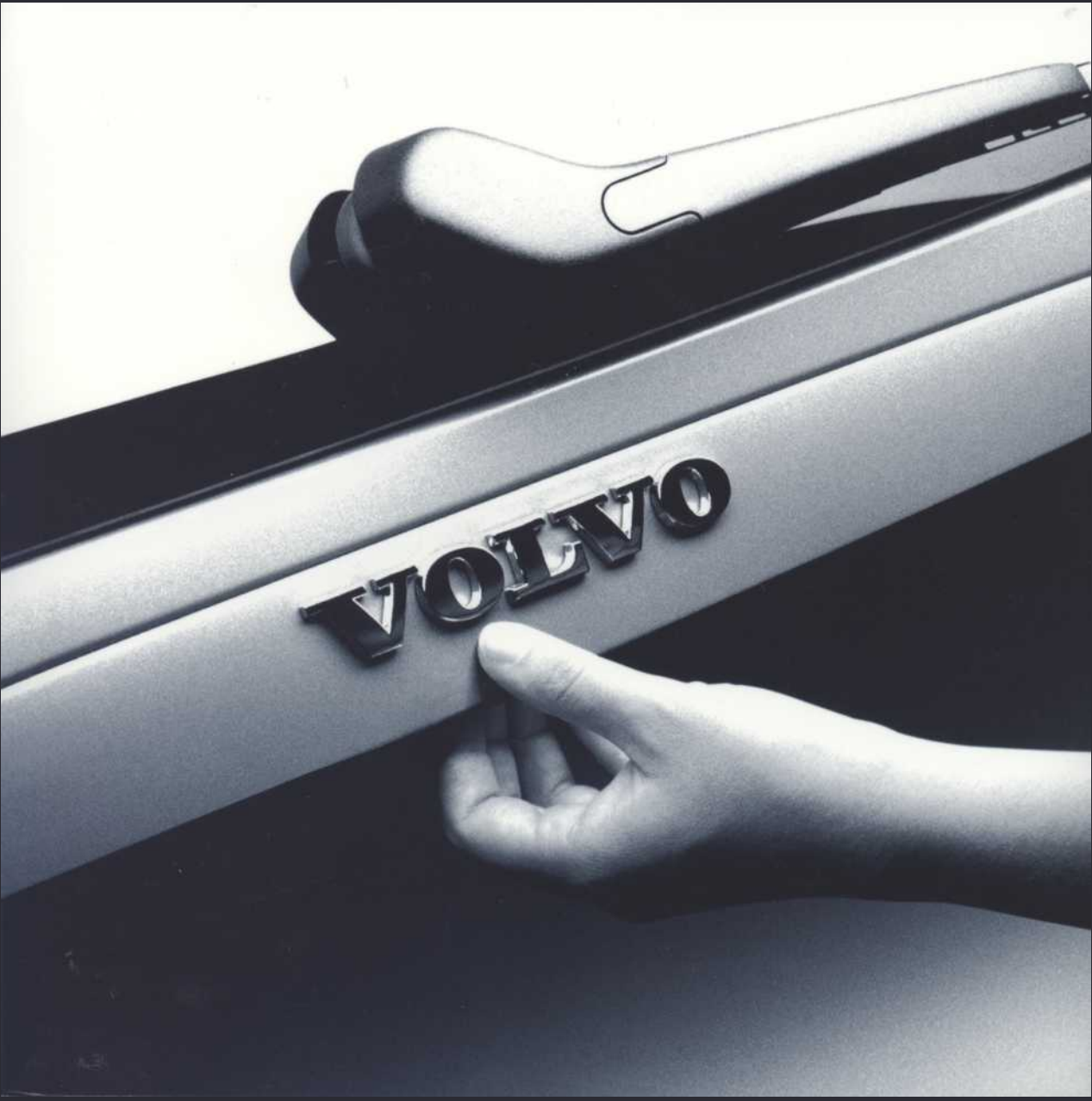


VOLVO CARS 2004

PRESS INFORMATION

VOLVO

for life



PRESS INFORMATION

The new Volvo V50

Sportswagon for young, dynamic and demanding families

- Sportswagon with attractive design and practical features
- Target group young families with an active lifestyle
- Annual target 74,000 cars
- Germany and Sweden the largest markets

The new Volvo V50 is what is known as a sportswagon – a modern descendant of a range of previous Volvo models in which a sporty design has been spiced up with practical features.

“The emphasis has been placed on attractive design and a sense of sportiness, with a ‘bonus’ in the form of practical details and extra luggage space,” says Volvo Cars’ President and CEO, Hans-Olov Olsson.

The design language and the equipment level in the new Volvo V50 are also taking a step upwards – towards the larger estate model, the Volvo V70.

“The Volvo V50 is smaller, but it still offers customers the properties of a large car in a compact format. Combined with an exciting design and exceptional road manners, this makes the car an extremely powerful challenger in this segment,” adds Hans-Olov Olsson

Rejuvenating the brand is an important factor in the Volvo Cars strategy. Volvo Cars is expecting the new Volvo V50 to appeal first and foremost to families with children where the parents are aged between 30 and 40.

“The entry level for our V models will become even more attractive. The new Volvo V50 is a genuine premium car, with properties that appeal directly to young families which set demanding standards for car ownership, when it comes to both design and the scope for an active lifestyle,” Hans-Olov Olsson continues.

Annual target 74,000 cars

Sales of the new Volvo V50 will begin during the first half of 2004 and the average annual sales target is 74,000 cars, with the emphasis on the European market.

The largest individual market will be Germany, with an average annual sales target of 15,000 Volvo V50s. It will be followed by Sweden (10,000), the UK (8,000), Italy (7,000) and the Netherlands (5,500).

More for your money in the basic version

The new car will be priced slightly higher than the current Volvo V40, but this is more than compensated for by the fact that the successor has an upgraded basic specification. For example, air conditioning and power windows front and rear are now fitted as standard. The DSTC (Dynamic Stability and Traction Control) anti-skid system is also standard on most markets.

Most of the options that can be specified on the larger Volvo V70 are also available to buyers of the new Volvo V50. This applies, for instance, to the built-in telephone and the navigation system.

Built in Belgium

Like the all-new Volvo S40, the Volvo V50 will be built at the Volvo Cars plant in Ghent, Belgium. Volvo's production operations in Born in the Netherlands will cease with the phasing out of the previous Volvo S40 and V40 models.

The Ghent Plant which, when fully extended, will be the company's largest production unit with an annual capacity of 270,000 cars.

The new Volvo V50 is the second in a range of new Volvo models sharing common technology with Ford and Mazda.

In addition to the new Volvo S40 and Volvo V50, the Volvo S60 will be produced in Ghent, whereas production of the Volvo V70 will be transferred to the Torslanda Plant in Sweden. The plant in Torslanda also produces the Volvo XC70, Volvo S80 and Volvo XC90.

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2004-01-04

PRESS INFORMATION

The new Volvo V50

Sportswagon with attitude

- Consistent design strategy
- Sporty and “cool”
- Extended tail
- Own, distinct profile
- Compact, athletic impression
- Interior with sense of advanced technology
- Extremely slim centre stack with functional design
- Discreet lighting points create a theatre-like effect
- Innovative upholstery, inspired by sportswear
- Roomy, flexible passenger compartment

The Volvo V50 is here – a sporty and “cool” car with a youthful attitude!

The Volvo V50 is a totally new five-door model with sporty lines, intelligent design solutions and a flexible interior – a modern sportswagon.

– “The V50 is the result of a consistent design strategy, in which the Volvo character has been developed for each new model,” says Henrik Otto, Volvo Cars’ Design Director. “Our new sportswagon is indisputably a genuine Volvo, but, at the same time, it has its own, totally individual and distinct profile – with characteristics from classics like the Volvo 1800 ES, Volvo 480 and its most recent predecessor, the V40.

Unique profile with extended tail

The rear of the Volvo V50 has a softer, more sports-oriented design than the very typical estate model, the V70. The combination of rounded roof lines and extremely abrupt tail is designed to create a modern, flair-filled impression.

This is reinforced by the softly rounded nose, the short bonnet and the marked cab-forward design.

The track and wheelbase have been extended, virtually putting a wheel at each corner. This also contributes to the sporty appearance, as well as giving the car stable on-the-road behaviour. The long wheelbase also makes it possible to fit conveniently wide rear doors.

The Volvo V50 is 46 mm longer than the new S40. It is the section behind the rear wheels that has been extended and utilised to increase luggage space.

“The luggage compartment is not simply spacious,” says Henrik Otto. “It is also practical and easy to load, thanks to the vertical side windows and the totally flat load floor.”

Front also distinguishes V50 from New S40

The Volvo V50 has a completely individual profile, while retaining a clear-cut Volvo identity.

The grille with its characteristic diagonal has chrome-plated, upright bars, as different from the horizontal mesh pattern on the new S40. The design of the foglamps also distinguishes the models. On the V50, they are rectangular. The paintwork round the headlamps on the V50 is also a contrasting lighter shade.

The bonnet has the classical V shape. The contour lines of the body – the Volvo shoulders, as they are known – have also been inherited from other Volvo models.

These broad shoulders are a modern Volvo feature that signals power and safety. From the rear, the distinctive, high tail lamps show with the utmost clarity that what lies ahead is a five-door Volvo.

Boat shape

From above, the body resembles the shape of a boat, with a rounded prow, a broad midship section and a narrowing stern. Together with the broad shoulders, this hull shape creates a compact, athletic impression, while contributing to the excellent aerodynamics.

The doors of the Volvo V50 are convex in shape, unlike the concave design of the doors on the larger Volvo models. This reinforces the compact appearance and increases the width of the cabin.

The windscreen wipers are of an entirely new type and are concealed under the bonnet. The turn indicator repeaters are integrated in the door mirrors, where they are easily visible from the sides.

A number of newly-designed aluminium wheels, several of which are unique to the V50, are available on the options list. The sportiest wheels are 18 inches in diameter and are equipped with ultra-low profile 215/45 tyres.

Exterior Sport Styling – sporty design concept

The Volvo V50 will also be available with an Exterior Sport Styling design concept, which further accentuates the sporty, dynamic image of this new model.

The package includes specially-designed spoilers front and rear, side skirts and a rear roof spoiler. A lowering kit, which reduces the height of the car by 20 mm and further enhances the driving experience, is also included.

Clean layout creates a sense of high tech

The interior of the Volvo V50 is built up of several visual layers. The first shows as an edge trim around the entire interior, along the side windows and the windscreen. It creates the impression of being safely ensconced in a cocoon.

The next layer is the instrument panel. It has a clean, uncluttered layout, with air vents and other details positioned as islands in an otherwise free area. The instrument panel has a new type of surface, a texture conveying a feel of cutting-edge technical innovation rather than classical leather-trimmed furniture. This special surface texture separates the instrument panel visually from the outer edge trim of the cabin.

The main instrument features two round gauges, surrounded by contrasting metal bezels. This design creates a sporty, three-dimensional look.

Elegant and spacious

The unique, super-slim, free-floating centre stack (which was introduced in the new Volvo S40) constitutes the topmost layer of the interior. It links the tunnel console with the instrument panel in an elegant, airy manner.

Behind the centre stack, there is a practical storage compartment for personal possessions, which can easily be accessed from both sides. This compartment features soft lighting, thereby further accentuating the impression of a free-floating panel – combined with a sense of carefully-planned function.

“The stack is the ultimate design symbol of this new car and represents a revolution in itself. A great deal of creativity and effort has gone into finding a technical solution for the super-slim format,” explains the responsible designer, Guy Burgoyne.

Four decor levels

Like the other panels in the car, the centre stack can be specified with different decor panels. This gives car buyers the opportunity to adapt the car to match their particular taste.

- At the basic level, the colour of this panel is the same as the basic interior colour.
- The version made of transparent plastic, “IcedAqua”, is totally unique. It creates a high-tech impression, as the electronics and technology partly can be seen through it.
- The dark panel, “Wood Effect”, creates a more elegant, refined impression.
- The “Aluminium” panel, made of real metal, produces the most product-oriented impression, combined with a feeling of top-class quality.

Multi-function controls

The controls on the centre stack have been given an ergonomic, functional design. Most of them perform several different functions in a logical, easy-to-use way. The top half of the control panel is used to operate the audio unit and integrated telephone, while the lower half is dedicated to the climate unit.

The four large knobs are used to regulate the main system functions. Other function buttons have been gathered together on a panel resembling a remote control. Each push-button is profiled in such a way that it is avoided to depress two at the same time. The same design concept can be seen in different parts of the interior.

The audio unit in the Volvo V50 can be supplemented with the same cutting-edge technology that was introduced in the Volvo XC90 – Dolby Surround Pro Logic II.

Theatre lighting

Inside the new Volvo V50, there are a number of discreet lighting points. They create a theatre-like effect by softly lighting different sections of the interior. Among other things, the centre stack is constantly lit from the roof, but the light is so soft that it never distracts the driver.

The first time the light makes its presence felt is when the driver moves his or her hand towards a control, something that facilitates operation when driving at night.

T-Tec upholstery

The interior is available in a choice of three shades: off black, grey and dark beige. Each interior colour comes with a range of matching upholstery colours.

Leather is one of four upholstery alternatives. The most innovative upholstery is Dala, a ribbed textile with T-Tec elements and visible light-coloured seams.

T-Tec is a material that has been specially developed for Volvo Cars and is inspired by sportswear and modern travel accessories. The contrast between T-Tec and textile – along with seams of a different yet matching colour – reinforces the dynamic appeal of the car.

Fold-down backrests

The cab-forward design, the long wheelbase and Volvo's concept of transverse engine installation combine to give the Volvo V50 a spacious cabin.

The cabin can be rearranged in the same flexible manner as in the Volvo V70. The rear seat splits into two sections and the backrests fold down. The front passenger seat is equipped with a fold-flat backrest. With the seats folded down, the load floor is entirely flat.

A brief comparison

The Volvo V50 is slightly shorter than its predecessor, the V40, but it is larger in every other respect.

Length	4514 mm	(2 mm shorter than the V40 model – but 46 mm longer than the new S40)
Width	1770 mm	(54 mm wider than the V40)
Height	1452 mm	(27 mm taller)
Wheelbase	2640 mm	(78 mm longer)
Track front	1535 mm	(63 mm wider)
Track rear	1531 mm	(57 mm wider)

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2004-01-04

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PRESS INFORMATION

The new Volvo V50

Sportswagon with turbo and AWD

- **Transverse, five-cylinder, in-line engines**
- **Compact car with top-class performance and wonderful driving pleasure**
- **New compact engine generation**
- **High torque and enjoyable engine performance**
- **Extensive engine programme and new diesel engine**
- **Particle filter with automatic regeneration function**
- **Sporty gearboxes**
- **Chassis for responsive, stable driving performance**

Volvo's new sportswagon, the V50, has transverse, in-line engines – with both four and five cylinders.

“Making room for a five-cylinder engine in a compact body is something of a work of art,” says Peter Ewerstrand, project leader for the V50 and the new S40. “We have succeeded by using new methods to reduce the exterior dimensions of the engine.”

The result is a compact car offering high performance and a generous helping of driving pleasure. The compact dimensions of the engine also contribute to the very high level of crash safety.

The chassis has been developed in parallel with the new engines to provide driving properties worthy of a sportswagon.

T5 turbo in combination with All Wheel Drive

The top-of-the-line model in the V50 programme is a four-wheel-drive, turbo-charged Volvo, the V50 T5 AWD. It has a five-cylinder, 2.5-litre petrol engine with a light-pressure turbocharger. Turbo technology produces exceptional torque from low to high revs. The high, flat torque curve ensures excellent acceleration.

The manifold and turbo unit in the T5 engine have been cast together in high-alloy cast steel which is particularly heat resistant (1,050°C)). It therefore requires less conventional cooling with petrol. As a result, the engine can be run on a leaner fuel mixture, resulting in lower fuel consumption and emissions, especially when driving at high speeds.

The T5 engine offers a maximum output of 220 bhp and 320 Nm of torque.

The Volvo V50 T5 AWD will have the same kind of four-wheel-drive system as Volvo's larger AWD models. The engine power will be automatically distributed between the front and rear wheels by an electrically-controlled hydraulic clutch, which reacts very swiftly (Haldex).

"The T5 engine and All Wheel Drive give the V50 model extremely enjoyable road manners," says Peter Ewerstrand. "Top-class performance is combined with responsive, stable driving characteristics."

New engine generation with extremely compact dimensions

The new petrol engines in the Volvo V50 (and the new S40) are a further development of the low-friction engines that power the large Volvo models. The new generation is known as RNC, where C stands for Compact. Most of the external engine components have been designed and packaged to enable the engine installation to take up exceptionally little space:

- The exhaust manifold outlets are angled down towards the engine block.
- The manifolds on the turbo engines are cast together with the turbo unit housing for added compactness.

The inlet manifold is compact-cast in fibreglass-reinforced plastic and is routed up over the engine. The fuel injectors are installed in an aluminium section for safety reasons.

- The alternator, water pump and air conditioning compressor have a compact design and are very efficiently packaged.
- The air conditioning compressor has been moved so that it is well protected in the event of a collision.

More space between engine and passenger compartment

The result is an engine that is 200 mm slimmer and 25 mm shorter than the one in the large Volvo models. This compact format makes the engine lighter. Combined with Volvo's transverse engine installation concept, it also contributes to a high level of crash safety, as there is added space for deformation in the engine compartment. In a collision, the engine can be shunted 150 mm to the rear before the crankshaft comes into contact with the cross-member near the bulkhead.

There is no less than 70 mm of free space above the engine between the cylinder head and bonnet. This allows the bonnet to crumple gently, thereby helping to reduce the risk of head injuries if a pedestrian or cyclist should collide with the car.

Powerful engines for silky-smooth operation

The new five-cylinder, in-line engines have a displacement of 2.4 and 2.5 litres respectively. The five cylinders and the large displacement produce high torque from low engine speeds – together with swift acceleration.

What is more, a five-cylinder engine with a long stroke has a more relaxed and pleasant character owing to its low vibration level and smooth operation.

The engines share the same technology as the units that power the large Volvo cars.

- Four valves per cylinder and dual overhead camshafts – for high power and alert response.
- Variable camshaft timing (CVVT) – for high power and high torque in combination with lower consumption and reduced emissions.
- Electronic engine management system with precise, adaptive control – for efficient combustion and good performance.

Extensive engine programme

When it is launched, the Volvo V50 will also be available with two five-cylinder, normally-aspirated engines, the 2.4i and 2.4 with outputs of 170 bhp and 140 bhp respectively. Both engines have a displacement of 2.4 litres.

In addition, there is an entirely new four-cylinder diesel engine. It is turbo-charged and has second-generation common rail technology featuring moving rails.

The injection system operates under immense pressure, ensuring extremely fine distribution of the fuel particles. This produces both good performance and low emission levels.

Using piezo-electrical injectors, the fuel can be divided between several small injectors during each combustion cycle, thereby helping to cut noise levels. With these piezo-electrical injectors, the engine is also prepared for forthcoming emission requirements.

It will also be possible to specify the diesel engine with a particle filter which significantly reduces unburned soot particles in the emissions, thereby reducing the negative environmental impact. The system is cleaned (regenerated) automatically, as the contents of the filter are burnt off at regular intervals. An additive in the fuel enables this process to take place at a moderate temperature (approximately 450°C compared with the normal 550°C or thereabouts). The entire process, including the supply of the fuel additive, takes place without the driver noticing anything. The regeneration interval is adjusted to match driving conditions and the driver's driving style.

The diesel engine is a result of the Ford Motor Company's and PSA's joint engine development programme.

The diesel engine has a displacement of 2.0 litres. In 2004, a smaller 1.6-litre diesel engine will also be launched.

The range of engines will be continuously extended.

Engine	Configuration	Output	Torque
2.4	5-cyl in-line	140 bhp	220 Nm
2.4i	5-cyl in-line	170 bhp	230 Nm
T5	5-cyl in-line	220 bhp	320 Nm
2.0 D (turbodiesel)	4-cyl in-line	136 bhp	340 Nm
1.8	4-cyl in-line	125 bhp	165 Nm
1.6	4-cyl in-line	100 bhp	145 Nm
1.6 D (turbodiesel)	4-cyl in-line	110 bhp	240 Nm

For performance and consumption figures, please see the separate specification document.

The plans also include a Bi-Fuel engine – an engine that can be run on both natural gas and petrol.

“We shall have a remarkably powerful range of engines and will be able to comply with most needs and wishes,” says Peter Ewerstrand.

Transmissions from the R models

The six-speed manual gearbox, which was originally developed for the Volvo S60 R and V70 R, is now making its entry in the Volvo V50 T5. The six gears are spread out to combine swift acceleration with high top speed. The gearbox has triple synchromesh and an extremely distinct gear-changing pattern.

The normally-aspirated engines are combined with a new generation of Volvo’s five-speed manual gearbox. It has been further developed with triple synchromesh for faster changes and distinct feel.

Adaptive automatic transmission

The automatic transmission for the Volvo V50 is the same as that used in the larger Volvo models. It is a five-speed unit with an adaptive gear-changing pattern; in other words, it adapts to the current driving style.

A great deal of effort has been invested in matching driveshafts and universal joints to the high engine power outputs and in ensuring smooth, snatch-free power transmission while accelerating.

Six gears for the diesel too

The turbodiesel comes as standard with a six-speed manual gearbox (not the same as in the T5 model). This contributes to swift acceleration, as a result of excellent pulling power in every ratio.

Chassis with the properties of a large car

The Volvo V50 has been developed in the same spirit as the Volvo S60 and Volvo S80. The experience acquired from the advanced Volvo S60 R and V70 R has also helped to form the basis for this new compact model.

“We wanted to produce a sportswagon with the right driving experience,” explains Peter Ewerstrand. “Driving pleasure with responsive, stable road performance as the starting point.”

The five-cylinder powertrain laid the foundations for large-car properties. Independent wheel suspension with a multilink system at the rear produces a superb combination of comfort and consistent driving characteristics. The wider track and longer wheelbase, compared with the current Volvo V40 model, also contribute to the stable behaviour the car exhibits on the road.

Front suspension geometry has been carefully balanced to provide quick, precise steering response, thereby enhancing the sporty appeal.

The steering is electro-hydraulic, with light, distinct and controlled steering feedback.

The Volvo V50 can be equipped with a sports chassis as an option (not the AWD model). Stiffer springs and reduced ground clearance help to produce greater directional stability in connection with sporty driving.

“People are entitled to expect a great deal from a modern sportswagon,” concludes Peter Ewerstrand. “We are convinced that the Volvo V50 is going to offer a particularly pleasant driving experience. This will be largely due to the new powertrain, the carefully-balanced chassis and the exceptional torsional rigidity of the body.”

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2004-01-04

PRESS INFORMATION

The new Volvo V50

Built according to Volvo's consistent environmental philosophy

- **Materials and technologies selected to minimise risk to health**
- **New engine technology produces environmental benefits**
- **Particle filter for diesel engine**
- **Premair[®]**
- **Pollen filter is standard**
- **Interior Air Quality System a new option in a compact Volvo**
- **Environmental Product Declaration from the start**

Careful selection of materials and technologies

The Volvo V50 is being produced at one of the most modern production plants in the world. Both the manufacturing methods and the materials and substances used in production have been chosen to minimise the risk to health for both production personnel and people outside the plant.

Examples: Chromium-free body material pre-treatment, water-borne exterior paints, CFC-free materials

The car has been designed with low emissions as the focal point, in order to have the smallest possible negative impact on the surrounding environment.

Examples: Aluminium low-friction engines, effective catalytic converters with three-way technology – located close to the engine, oxygen sensor (Lambda sensor) both upstream and downstream of the catalytic converter, system for recovery of evaporated fuel vapour (EVAP).

Like all Volvo cars, the Volvo V50 has been designed for a high recycling rate.

Examples: 85% by weight of the materials in the car can be recycled; plastic components are labelled to facilitate recycling; recycled felt and wood-fibre materials are used in certain interior trim components.

Lower fuel consumption and lower emission levels

The new petrol engines are a further development of Volvo's low-friction engines.

The manifold and turbo unit in the T5 engine have been cast together in high-alloy cast steel which is particularly heat resistant (1,050°C). It therefore requires less cooling in the conventional way with petrol.

As a result, the engine can be run on a leaner fuel mixture, thereby reducing fuel consumption and exhaust emissions, especially when driving at high speeds.

The new plastic inlet manifold also produces positive environmental effects. The minimal heat-conducting ability of plastic results in cooler inlet air and thereby more efficient combustion.

The Lambda sensors have been improved to heat up more rapidly and to be activated more efficiently in cold starts. This helps to reduce emissions.

The five-cylinder engines in the Volvo V50 have radiators featuring Volvo's patented PremAir® system, which has been developed in collaboration with the Engelhard Corporation. PremAir® is a system that uses a catalytic coating on the radiator. It converts up to 75% of the ozone passing through the radiator into harmless oxygen.

The plans also include a Bi-Fuel engine – in other words, an engine that can be run on natural gas, biogas and petrol.

Comply with next generation of emission regulations

The five-cylinder engines have been upgraded to comply with the next generation of North-American and Californian emission regulations for this decade.

These regulations are the most rigorous emission standards in the world and they have contributed to the additional development of techniques to accommodate the HC and NOx standards – as well as improving durability. Volvo offers this refined technology for emissions on the new five-cylinder engines in every market.

Particle filter with automatic regeneration function

It will be possible to specify the new diesel engine for the Volvo V50 with a particle filter which significantly reduces unburned soot particles in the emissions, thereby reducing the negative environmental impact. The system is cleaned (regenerated) automatically, as the contents of the filter are burnt off at regular intervals. An additive in the fuel enables this process to take place at a moderate temperature (approximately 450°C compared with the normal 550°C or thereabouts). The entire process, including the supply of the fuel additive, takes place without the driver noticing anything. The regeneration interval is adjusted to match driving conditions and the driver's driving style.

Cleaner inside than out

Like other Volvo models, the Volvo V50 has been developed to offer its passengers a clean and healthy cabin. A cabin pollen filter is standard. In addition, Volvo's Interior Air Quality System (IAQS) is now also available as an option in this compact model. IAQS features an active carbon filter. The system automatically removes impurities and odours from the incoming air and makes the interior air cleaner than the air outside the car.

All the materials that are used in the interior have been selected and tested not to cause known allergic reactions and reduce the risk for other known health problems that can be caused by interior material.

Examples: Low PVC content in interior trim materials, chromium-free leather, surface treatment of interior fittings to prevent the emission of nickel, ÖKO-TEX-certified fabrics (the ÖKO-TEX label is an international registered symbol for the testing of textiles and leather. This certification ensures that textiles and leather are free from substances that can cause allergies or ill-health).

Environmental Product Declaration from the start

Like other Volvo models, the Volvo V50 is accompanied by an environmental product declaration (EPD), something Volvo was the first car manufacturer in the world to introduce. Volvo Cars' EPD is based on an holistic approach with the emphasis on health, resource utilisation and ecological consequences. It gives the car buyer an overview of the environmental impact of the car throughout its service life, making it easier to compare the eco performance of Volvo's various models and engine alternatives.

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PRESS INFORMATION

The new Volvo V50

Compact sportswagon with enhanced safety levels

- **New, patented frontal structure with several crumple zones**
- **Four steel grades interact for optimal deformation**
- **Side-impact protection system design is similar to the Volvo S80**
- **Frontal design with integrated protection for other road users**
- **Strong seats help to reduce the risk of injury in rear-end collisions**
- **34% increase in torsional rigidity compared with the Volvo V40**
- **Unique intelligent driver information system – IDIS**
- **Keyless Drive – a key-less locking/unlocking system**
- **Volvo On Call and Emergency Service System**

The Volvo V50 is a compact sportswagon which is both enjoyable to drive and flexible to use. What is more, it offers an enhanced level of safety – both protective and preventive.

Like the new S40, the Volvo V50 has very stiff body, a patented frontal structure and a comprehensive interior safety system, creating a vehicle with excellent safety characteristics.

The Volvo V50 also sees the introduction of Keyless Drive, a key-less locking/unlocking system with well-planned functions to help create a convenient car ownership experience.

PROTECTIVE SAFETY

Crumple zones with different grades of steel

“Our new compact models, the V50 and S40, have been developed to comply with rigorous safety targets,” says Ingrid Skogsmo, head of the Volvo Cars Safety Centre.

In a compact car body, the preconditions for efficient deformation are different from those of a large body. As the necessary deformation is absorbed within a shorter total distance, the properties of the various materials must be exploited to the maximum in order to absorb as much of the energy as possible.

The frontal body structure of the Volvo V50 was divided into several zones, each with a different task in the deformation process. The outer zones are responsible for most of the deformation. The closer the collision forces get to the passenger compartment, the less the materials deform.

“The objective is that the passenger compartment act in a predictable manner in most types of collision,” explains Ingrid Skogsmo.

In order to give each zone the relevant properties, the quality of the steel varies. Four different steel grades are used. In addition to conventional bodywork steel, three different grades of high-strength steel are employed: High Strength Steel, Extra High Strength Steel and Ultra High Strength Steel.

The zonal system enables the collision forces to be absorbed in a highly ingenious and effective manner:

Low-speed deformation zone

The front bumper incorporates a rigid cross-member made of Ultra High Strength Steel. The attachments to the longitudinal members of the body are designed in the form of ‘crash boxes’. They help to absorb the forces generated by a low-speed collision without damage to the rest of the body structure. These crash boxes can be replaced easily at a reasonable cost.

High-speed deformation zone

The straight sections of the side members are made of High Strength Steel, a very ductile grade of material, which is optimised for high energy absorption. This is the zone that accounts for most of the deformation in a collision.

In addition, Volvo has opted to include upper side members in the compact Volvo V50, as they help provide significant occupant protection if the vehicle should collide with a truck platform or a loading pier, for example.

Back-up zone

The section of the member that turns outward toward the A-pillar is designed to act as a barrier for the cabin space and as a back-up to help reduce deformation. The design also helps minimise the risk of the front wheel penetrating the interior. The wheel instead helps to absorb the collision forces. This section is extremely rigid and is made of Extra High Strength Steel.

Three-way attachment

A rigid cross-member connects the A- pillars and lower side members so that they form an extremely rigid three-way attachment on each side. This design plays a vital part in helping to maintain the cabin space in a severe crash.

The new front structure is one of Volvo's many patented safety designs.

Compact engines contribute to crash safety

Efficient packaging has enabled the engines in the Volvo V50 to be made 200 mm slimmer and 25 mm shorter. As these engines are installed transversely, the reduced width creates more space between engine and passenger compartment. In a collision, the engine can be pushed 150 mm to the rear before the crankshaft comes into contact with the cross-member near the bulkhead.

The Volvo V50 also has an interior safety system design that is patterned after the Volvo S80.

The steering column can be deformed up to 140 mm. When deformed, the steering column moves horizontally, to provide the optimal airbag position for this vehicle.

Other safety features that are shared with the Volvo S80:

- Collapsible pedals
- Dual-stage airbags
- Seat belt pretensioners for the front seats and rear outboard seats
- Force limiter for the front seat belts
- Belt reminder for the front seats (for European markets also on all seats at the rear)

Side Impact Protection System

The Volvo V50 is 54 mm wider than its predecessor, the V40. This creates added space for deformation in a collision. In other respects, the Volvo V50 has the same type of side impact protection as the Volvo S80, with SIPS (Side Impact Protection System), side-impact airbags and inflatable curtains. These curtains are also designed to provide enhanced protection in roll-over accidents, by deflating more slowly (approximately three seconds) than the front airbags.

The side airbags are larger than those in the V40 model, to provide additional protection at hip and chest height.

Several features help to make the body stiffer and reduce side penetration:

- The reinforced, transversely-installed tubular beam between the A-pillars
- The strong, rigid SIPS-tubes in the seats and the deformable steel box in the centre
- The diagonally-installed beams made of Ultra High Strength Steel in the doors
- The B-pillars which have been significantly reinforced and are dimensioned to help provide enhanced protection

Rear-end collisions

The Volvo V50 is also designed to provide enhanced occupant protection in a rear-end collision.

Volvo's system for avoiding neck injuries – WHIPS (Whiplash Protection System) – is one of the most effective on the market. In the event of a severe impact from the rear, the seat backrest and head restraint accompany the movements of the seat occupant's body.

The seats and backrests have a particularly robust design. They are designed to withstand loads from items such as unsecured luggage. At the same time, they are designed to yield in severe collisions in which a balance between strength and flexibility is important for occupant safety.

“Our seats are far sturdier than those that are usually found in most of the compact segment,” says Ingrid Skogsmo. “This is particularly important in a five-door model with its additional load capacity.”

Protection for other road users

The Volvo V50 has a frontal design with clean, smooth surfaces and rounded corners. The aim here is to help reduce the risk of injury to pedestrians and other road users in the event of an accident. Furthermore, the front has energy-absorbing characteristics, including a soft structure ahead of the bumper, to help reduce the risk of leg injuries.

The bonnet and front wings are designed to absorb energy. This helps to reduce the risk of head injuries. In addition, the new, compact petrol engines leave a generous 70 mm of free deformation space between the cylinder head and bonnet.

Built for children too

Like the other Volvo models, the Volvo V50 has been developed with children in mind. The safety structure of the body and the interior safety systems are designed and dimensioned to help protect the youngest occupants as well.

Both rear outer seats can be fitted with integrated child booster cushions for children above three years of age.

The front passenger airbag can be switched off and disabled with a key (available from spring 2004) (not in the USA or Canada).

The front passenger seat is prepared to fit a rearward-facing child seat. It has special anchorage loops for attachment using the safety belt. (Warning: Never place a child seat of any type in the front seat of a vehicle equipped with a passenger side airbag)

PREVENTIVE SAFETY

Stable driving properties

The body of the Volvo V50 is 34 per cent stiffer than that of its predecessor, the Volvo V40, thanks to advanced body design. This torsional rigidity helps to produce stable, predictable behaviour on the road. What is more, the chassis design, with its wide track and long wheelbase, also has a positive effect on driving stability.

- The front track is 1,535 mm (63 mm wider than the V40)
- The rear track is 1,531 mm (57 mm wider)
- The wheelbase is 2,640 mm (78 mm longer)

The suspension is independent, with spring struts at the front and a multilink system at the rear. The rear suspension helps to counteract any tendency to skid.

The Volvo V50 can be specified with:

- The STC (Stability and Traction Control) anti-spin system
- DSTC (Dynamic Stability and Traction Control), which corrects the progress of the car if it displays any sign of starting to skid

The Volvo V50 T5 will also be available in combination with All Wheel Drive. Volvo's electronically controlled AWD system distributes the torque automatically to help match the road conditions and driving style and is designed to provide more stable, predictable driving characteristics.

Effective brakes

The Volvo V50 has extremely effective ABS brakes – with electronic brake-force distribution to the rear wheels and automatic panic-braking assistance – EBA (Emergency Brake Assistance). The front wheels feature ventilated discs. The disc size is adapted to match engine power (diameter up to 16.5").

Projector-type headlamps

The headlamps feature projector-type low beams. The concentrated beam of light is surrounded by a "halo" which helps oncoming drivers judge the distance to the car.

Bi-Xenon gas discharge lamps (GDL) for high and low beam are available as an option.

Additional turn indicators in the door mirrors and integrated side-marker lights in the front and rear lamps make the Volvo V50 easy to see from the side as well.

Ergonomic driver's environment

A driving position with the correct ergonomic design, with all the instruments and controls in just the right position, makes for safer driving. In this respect, the Volvo V50 continues a renowned Volvo tradition. It has a comfortable, ergonomically-designed driver's seat, an adjustable steering wheel and a logically laid-out instrument panel.

Steering-wheel-mounted controls for the audio system, cruise control, telephone and RTI (Road and Traffic Information) navigation system further enhance driving safety.

Intelligent Driver Information System

The Intelligent Driver Information System – IDIS – is a new feature in the automotive industry, which has been inspired by fighter aircraft technology. The system helps the driver to avoid being distracted while driving.

When overtaking or braking, for example, signals from the integrated GSM telephone and certain peripheral information are under certain conditions delayed until the situation is calmer.

The IDIS function continuously registers the driver's activity by monitoring steering wheel angles, acceleration, turn signal function and so on. This information is processed and, at a given activity level, information that is not essential for safety is held back.

IDIS is standard on all versions of the Volvo V50, irrespective of whether or not the car is fitted with an integrated phone.

IDIS is factory-prepared for forthcoming on-board systems for information and communication. The more of these functions the car has, the greater the benefit of IDIS.

SECURITY

Volvo's holistic view of safety encompasses not just protective and preventive safety, but also personal security. The Volvo V50 is designed to provide enhanced protection for the occupants of the car and their property, both while on the move and when the car is parked.

The Volvo V50 can, for example, be equipped with laminated side windows, an unusual feature in a compact car. Laminated glass is extremely difficult to smash and provides enhanced protection from break-ins.

Keyless Drive – key-less locking system

The Volvo V50 can be specified with a key-less locking/unlocking system. This makes it possible to unlock (and lock) the car and turn on the engine without using a key. In order to do this, the driver needs to have what is known as a PAD (Passive Authorisation Device) within reach, in his pocket, for example. It is also possible to activate all normal remote functions such as follow-me-home lighting and the panic alarm from a distance. As a result, the system offers complete freedom of action and swift access to the car in a threatening situation.

QUESTIONS AND ANSWERS ABOUT KEYLESS DRIVE

How do you lock and unlock the car?

You use either a PAD in the same way as the standard remote control (by pressing the buttons), or the door handles to unlock and door buttons to lock the car.

Is it possible only to open the driver's door?

It is easy to adjust the settings to enable you to open all the doors and compartments/hatches at the same time or just one specific door (or the tailgate).

What happens if you leave the pad in the car?

It becomes inactive when the car is locked. It is then impossible to unlock the car, unless you have another PAD in your pocket. Without an authorized PAD, no one can open the car in any case. The PAD inside the car can be reactivated in a number of ways. The easiest way is to use another authorized PAD to unlock the car.

How is the engine turned on?

The engine is turned on using a knob on the instrument panel (press and turn). For safety reasons, the clutch (manual transmission) or brake pedal (automatic) must be depressed at the same time.

Does the engine stop if the pad is dropped from the car?

Should this happen while driving, you can still continue to drive. However, if the engine is turned off, it is not possible to restart without a PAD.

Volvo On Call with an emergency signal

Volvo On Call is an option in the Volvo V50 with an integrated GSM telephone. In an accident in which an airbag or belt pretensioner has been activated, a signal is transmitted automatically to the CSC (Customer Service Centre), which can immediately locate the car and call for help. In situations in which the alarm has been activated, the CSC also receives a signal and can then inform the police – who can be guided to the scene.

(Volvo On Call is not available in North America and Japan)

Emergency Service System

This is a function in Volvo On Call which ensures that the information that is sent to the CSC is supplemented with information about the type of accident, the severity of the accident, whether the airbags have been activated and so on. This helps the rescue services to plan and design their action in the appropriate way.

Other security functions

The Volvo V50 is also equipped with a number of theft-protection functions, such as

- Electronic immobiliser
- Electronic “anti-theft marking”
- Uniquely identified control modules
- Audio system which is integrated in the on-board electrical system

The locking system (the key-based standard system) is extremely sophisticated and offers a wide range of personal settings:

- Unlocking of doors – all the doors or only the driver’s door
- Automatic locking of the doors after moving off
- Indicator blink when unlocking or locking – with an option to cancel

Variable timing for follow-me-home and approach lighting – 30, 60 or 90 seconds

KH

2004-01-04

ENGINES

Type
Configuration
Displacement, cm ³
Bore (mm)
Stroke (mm)
Engine cylinder block material
Cylinderhead material
Combustion chamber type
Compression ratio
Valves, no/cylinder
Camshafts
Engine management system
Ignition sequence
Engine idling speed, rpm
Fuel, rec. octane
Max output, kW (hp)/rpm.
Max torque, Nm/rpm.

POWER AND TORQUE →

TRANSMISSIONS

5- or 6-speed manual gearbox.
5-speed adaptive automatic transmissions with Geartronic, electronically controlled, with lock-up and winter mode selection.

Ratio	MMT6	M66W	M56L	M56H	AW55-51
First	3.08	3.39	3.39	3.07	4.66
Second	1.86	1.91	1.90	1.77	3.03
Third	1.24	1.27	1.19	1.19	1.98
Fourth	0.84	0.95	0.87	0.87	1.34
Fifth	0.89	0.78	0.70	0.70	1.02
Sixth	0.71	0.65	–	–	–
Reverse	4.19	3.20	3.30	2.99	5.11

Manual gearbox/final drive
Automatic gearbox/final drive

PERFORMANCE

Gearbox
Acceleration, 0–100 km/h (sec)
Top speed, km/h
Fuel consumption l/100 km (Combined)
CO ₂ g/km

CHASSIS

Suspension	front	Spring-strut, lower link, anti-roll bar
	rear	Individual, multilink, coil springs, anti-roll bar
Steering		Rack and pinion, power assisted
Turning circle, curb to curb		10.6 m
Braking system		ABS system with EBD. Ventilated discs front and rear.
Braking distance 100–0 km/h		38 m
Brake disc diameter		
Front/Rear		300/280 mm
Front/Rear T5		320/280 mm

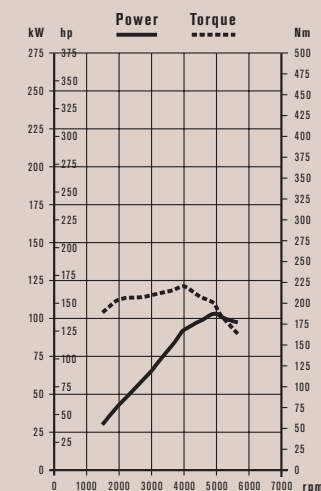
MEASUREMENTS AND VOLUMES

Exterior measurements (cm)	
Length	451,4
Width	177.0
Height, curb	145.2
Wheelbase	264.0
Track, front	153,5
Track, rear	153,1
Ground clearance, curb	13.5
Weights/Miscellaneous	
Weight, curb, kg (B5244S4/D4204T)	1425/1456
Fuel tank, l (Petrol/Diesel)	62/55
Max. trailer weight, kg	1500
Max load, kg	450
Max roof load, kg	75
Drag coefficient, Cd	0.32

Interior measurements (cm)	
Headroom with sunroof (front/rear)	96,9/96,8
Headroom without sunroof (front/rear)	98,8/96,8
Passenger compartment width at shoulder height (front/rear)	140.2/137.4
Leg room (front/rear)	105.7/87,3
Cargo volume, litres (ISO V211)	417
(ISO V212)	717
(ISO V214)	1307
Cargo length (L203)	98,9
Cargo length with rear seat(s) folded down (L202)	176,6
Load length with rear seat(s) and front passenger seat folded down	306,0
Height of luggage compartment (H201)	78,5
Cargo Floor Height to Ground (H502)	62,8
Rear opening height (H202)	68,5
Width of luggage compartment between wheelhouses (W201)	95,9
Rear opening width at floor, min. (W203)	100,2
Rear opening width above belt, min. (W205)	91,1
Rear opening maximum width	100,5

Volvo V50 2.4/140 (B5244S5)

In-line 5 cyl., naturally aspirated
Transverse, front wheel drive
2435
83
90
Aluminium
Aluminium
Pent-roof
10.3
4
2
Microprocessor controlled fuel and ignition system with self diagnostics
1-2-4-5-3
720
91–98 RON
103 (140)/5000
220/4000

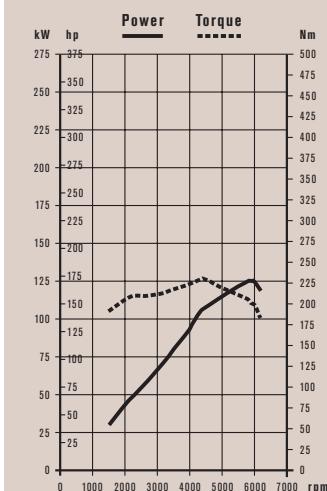


M56L/4.00
AW55-51/2.44

Manual	Automatic
10	10.7
205	200
8.5	9.2
203	220

Volvo V50 2.4i/170 (B5244S4)

In-line 5 cyl., naturally aspirated
Transverse, front wheel drive
2435
83
90
Aluminium
Aluminium
Pent-roof
10.3
4
2
Microprocessor controlled fuel and ignition system with self diagnostics
1-2-4-5-3
720
91–98 RON
125 (170)/6000
230/4400



M56H/4.25
AW55-51/2.44

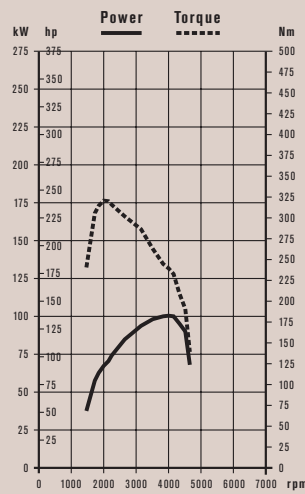
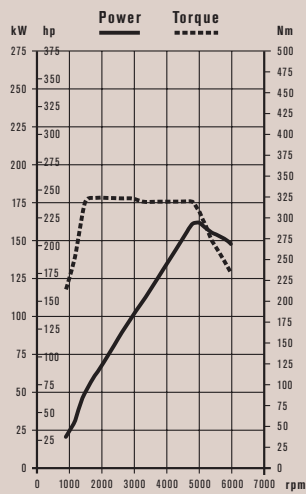
Manual	Automatic
8.3	9
220	215
8.6	9.2
204	220

→ Cont'd Volvo V50

Preliminary data

Volvo V50 T5 (B5254T3)
In-line 5 cyl., light press. turbo
Transverse, front wheel drive
2521
83
93,2
Aluminium
Aluminium
Pent-roof
9.0
4
2
Microprocessor controlled fuel and ignition system with self diagnostics
1-2-4-5-3
770
91-98 RON
162 (220)/5000
320/1500-4800

Volvo V50 2.0D (D4204T)
In-line 4 cyl. turbo diesel
Transverse, front wheel drive
1998
85
88
Aluminium
Aluminium
-
18.5
4
2
Common-Rail Direct Injection with self diagnostics
1-3-4-2
800
Diesel Min Cetane 48
100 (136)/4000
320/2000



M66W/3.77
AW55-51/2.27

MMT6/2.85*

Manual	Automatic
6.9	7.3
240	235
8.8	9.5
209	227

Manual
9.6
210
5.7
153

* Gear 5, 6 & Rev. (4.07 Gear 1, 2, 3, 4)

