings a unique character to the car's performance.

The advanced electronics of Volvo's unique 'Four-C' (Continuously Controlled Chassis Concept) technology allow all of the car's dynamic systems to communicate and work in unison.

The car's speed, wheel movement and steering are continuously monitored via Multiplexed control systems that update the suspension settings 500 times per second and monitor the electronic control of the All Wheel Drive (AWD) system for maximum traction, road-holding, stability and safety.

For 'performance on demand', three buttons on the dashboard give the driver a choice of types of handling and driving pleasure:

Sport – Standard mid-setting for sporty driving. ('Sky-hook' control technique)

Advanced Sport – Uncompromising sports car handling, prioritising maximum driving pleasure using 'direct road contact' control technology, ('Sky-hook' control technique)

Comfort – Optimises ride comfort using 'Sky Hook' control technology to make the car feel like it is suspended from an artificial horizon. ('Road Contact' control technique)

'Four-C' works in conjunction with a sophisticated all-wheel drive system. Developed in conjunction with the Swedish specialist Haldex, it operates independently of driver input, distributing torque automatically between the front and rear wheels for the best possible grip in all conditions.

The intelligent AWD system uses a variety of sensors to monitor the road surface and the steering wheel, brake and accelerator pedal positions. In normal driving conditions on dry roads, almost all the power is distributed to the front wheels. However, if the sensors detect slippage, torque is proportionately diverted to the rear wheels to maximise traction. This system responds in just one-seventh of a wheel turn, making an outstanding contribution to active safety and driver enjoyment.

STEERING, BRAKES AND TRANSMISSIONS

The Volvo S60 stops and steers with all the finesse you'd expect of a sports saloon. The rack and pinion steering is linear in response and offers plenty of driver feedback, while the anti-lock brakes are boosted by an Electronic Brakeforce Distribution (EBD) system.

A five-speed manual is standard across the range, with the exception of the Volvo S60 R, which benefits from a sixth ratio. But for those who

prefer to let a computer take the strain, Volvo offers two five-speed automatic transmissions. Both adapt their shift points to suit individual driving styles but the alternative Geartronic system also permits sequential manual changes for added control.

- Power-assisted rack and pinion steering tuned to optimise feedback and response
- Anti-lock brakes (ABS) with Electronic Brakeforce Distribution (EBD) fitted as standard
- Six-speed manual and Spaceball gearshifter standard on Volvo S60 R. Five-speed manual on all other models.
- Five-speed adaptive automatic available as an option
- Geartronic adaptive auto with sequential manual shift facility available on 2.4T, T5 and Volvo S60 R

The Volvo S60 uses a power-assisted rack and pinion steering system that has been developed to optimise driver feedback and response. 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.

The vast disc brakes are derived from those fitted to the larger, heavier Volvo S80, and have been designed to reflect the car's sporting potential. As you'd expect from Volvo, an anti-lock braking system is fitted as standard and this is joined by Electronic Brakeforce Distribution (EBD). 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.

Volvo S60s equipped with DSTC (standard on the 2.4T, T5 and Volvo S60 R), also feature EBA (Emergency Brake Assist). 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. Brembo brakes ensure the S60 R's braking matches its performance.

Four different transmissions are available on the Volvo S60. All models, with the exception of the Volvo S60 R are supplied as standard with a five-speed manual gearbox. This has been tuned to provide a slick, positive shift action and, to highlight its sports appeal, it's available with the unique and stylish Spaceball gearlever (also standard on the T5) and linked to a six-speed gearbox, providing the ultimate in flexibility and control.

For drivers who prefer to let a computer take the strain, Volvo has a choice of two automatic gearboxes. There's a fully adaptive unit with five speeds that automatically adjusts its shift patterns according to an individual's driving style. But on the 2.4T, T5 and Volvo S60 R models, this is upgraded to a Geartronic system. This is a fully adaptive five-speed automatic that also offers the driver the opportunity to choose gears manually. Gears are selected sequentially by tipping the lever forwards to change up and backwards to change down.

INTERIOR DESIGN CONCEPT

The interior of the Volvo S60 echoes the sporting appeal of the exterior. The fascia has been deliberately angled towards the driver and the position of the controls has been maximised for enthusiastic driving.

But the Volvo S60 has ample space inside for four or even five adults. And with a boot capacity of 424 litres, there's plenty of room for their luggage.

In keeping with every contemporary Volvo, the Volvo S60 is packed with clever details to take the stress out of contemporary motoring. SE models, for example, feature a unique boot tray that keeps important items upright and secure.

- Driver-orientated fascia design
- Space for five adults

- Wealth of 'surprise and delight' features including separate air vents for rear passengers
- 424 litre boot with split/fold facility as standard
- Unique multi-function load and shopping bag holder (standard on SE models)

The interior of the Volvo S60 echoes the sporting appeal of the exterior. "This is absolutely a driver's car," says Geza Loczi, the Chief Designer in Volvo's California Design Studio. "The orientation of how you sit in the car is different from a normal saloon. You feel more a part of the road."

This shifting emphasis can clearly be seen in the layout of the fascia. Although the basic architecture and the logical arrangement of the controls echo those of the larger Volvo S80, the centre console is now angled towards the driver. The steering wheel also tilts more towards the driver than it does in any other Volvo. And for the first time since the Volvo 1800 ES Sports coupe of the 1970's, the Volvo driver sits behind a three-spoke sports steering wheel.

Loczi explains: "We've brought all the elements that you use when you drive the car close to you. It all serves to emphasise the position of the driver in the car, giving you a special place for you to work, to do your job." A multi-adjustable seat and steering wheel also ensures that drivers of all shapes and sizes can find the optimal driving position.

However, while the cockpit of the Volvo S60 is driver-orientated, it's not driver-only orientated. Volvo's designers haven't forgotten the role of passengers in the car and a high priority has been given to comfort and convenience features. The Volvo S60 can easily fulfil a role as a family car, but as Loczi concludes, "it's a family car with a sporty attitude."

This philosophy is reflected throughout the interior. Despite the swooping, coupe-like roofline, there's ample leg and headroom in the rear for two or

even three adults and every passenger benefits from a full three-point seatbelt. As Loczi explains: “Usually, if you have a sporty car you have to give up the ability to take an extra couple of people in it – in the S60, you don’t.” The critically acclaimed seats offer excellent comfort for both front and rear occupants with lateral support for an enthusiastic driving style.

The interior is also packed with the kind of ‘surprise and delight’ features that take the burden out of contemporary motoring. There are separate air vents mounted in the B-pillars for rear passengers, which adds to their comfort and helps to clear ice and mist from the side windows. There’s also a sprinkling of cup and storage holders, and a neat hook on the side of the front seats keeps a jacket within reach without it obscuring rearward vision. Some models also feature a rear waste bin, perfect for swallowing the detritus associated with any family journey.

At 424 litres, the Volvo S60’s well-shaped luggage compartment is almost a match for that of its big brother, the Volvo S80. The rear seat also split/folds to accommodate awkwardly shaped objects and, for extra-long items, the front passenger seat can also be folded forwards. The versatility of the Volvo S60’s boot can be enhanced with a multi-functional load and shopping bag holder. This can be used to keep important items upright and secure, and when it’s not needed, it folds neatly into the floor of the boot. It’s yet another example of the attention to detail that helps the Volvo S60 stand out in a competitive class.

QUALITY AND EQUIPMENT

A passion for high quality lies at the heart of the Volvo brand, which is reflected in the choice of trim materials and the outstanding build quality.

The standard specification is equally impressive, with Electronic Climate Control with Volvo’s Air Quality System (AQS), a CD player and cruise control fitted to every model. Owners wishing to personalise their car

are offered a wide range of accessories and options, including Volvo's DVD-based Road and Traffic Information System (RTI).

Peace of mind is provided by a comprehensive warranty package that includes one year's free RAC cover and a full three year/60,000 mileage mechanical warranty.

- High standard of trim materials and build quality
- Standard specification includes Electronic Climate Control with Volvo's Air Quality System (AQS), premium audio system with CD player and eight speakers, plus cruise control
- DVD-based Road and Traffic Information System (RTI) available as an option (with or without TV tuner)
- Vast range of accessories to meet lifestyle requirements
- Three year/60,000 mileage warranty package

A passion for high quality lies at the heart of the Volvo brand. It's inherent not only in the build quality that reflects the ruggedness, durability and reliability for which the marque is renowned, but also in the choice of body and trim materials. From the exquisitely crafted door handles to the leather-wrapped gearknob, the Volvo S60 exudes a feeling of quality, well-being and good Swedish design. The switchgear has a solid, chunky feel and the fascia is awash with soft-touch plastics, reminding occupants that they are enjoying a premium product.

Customers in the compact executive sector also expect a high level of standard equipment, and the Volvo S60 does not disappoint – this is no spartan sports car. The luxury specification of every model includes Electronic Climate Control with Volvos Air Quality System, all-round electric windows, cruise control, electric/heated door mirrors, alloy wheels and a premium audio system with CD and at least eight speakers.

Customers are also able to pick from a vast range of optional extras, giving

their Volvo a personal touch. Hi-fi enthusiasts, for example, can upgrade the standard audio system to a Dolby Pro Logic Surround Sound system with a 4 x 75W amplifier and no fewer than 13 speakers.

Business users may be interested in the RTI (Road and Traffic Information System) that is comprised of a large, remote-controlled colour screen, which is linked to a DVD system and displays route information for the whole of Europe. It retracts into the top of the fascia when not in use and can be controlled using a joystick-style switch on the steering wheel or a separate remote control unit. The screen can also be specified to double as a TV monitor, turning the Volvo S60 into a mobile multi-media centre.

There is a vast range of accessories designed to accommodate the varying lifestyles of Volvo S60 owners. Reverse warning sensors, towbars, dedicated mobile phone kits and child booster cushions and seats can accompany ski, surfboard, or bicycle carriers. Each item is designed and built with the same attention to detail as the rest of the car and integrates beautifully into the overall package.

Volvo's employees are justifiably proud of the quality of their products, but they're equally determined to offer the best customer service. In 2001, Volvo's management set a target of becoming the 'Customer satisfaction no. 1' in the premium sector by 2004. To fulfil this ambitious target, the company has initiated a series of Quality Forums, which scrutinise information from a combination of internal and external sources, including independent rankings by companies such as JD Power. Having analysed the data, the Forums initiate action plans to improve performance in specific areas.

This quality assurance package is backed up by a comprehensive warranty. The standard mechanical warranty is three years/60,000 miles, there's a three year, unlimited mileage warranty on the paintwork and eight years, cover against rust perforation. In addition, all Volvos are covered by one year's free RAC cover, which provides full breakdown and recovery assistance, anywhere in Europe, 24 hours a day.

SAFETY

Volvo's commitment to safety is as old as the company and the Volvo S60 features a comprehensive safety package designed to protect occupants in a wide variety of accidents.

The SIPS (Side Impact Protection System) includes side and Inflatable Curtain (IC) airbags that protect both front and rear occupants. In a frontal collision, 'intelligent' airbags work in unison with the safety belts, while the WHIPS (Whiplash Protection System) reduces the risk of back and neck injuries in the event of a rear impact. In the rear of the car, all three passengers benefit from three-point seatbelts with pretensioners, and there are ISOFIX fittings for child seats.

The success of these systems is reflected in a top score (when tested) four star EuroNCAP rating and the Volvo S60 achieved a maximum 100% score in the side impact test.

- Top score (when tested) four star EuroNCAP crash test rating, 100% score for side impact
- SIPS (Side Impact Protection System) with side airbags and IC (Inflatable Curtain) airbags for front and rear passengers
- Twin front 'intelligent' airbags
- Five three-point seatbelts with pre-tensioners. Load limiters for front occupants
- WHIPS (Whiplash Protection System) fitted as standard
- ISOFIX fittings in rear and range of bespoke child safety seats protect next generation

Volvo's commitment to safety is as old as the company itself. As, Assar Gabrielsson, one of the founders of Volvo, declared: "Cars are driven by people. The guiding principle behind everything we make at Volvo therefore, is – and must remain – safety."

It's a philosophy that has been demonstrated to fine effect in the Volvo S60, which features a comprehensive safety package designed to protect occupants in a wide range of accidents. The success of these measures was recognised in the EuroNCAP crash tests where the Volvo S60 achieved a four star rating and a maximum 100% score in the side impact tests. EuroNCAP's testers concluded: "The S60 provides a structurally stable safety cage and is particularly good at protecting its occupants in a side impact, deploying airbags to protect their heads and bodies."

The key to this impressive performance is the Side Impact Protection System (SIPS). A large part of the force of a collision that would otherwise penetrate through the side of the car is dissipated by SIPS via beams, pillars, the floor, the roof and other parts of the car body.

The side impact airbags then play an important role in protecting the chests of the occupants. They are fitted in the outer edge of the front seats, not in the door, which ensures that they're always securely positioned next to the occupant's side, whatever the position or angle of the seat.

Further protection is provided by the IC (Inflatable Curtain) airbag, which sits in the headlining and protects both front and rear occupants. In the event of a side impact, IC inflates in a few thousandths of a second and then remains inflated for about three seconds in order to provide maximum protection throughout complex collision sequences.

The two front airbags are 'intelligent' and deploy in two stages according to the severity of the accident, alleviating the risk of facial injuries caused by the occupant's faces impacting with the airbag. They are complemented by three-point safety belts with tensioners, which are fitted for all five occupants. The tensioners activate within a few thousandths of a second in the event of a collision and tighten the belt for maximum protection. The front seat safety belts then release a little so that the driver and passenger are cushioned by the airbags in a controlled manner.

The Volvo S80 debuted the WHIPS (Whiplash Protection System), which is now fitted across the Volvo range and helps prevent neck and back injuries in a rear impact. In the event of an accident, the entire backrest moves rearwards to reduce the strain on the occupant's back and neck. Then, when their back has been safely restrained by the backrest, it inclines backwards in order to reduce the force that would otherwise throw their head forwards. WHIPS reduces acceleration forces on the neck by about a half.

Volvo's engineers have also made special provision for protecting the next generation. Every Volvo S60 comes fitted as standard with the provision for the fitment of ISOFIX child safety equipment, and a bespoke rearward-facing child safety seat can be supplied as an option. An integrated booster cushion built into the rear centre armrest is also available and so is a stand-alone booster cushion with an adjustable backrest.

ENVIRONMENT

Volvo's commitment to the environment is reflected in its 'clean inside and out' programme. An air filter prevents dust, pollen and exhaust particles reaching the interior, while the Air Quality System ensures that the air inside the cabin is always cleaner than outside. All the trim materials comply with Öko-Tex standards, helping to reduce the risk of an allergic reaction.

Another pioneering feature is the PremAir system, which converts 75% of the ground level ozone passing through the radiator into oxygen and helps improve the local environment. Little wonder that each new Volvo is backed by an Environmental Product Declaration from Lloyd's Register Quality Assurance Limited (LRQA).

- Clean 'inside and out' programme
- Cabin air filter removes dust, pollen and exhaust particles
- PremAir ozone system converts 75% of ground level ozone to oxygen

- Air Quality System ensures cleaner air inside than out
- Interior trim materials conform to Öko-Tex standards and are allergen-free
- Several of the engines already meet stringent EU 2005 and ULEV (Ultra Low Emission Vehicle) emission requirements
- Each new Volvo is backed by an environmental declaration examined and verified by Lloyd's Register Quality Assurance Limited (LRQA)

According to the 2001 RAC Report on Motoring, the typical private motorist drives for over 250 hours each year, while in the same period, a company car driver spends an average of 425 hours inside their vehicle.

Yet, while most of us are aware of vehicle emissions and air quality issues, how many drivers know that the air inside their cars may also be harmful? Or that the metals, textiles and leathers used in car interiors can emit volatile substances, which activate allergies and skin conditions?

Many motorists don't realise their car could be increasing their risks of asthma, eczema, headaches, eye irritation or even a heart attack. In recent years, the number of people suffering from allergies and other forms of hypersensitivity has been growing rapidly.

Volvo's 'clean inside and out' programme to create emission-free cars is a healthy solution to the problem.

The Volvo PremAir system makes a major contribution to air quality. It's an industry first and is fitted as standard to every Volvo S60. PremAir features a catalytic coating on the radiator that converts 75 per cent of the ground level ozone passing through it into oxygen. This reduces harmful pollutants in the environment and makes a major contribution to local air quality.

Every Volvo S60 also benefits from Volvo's Air Quality System. This constantly monitors the cabin environment to minimise odours and pollutants

entering from the outside. It ensures that the air inside the car is always cleaner than that outside. The air-conditioning system also incorporates a cabin air filter that prevents dust, pollen and exhaust gas particles entering the car.

The interior of the Volvo S60 complies to a strict standard called Öko-Tex, which sets maximum levels for dangerous substances contained in textiles and trim materials. All the leather upholstery and the trim fitted to the Volvo S60 meets Öko-Tex standards. The components on the Volvo S60 that most frequently come into contact with the skin – the door handle, ignition key and safety belt locks – are also compliant with Öko-Tex and allergen-free.

The Volvo S60's slippery shape and sophisticated catalyst and engine management systems help to keep fuel consumption and emissions to a minimum. The Bi-Fuel models, in particular, make a major contribution to improving environmental standards. Natural gas (CNG) powered cars cut the emissions of carbon dioxide – which contributes to the greenhouse effect – by about 20% compared with the same car running on petrol fuel. An LPG-powered Volvo S60 reduces carbon dioxide emissions by around 10%.

Volvo's commitment to the environment also extends beyond the car's immediate environment. It was one of the first manufacturers to use tools to evaluate the life-cycle environmental impact of its products. The system, known as EPS (Environmental Priority Strategies in product design) enables Volvo to evaluate the impact of its products and processes on natural resources, ecosystems and human health. This information is available to the public at www.volvocars.co.uk.

It's a strategy that's clearly paid dividends - emissions of solvents from Volvo's Torslanda plant in Sweden have been reduced by over 90% since 1972 and virtually the entire car can be recycled at the end of its life. Little wonder that each new Volvo is backed by an Environmental Product Declaration examined and verified by Lloyd's Register Quality Assurance Limited (LRQA) in London.

SECURITY

Volvo is committed to protecting the car, its occupants, and their possessions. Every model is fitted as standard with a sophisticated alarm and immobiliser system that can be switched on and off using the remote control unit on the key fob. The combination of deadlocks and optional laminated side windows makes the Volvo S60 a difficult car to break in to.

The remote controller also operates the Approach lighting system, which illuminates the car and the surrounding area as the driver approaches. Likewise, a tweak of the headlight stalk activates the Home Safe system, switching on the headlamps for thirty seconds after the occupants have left the vehicle.

- Electronic immobiliser fitted as standard
- Alarm and deadlock system operated from remote control key fob
- Approach and Home Safe Lighting system fitted to every model
- Visible VIN

Volvo's passion for safety also extends to issues of personal security. The Volvo S60 is fitted as standard with a wide range of features designed to protect occupants from burglary, theft and assault.

An electronic immobiliser makes it impossible to start the car without the correct key, while the outer lock cylinder rotates, making it difficult to break in to. If the thief does manage to get in, via a window, for example, the deadlock system makes it impossible to open a door from the inside. The introduction of optional laminated side windows also makes it harder for thieves to gain access.

The remote control key fob, allowing the driver to open the car when approaching it, activates the deadlock system. This system can also be used

to open the boot independently of the doors, which is a useful deterrent to opportunist thieves.

The same remote control system also switches on the alarm system, which is standard in every Volvo S60. The alarm is triggered if anyone attempts to open the doors, the bonnet or the boot lid. It also reacts to movement inside the car or if a window is broken. As an option, this system can be upgraded to include a level sensor that activates the alarm if the car is jacked up in any way.

The Approach and Home Safe lighting system provide an important contribution to personal security. By pressing a button on the remote controller as they approach the car, the driver is able to turn on the inside lights, the side marker lights and the lights in the rear-view mirrors. On leaving the car, a tweak of the headlight stalk activates the dipped beam headlamps for 30 seconds, lighting a path to the door. It's a simple system that offers considerable peace of mind.

DID YOU KNOW?

- 1 An S60 T5 smashed 18 British Land Speed records in an endurance test at Millbrook in October 2000. It averaged 125.10mph over 24 hours!
- 2 The S60 made its world debut at the Paris Motor Show in September 2000 and made its UK debut at the British International Motor Show at Birmingham in October 2000.
- 3 Approximately 38 per cent of S60 sales are now the 'D5' turbodiesel.
- 4 The S60 is produced in Ghent, Belgium, and Gothenburg, Sweden.
- 5 The S60 is sold across the world, in markets as far afield as Australia, the Far East, and both North and South America.
- 6 The 2002 New Car Buyers Survey showed over 91 per cent of S60 buyers were male, typically 35+, a graduate, enjoys a favourite hobby of watching football or rugby, and either own a small business, are company directors, or retired.

