

PRESS INFORMATION

VOLVO

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PRESS INFORMATION

All-new Volvo XC90 - The next-generation SUV

The all-new Volvo XC90 sport-utility vehicle represents the company's first foray in the mid-size premium SUV market. With its attractive styling, exemplary handling characteristics and innovative safety features, the XC90 marks the introduction of the next-generation of sport-utility vehicles.

Adhering to Volvo's core brand values of safety, environmental consciousness and value, the XC90 also manages to accomplish no fewer than five automotive world firsts: Roll Stability Control (RSC), an inflatable side curtain for all three rows of seats, an integrated sliding center booster seat for children, seatbelts with pretensioners in all seating positions and the availability of a Dolby 5.1 Pro Logic II surround sound stereo system featuring a 305-watt Alpine amplifier and 12 premium speakers.

Built off the venerable P2 large-car platform that is also utilized by the flagship S 80 luxury sedan, the XC90 is the largest vehicle in the Volvo lineup. Unitized construction increases torsional rigidity and helps to reduce noise, vibration and harshness. Volvo's unique vehicle architecture mounts the engine transversely, allowing increased room within the passenger compartment for an optional third-row of seats, boosting seating capacity to seven. A full 93.2 cubic feet of cargo capacity and over 9.5 feet of cargo length are available when the second and third rows and the front passenger seat are folded flat. Adding to the vehicle's versatility are no less than 64 seating configurations, more than any other of the XC90's competitors.

Maximizing interior versatility is what sets the XC90 apart from other SUVs in its class. Optional forward facing third row seats, offered as part of the Versatility Package, increases seating capacity to seven. Also included are separate controls for the rear air conditioning unit and audio systems. A unique feature of the XC90's second row seats (when ordered with the Versatility Package) is that the 40/20/40 bench seat is adjustable fore and aft, affording more room for the third-row passengers. When not in use, the third row folds flat below the cargo floor, increasing luggage capacity without the hassle of lifting a heavy seat out of the vehicle. The center portion also incorporates a child booster seat, and when slid into the forward position allows the child to better interact with the front seat occupants.

Two versions of the Volvo XC90 will initially be offered when the vehicle goes on sale in November 2002: the XC90 AWD and the XC90 AWD T6. The XC90 AWD is powered by a 2.5-liter inline five-cylinder turbocharged engine producing 208

horsepower at 5,000 rpm and 236 lb.-ft. of torque from 1,500 - 4,500 rpm. The XC90 AWD T6 gets its power from a twin turbocharged 2.9-liter inline six-cylinder engine making 268 horsepower at 5,100 rpm and a stout 280 lb.-ft. of torque from 1,800 - 5,000 rpm. Both all-wheel-drive models will tow up to 5,000 pounds.

Following on the heels of the all-wheel-drive models, a front-wheel-drive version, the XC90, will go on sale in the first quarter of 2003. The same engine that's found in the XC90 AWD, a 208-horsepower 2.5-liter five-cylinder engine, will also power the XC90.

As with other all-wheel-drive Volvos, the XC90's system operates seamlessly and is invisible to the driver. Created by Haldex and specifically tuned to meet the demands of the XC90, power is transferred automatically between the front and rear wheels, depending on available traction. Under normal conditions, 95 percent of the engine's power is sent to the front wheels. If slippage is detected and the front wheels lose traction, a multi-plate clutch located in the rear differential engages and instantly begins routing up to a maximum of 65 percent of the power to the rear wheels. Engagement of the all-wheel-drive system is extremely fast, allowing just 117th of a wheel rotation before power begins being diverted to the wheels with the most traction.

With a wheelbase of 112.6 inches, 2.7 inches longer than the S80 luxury sedan, and an extremely wide track of 64.3 inches front and 63.9 inches rear, the XC90's ride is compliant and controlled even when driven over rough or uneven road surfaces. The independent MacPherson strut front suspension coupled with a ZF steering gear allows sharp, precise response. The fully insulated multi-link independent rear suspension filters noise and vibration for a quieter ride.

XC90 Buyers

XC90 buyers will be around 45 years old, approximately two years younger than the average Volvo purchaser. A majority of them will most likely be married with a median income around \$145,000. About 40 percent of them will already own three or more other cars and more than half, 55 percent, will be men.

Competitive Group

The mid-size premium SUVs the XC90 will compete with are the Acura MDX, the Mercedes-Benz ML320, the Lexus RX 300 and the BMW X5 3.0i.



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2003 Volvo XC90: Many New Features

The Volvo XC90 SUV is completely new for 2003. Based on the P2 large-car platform, the Volvo XC90 introduces no fewer than five automotive world firsts.

Roll Over Protection System (ROPS)

As a leader in the study of automotive safety, Volvo has addressed one of the top concerns of today's SUV buyer, namely the occurrence of a roll over accident.

While the XC90's center of gravity was raised just 3.5 inches higher than that of the XC70, the commanding view today's SUV buyers crave hasn't been eliminated. In fact, the driver of an XC90 sits 6.5 inches higher than that of the driver of an XC70, allowing greater visibility of the road ahead while maintaining the handling traits of a lower-riding passenger car.

Sport-utility vehicles, because of their higher center of gravity over that of a passenger car, may exhibit a greater risk of rolling over during an extreme maneuver such as avoiding an accident. Enter Roll Stability Control (RSC), a Volvo XC90 exclusive that's designed to assist the driver in maintaining control during just such an event, and help prevent the XC90 from rolling over. RSC is an active stability enhancement system utilizing gyroscopic sensors to determine roll speed and roll angle. Terminal angle - the angle in which a roll over is imminent - is instantly calculated, thus triggering the XC90's standard Dynamic Stability Traction Control (DSTC) system. Once engaged, DSTC reduces power and/or brakes the necessary wheels to induce an understeer situation until driver control is regained.

In the event that a roll over does occur, the XC90's roof structure is reinforced with Boron steel, a metal that is four or five times stronger than normal steel.

Inflatable Curtain for all three rows of seats

Whether the XC90 is equipped with the standard five-seat configuration or the optional seven-seat layout, every passenger is protected with an inflatable side curtain that deploys from the headliner in the event of a side impact or roll over.

The curtain is designed to stay fully inflated for longer so as to offer maximum protection in a roll over situation. When deployed, the curtain follows the contour of the window glass as it inflates. If the occupant's head is resting against the window the curtain will slip between the glass and the occupant's head to provide enhanced protection.

Seatbelts with pretensioners in all seating positions

Complimenting the IC are seatbelts with pretensioners in every seating position, including the optional forward facing third row seats. In the event of an accident, the seatbelts' ratchet device reels the belt in, keeping all of the occupants firmly in place.

Integrated sliding child booster seat

The middle row of seats, designed like the seats in a regular passenger car, has a three-part backrest with a 40/20/40 split to offer maximum flexibility. The middle seat in this row can be equipped with an integrated child booster cushion. In an XC90 configured with the optional seven-seat layout the child seat can slide forward so that it is positioned just behind the two front seats, thus improving contact between the child and the front seat occupants.

Dolby 5.1 Pro Logic II surround sound stereo

Available as an option, the Dolby 5.1 Pro Logic II surround sound stereo system is an audiophile's dream-come true. An Alpine amplifier provides 305 watts of crystal clear music through 12 premium speakers. Also included is an in-dash six-CD changer. Five-passenger models may also be equipped with an optional 8-inch, 140-watt subwoofer for optimal bass clarity.

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Unique vehicle architecture gives Volvo a competitive edge

- **More space**
- **Faster reduction of emissions**
- **Very efficient crumple zone area due to the slim engine configuration**
- **The Volvo vehicle architecture gives obvious advantages to customers**

You could say that Volvo Car Corporation began paving the way for the Volvo XC90 already in the beginning of the 1990s.

The Volvo 850, introduced in 1991, included a new power train concept, which still, well into the new millennium, gives every new Volvo a competitive edge.

The original concept includes a transverse in-line five-cylinder engine, partnered with an extremely compact gearbox. An in-line six-cylinder engine was added with the introduction of the Volvo S80 in the late 1990s.

Three major benefits

While a traditional north-south orientation of the engine requires a longer engine bay, the transverse solution offers the designers more freedom without compromising Volvo's extremely stringent safety standards.

- This unique Volvo vehicle architecture makes it possible to maximize the interior space. For the XC90 it means 7 seats in a compact package.
- The in-line engine has a "warm" and a "cold" side. With the "warm" side facing rearwards, there is only one, short flow of exhaust fumes to the catalytic converter. This means that the emission reduction becomes more efficient.

- An SUV needs strong low-end torque - Volvo XC90 gives max torque already at 1 500 revs/minute. The in-line engine is ideal for turbo charging, giving the opportunity to tailor the low-end torque for excellent takeoff performance.

"In recent years, this architecture has given us extra legroom in the rear seat of the Volvo S80, more luggage space in the Volvo V70, the dynamic coupe-look of the Volvo S60...and now it's time for the XC90", says Hans Wikman, Project Director Volvo XC90.

Seven seats where others struggle to seat five

Just like the S60, it has the cockpit forward design. The windscreen and the passenger compartment have moved forward - further than in most other SUVs.

"This means that we can provide added roominess within a given footprint, and the XC90 is compact for an SUV It is just 90 millimetres longer than a Volvo V70 - and we can seat seven people in a size, where most competitors struggle to seat five. And we still have adequate of luggage space behind the third row", says Hans Wikman.

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Chassis and powertrain: performance and roadholding at a premium level

- Ride comfort and road holding on a par with premium passenger cars
- Emergency Brake Assistance
- Electronically controlled all wheel drive
- Turbocharged engines from 208 bhp to 268 bhp
- Geartronic standard with all engines

The Volvo XC90 is a vehicle designed for all types of roads. Even though it is not intended for extreme off-road driving, the combination of electronically controlled all wheel drive and 8.6" of ground clearance creates the right pre-conditions for continued progress when road surfaces get rough.

The feeling of safety that the high seating position gives the driver is supplemented with the knowledge that he or she can control the car with the help of instant, well-weighted response from the chassis, engine and brakes. Progress is thus more relaxed and comfortable.

The chassis in the Volvo XC90 is designed to give the vehicle the same ride and road holding as a premium passenger car. It is based on the chassis of the Volvo S80, S60 and V70, cars that are renowned for their excellent road manners.

In the Volvo XC90, however, the suspension has been upgraded and dimensioned to handle heavier loads and higher ground clearance.

Well-isolated rear suspension for quieter progress

The independent multi-link rear suspension is well isolated, with the dampers and springs attached directly to the sub frame. This results in a quieter ride, since road and transmission noise is largely filtered out before it reaches the bodywork.

The independent MacPherson front suspension together with the new ZF steering gear, promotes increased precision and sharp response.

The Volvo XC90 has an extremely wide track 64.3" front, 63.9" rear and a long wheelbase -112.6". This makes for exceptional stability, with the vehicle behaving very consistently and dependably even on curving, twisting and uneven roads.

The Volvo XC90 can be specified with a range of wheels with a diameter of up to 18 inches.

The braking system in the Volvo XC90 is dimensioned to help stop the vehicle safely, even when it is fully loaded with seven people and their luggage. This is achieved with a large brake system and Emergency Brake Assistance (EBA) . This system monitors how quickly the brake pedal is pressed, and can thus determine if the driver is panic-braking. In such a situation, the brake pressure is boosted to maximum in the shortest possible time, thus reducing the stopping distance.

Electronically controlled AWD

One important ingredient in the recipe for safe driving pleasure in the Volvo XC90 is its electronic AWD system, developed in close cooperation with one of the foremost experts in this area - Haldex of Sweden.

The all wheel drive system in the XC90, like the one in the S60AWD sedan, automatically distributes power between the front and the rear wheels for enhanced traction on all surfaces.

The electronically controlled AWD monitors the vehicle's contact with the underlying road surface and assesses the signals that the driver receives through the steering wheel, brake pedal and accelerator. This information then helps determine whether, and if so how, the system should respond.

In normal driving on dry roads, almost all power, 95%, is delivered to the front wheels.

If the road surface causes the front wheels to slip, power is proportionately

diverted to the rear wheels. With electronically activated all wheel drive, engagement takes place extremely quickly, after just one-seventh of a wheel turn, which limits wheel spin and helps ensure reliable road grip.

As a result, the AMID system in the Volvo XC90 has all the benefits of a permanent all wheel drive system, without the accompanying disadvantages such as higher fuel consumption and heavier weight.

The electronic AWD system interacts in the Volvo XC90 with the active chassis systems DSTC - Dynamic Stability and Traction Control. This is an anti-skid system that automatically counteracts tendencies towards a skid before the driver even has time to notice. The system continuously compares the vehicle's direction of progress with the driver's steering wheel movements. If the vehicle shows any tendency to start skidding, the brakes are instantly applied to one or more wheels to stabilize the vehicle.

DSTC also includes an anti-spin system that automatically brakes the wheel that spins, so that drive is diverted to the wheel with the best grip. It also controls the engine torque.

Engines for every need

The Volvo XC90 is available with a choice of two engines, all made entirely of aluminium:

- An in-line 6-cylinder engine with a displacement of 2.9 litres, equipped with twin turbochargers. It produces 268 bhp and has 280 ft.lbs of torque from just 1 800 revs/min.
- An in-line 5-cylinder 2.5 litre engine with a light-pressure turbocharger. It has a power output of 208 bhp and 236 ft.lbs of torque from 1500 revs/min.

Both engines come from Volvo's passenger car range, but they have been re-profiled to suit XC90. In particular the 2.5T, 5 cylinder engine, produces far more torque from lower engine speed.

The 6-cylinder engine is the same unit that powers Volvo's largest sedan, the S80 T6. It has a parallel turbo system - two small and highly efficient turbochargers that

are installed alongside each other. They are driven by and feed three cylinders each.

In the Volvo XC90, the T6 engine's displacement has been enlarged from 2.8 to 2.9 litres and it is equipped with continuously variable valve timing or CVVT on both the inlet and exhaust sides. CVVT adjusts valve timing to suit the engine's current revs and load, and it thus exploits the engine more effectively, reducing fuel consumption and emissions.

One of the most important results is that maximum torque is available from just 1 800 revs/minute, compared with the 2000 revs/minute of the 2.8-litre version.

The 5-cylinder light-pressure turbo engine now reaches its maximum torque 236 ft.lbs from just 1500 revs/minute, giving the XC90 excellent starting and towing characteristics. This has been achieved with a longer piston stroke by increasing engine displacement from 2.4 to 2.5 litres. This change is matched by a somewhat smaller turbo charger, which steps into operation a bit earlier. In addition, power output has increased from 197 to 208 horsepower and with a nearly 18 percent increase in torque output.

All performance figures are preliminary.

Best of two worlds: Geartronic

Both the Volvo XC90 T6 and the 2.5T use automatic Geartronic transmissions as standard. The T6 uses a 4-speed transmission, while the 2.5T is equipped with a 5-speed. With Geartronic, the driver gets the best of both worlds: on the one hand, the transmission can be left to take care of gear changing entirely automatically, or the driver can over-ride the system to change gears manually without a clutch pedal.

The automatic transmission is adaptive, which means that it monitors the driver's driving style and adjusts the gear changing pattern accordingly. It also features a "W" setting for winter driving on slippery surfaces. Here, the car starts off in a higher gear to avoid wheel spin and loss of control.

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Volvo XC90: electronically controlled all-wheel drive for swift, intelligent activation

- **Updated 100 times per second**
- **Superior starting performance on difficult driving surfaces**
- **Enhances car-like qualities of the Volvo XC90 SUV**
- **Interfaces with the traction and anti-skid control systems**

The XC90s electronically controlled all-wheel drive system is completely automatic, and one of the most technically sophisticated systems on the market today.

By comparison with the earlier Volvo all-wheel drive systems based on a viscous coupling differential, the new AWD system is much more swift in its response. One of the front wheels need only start to slip through a seventh of a single wheel revolution for the system to divert more power to the rear wheels. This means that the new AWD system provides much better starting traction on difficult surfaces, minimising the risk, for instance, of the front wheels digging themselves into soft sand. The `heavier' the driving surface is, e.g. wet sand or mud, the greater the difference and the advantages compared with the earlier system.

Normally anything between 5 and 65 percent of the power is delivered to the rear wheels, depending on the driving conditions. Changes in the amount of power diverted to the rear wheels take place extremely quickly but smoothly, without the driver even noticing.

In extreme situations, such as if the front wheels happen to be on ice-rink-smooth ice but the rear wheels still have maximum grip, all of the power can be diverted to the rear wheels.

Managing the distribution of power between right and left is the Traction Control System (TRACS), Volvo's traction system. TRACS intervenes when necessary by braking one wheel to increase the relative power to the wheel with the best traction. This means that the AWD system, working in conjunction with TRACS, can distribute power to the wheels, which have the best traction at any given time.

In more normal driving on good surfaces, the electronic AWD system further enhances the car-like qualities of the Volvo XC90. The steering precision is excellent even when accelerating hard - anything resembling torque steer is virtually eliminated by the rapid response of the new system in combination with the new precision steering gear from ZF.

When the XC90 is being parked, the AWD system is controlled to prevent the front and rear axles from 'competing' for power at angles up to full lock, ensuring easy manoeuvring for the driver.

When the vehicle is braked, the system is deactivated so that the brake and ABS systems can function effectively, for high stability and short braking distances.

Similarly, the AWD system is deactivated by the Dynamic Stability and Traction Control system (DSTC) if this performs any braking intervention to counteract skidding.

Here is a brief technical description of the way Volvo's new AWD system works: 100 times per second, the electronic control system makes an 'intelligent' assessment of information from a number of different sources:

- Wheel rotation speed (as measured by the ABS sensors)
- Throttle status
- Engine torque
- Engine speed
- Braking system

The system has three main parts: a hydraulic pump which is actuated by differences in speed between the axles, a 'wet' multi-disc coupling, and a control valve with electronics.

The whole coupling can be regarded as a hydraulic pump in which the pump housing and the ring-shaped piston are connected to one axle, while the piston control unit is connected to the other axle. When both axles are rotating at the same speed, no pumping takes place. As soon as a difference in speed arises, the system starts pumping oil. Because the pump used is a reciprocating pump, its action is virtually instantaneous, avoiding the delay inherent in a slower type of pump.

The oil is pumped to a coupling piston, which compresses the multi-disc portion of the coupling, thereby reducing the speed difference. From here the oil is returned to a tank via an adjustable check valve which controls the oil pressure and therefore the pressure on the coupling discs.

Electronic control means that the coupling responds ideally in a whole range of driving situations.

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Safety: the sights are set on leadership

- **Roll Stability Control**
- **Special steel in a reinforced roof structure**
- **IC (Inflatable Curtain) - for all three rows of seats**
- **Lower cross-member for increased car-to-car compatibility**

Customers expect Volvo to retain its lead in the field of safety - irrespective of vehicle type. With the launch of its first-ever SUV, Volvo Car Corporation enters an entirely new segment, and the goal is perfectly clear: to lead the way in terms of safety.

As in all other Volvo models, safety in the Volvo XC90 is a holistic concern. Safety is never achieved by simply adding a number of individual stand-alone features into a car: what is important is the interaction between them - it is this interplay that shapes the result. This holistic approach is - and always has been - one of the cornerstones of Volvo's safety philosophy.

With XC90s entry into the SUV market, there is increased focus on several new areas. One of them is roll-over accidents, where the vehicle rolls over onto its roof one or more times.

Roll-over Protection System

Volvo's Roll-over Protection System, ROPS, tackles the problem from two directions:

A world first stability-enhancing system, Roll Stability Control, RSC, which decreases the risk of rolling over in the first place - keeping the XC90 on all four tires is the first priority.

Increased protection for the occupants if the vehicle does roll-over is a comprehensive approach at addressing roll-over accidents.

Because of its higher center of gravity, an SUV has greater risk of rolling over in certain critical situations compared with a conventional passenger car. That is why the centre of gravity in the Volvo XC90 has been kept as low as possible. In fact, it is just 3.5" higher than that of the Volvo XC70.

However, this does not mean that Volvo has compromised on one of the properties that SUV buyers value so highly: a commanding seating position. The front seats are no less than 6.5" higher than in the Volvo XC70.

In order to help reduce the risk of a roll-over situation, the Volvo XC90 is equipped with an active stability-enhancing system known as Roll Stability Control or RSC, a world first. The system uses gyroscopic sensors to register the car's roll speed and roll angle. Using this information, the terminal angle is instantly calculated and thus also the roll-over risk.

If the calculated angle is so great that there is an obvious risk of rolling over, the DSTC (Dynamic Stability and Traction Control) anti-skid system is activated. DSTC responds by reducing the engine's power and also by braking one or more wheels as necessary until the car understeers and stability is regained.

This helps reduce the risk of a roll-over accident initiated by extreme manouvers. RSC is the only active stability-enhancement system on the market to measure the car's roll angle. It was developed jointly by Volvo and Ford Motor Company.

Special steel in a reinforced roof structure

If the Volvo XC90 experiences a roll-over the passive safety systems step in.

The goal is to reduce the risk of the occupants' heads from coming into contact with the car's interior roof panel or sides. Volvo has reinforced parts of the roof structure in the Volvo XC90 with Boron steel, which is four or five times stronger than normal steel.

All the seats, including the 3rd row, are equipped with seat belt pretensioners which help keep the occupants securely in place, a Volvo unique feature. In an accident, the pretensioner pulls the seat belt firmly, securing the occupant's body in the seat and thereby providing enhanced protection.

In order to help prevent the head from striking the car's sides, the Volvo XC90 is equipped with Volvo's IC or Inflatable Curtain. IC also helps prevent the occupants from being ejected in an accident.

The Volvo XC90 has a version of IC that is specially adapted to deal with roll-over accidents.

This means that it stays fully inflated for longer so as to offer maximum protection in a roll-over scenario. What is more, the curtain is folded in its cassette in such a way that it follows the contour of the window glass as it inflates. If the occupant's head is resting against the window at the moment of inflation, the curtain will thus slip between the glass and the occupant's head to provide enhanced protection.

In the Volvo XC90, all three rows of seats in the 7-seat version are protected by the IC. Volvo is currently the only manufacturer offering this kind of protection for 3rd row occupants.

Selfless compatibility

The problem of compatibility - when an SUV collides with a car that sits closer to the road surface - was a high priority throughout the development of the new Volvo XC90. The typical SUV has a high ground clearance and thus often comes with high-positioned bumpers. This may create a greater risk of damage to the oncoming passenger car and more serious injuries to its passengers, since the lower car's protective beams and crumple zones simply slip below the front of the SUV without being activated.

In order to reduce the risk of this type of injury, the front suspension subframe in the Volvo XC90 is supplemented with a lower cross-member, positioned at the height of the beam in a conventional car. This lower beam is integrated into the XC90s structure and is neatly concealed behind the spoiler.

The lower cross-member strikes the oncoming car's protective structure, activating its crumple zone as intended so the occupants can be given the maximum level of protection. This construction also reduces risk of injuries in frontal collisions as well as in rear-end impacts and side impacts

During the development of the Volvo XC90, considerable attention was also

paid to the safety of pedestrians, cyclists and other relatively unprotected road-users. The entire front of the car features clean, gentle and smooth lines, and there are no protruding parts that may cause enhanced injuries.

The engine in the Volvo XC90 is installed low in the vehicle. As a result, the hood has no less than 3.1" of deformation space before there is any contact with the engine below it. It thus serves as a impact-absorbing "bumper", reducing the risk of serious injury to a pedestrian who may be thrown onto the hood.

High safety level in the third row of seats

The Volvo XC90s third row of seats provide a high level of passenger safety. In the case of a rear end collision the space behind the seats is designed to absorb and spread the collision force in an effective way.

The occupants of the rear most seats sit just above the rear axle, which is the optimum position in terms of side-impact safety. These seats also feature belt tensioners, head restraints and, as already mentioned, the Inflatable Curtain or IC.

Whiplash and side impact protection

The front airbags are of the dual-stage type, with a sensor that monitors the incoming collision force and adjusts the airbag's inflation accordingly.

Safety for the car's youngest occupants has always been a high priority at Volvo. That is why the Volvo XC90 has a standardised attachment system, ISOFIX, for child seats.

WHIPS, Volvo's award-winning whiplash Protection System, is fitted in the two front seats of the Volvo XC90. WHIPS is activated in the event of a rear-end collision from speeds as low as 8 mph, helping to reduce trauma on the spine and neck and thus reducing the risk of injury.

The XC90 also features another award-winning safety system - the Side Impact Protection System, SIPS, first introduced in the Volvo 850. The system is designed to absorb and distribute the collision forces in a side impact collision, thereby reducing the risk of injury.

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Design: Scandinavian style with flexibility and muscles

- **Muscular design**
- **Unique vehicle architecture allowing for seven-seat capability**
- **Innovative flexibility**
- **Light, space and function**
- **Exterior Styling Kit**

"Masculine, but not macho; muscular, but not aggressive," is how the new Volvo XC90 is described by Peter Horbury, Vice President and Chief Designer at Volvo Cars.

The muscular stance is the synthesis of a number of traditional yet unique Volvo features:

- the upright, dark, egg-crate grille with Volvo diagonal and emblem
- the V-shaped hood, further accentuated on the Volvo XC90
- the broad, pronounced shoulders
- the characteristic tail lamps incorporating design language of the sedans and wagons

"Nobody should be in any doubt that this is a modern Volvo," says Peter Horbury. The muscularity of the Volvo XC90 is matched by chamfered corners front and rear, promoting a gentle, non-aggressiveness, while giving the vehicle a more compact impression.

Smart vehicle architecture

Peter Horbury is happy to talk about the vehicle architecture of the Volvo XC90, an architecture based on the concept of transversely mounted engines.

"The concept dates back to 1991 and the introduction of the Volvo 850, and has proven to be extremely beneficial to us - and our customers. The beauty of the concept is that it gives you more space to work with. This is why we have managed to create a compact SUV with three rows of seats," explains Peter Horbury.

The Volvo XC90 is a seven-seat SUV with compact overall body dimensions. It's 188.9" long, just 3.4" longer than a Volvo V70.

The tailgate on the Volvo XC90 has a rather sporty angle. This is one way of announcing that this is not a regular station wagon, since the vertical tailgate is such a well-known design feature of the Volvo V70 and XC70.

The incline of the tailgate also means that the roofline is truncated, making the vehicle look shorter and giving it a thoroughly modern sporty stance on the road. The tailgate splits into 70/30 proportions. The upper section is light and is easy to open and close, while the lower section can be used as a seat or a platform to access roof mounted accessories.

The bumpers of the XC90 seem to embrace the vehicle and the tough, dark colored, composite panels provide a protective cradle. This emphasizes the vehicle's higher ground clearance and its SUV character.

Interior with a Scandinavian flavor

The interior of the Volvo XC90 is characterised by airiness, space and quality materials. The large glass windows allow plenty of light to enter the passenger compartment, and the cleanness of the layout and interior trim further boosts the feeling of space and elegance.

Facing the driver is one of the car world's clearest and most ergonomically designed instrument panels. It is characterised by Scandinavian simplicity of line and functionality: plenty of information from a small number of meticulously designed instruments.

Compared with those found in a passenger car, the instruments and controls are angled slightly up towards the driver's eyes. Together with the high seating position, this enhances the feeling of control - the single quality that SUV buyers generally prize most highly.

The seats in the Volvo XC90 are designed to allow it to be easier to climb into and out of the vehicle.

Focus on flexibility

The interior of the Volvo XC90 offers what is perhaps the greatest flexibility in the SUV class. Despite its compact dimensions, the vehicle offers generous interior space. The Volvo XC90 can be ordered either as a five-seat or in seven-seat configuration.

No matter which variant the customer chooses, both the second and third rows of seats, as well as the front passenger seat, can be folded down to create an entirely flat luggage compartment.

The middle row of seats, designed like seats in a regular passenger car, has a three-part backrest with a 40/20/40 split to offer maximum flexibility. The middle seat in this row can be equipped with an integrated child booster cushion. In a 7-seater the child seat can slide forward so that it is positioned just behind the two front seats, thus improving contact between the child and the front seat occupants.

The third row features two separate, front facing seats, offering full comfort for adults of modest build or children.

"Everyone rides in Business Class in the Volvo XC90, nobody travels economy class," concludes Peter Horbury.

Exterior Styling Kit

For owners who want to reinforce the elegant, powerful image of their Volvo XC90 there is an Exterior Styling Kit, which is fitted by the dealer.

It consists of

Running Boards. Fitted along the sides and under the doors. The Running Boards, made of aluminum, help protect the sills from denting during tough driving. They also become footsteps when climbing into and out of the car.

Side décor. Colour-coded design kit that covers the front wheel arch, lower part of front and rear doors and the rear wheel arch. Increases the sporty image of the car and protects the side of the vehicle.

Rear skid plate. Further enhances the rugged image of the Volvo XC90, and highlights the ground clearance of the vehicle.

"Atlantis" 18-inch wheels Sporty six-spoke aluminium wheels.

Roof ribs. Seven rubber ribs mounted lengthwise on the roof.

Mud flaps. Mud flaps shaped to fit the wheel-arches of the vehicle. Effectively protects the sides of the vehicle from gravel thrown up by the wheels.

Crossbars. Aerofoil-shaped design roof load carriers, which are an asset to the car's appearance even when no roof load is being carried. Made of aluminum for an exclusive impression.

2002-06-24

påf

Environmental standards: among the cleanest SUVs on the market

- ULEV and ULEV II
- Interior Air Quality System
- Öko-Tex standard 100
- PremAir® - ozone-eater

Environmental care is one of the core values at Volvo Car Corporation.

That is why the engineering team faced an extra-tough challenge when Volvo developed the Volvo XC90, since SUVs are relatively large vehicles with powerful engines.

"We know that many of today's SUV owners are uncomfortable about the fact that their vehicles produce higher emissions and consume more fuel than most passenger cars do," says Hans Wikman, the Project Director behind the development of the Volvo XC90.

The Volvo XC90 will take the lead in the SUV segment as regards both fuel economy and emissions control. The 6-cylinder engine meets the American ULEV (Ultra Low Emission Vehicle) requirements, while the 5-cylinder petrol engine already meets ULEV II, a standard that doesn't apply until model year 2004.

What is more, the Volvo XC90 meets these standards in 50 American states, a clear demonstration that Volvo Cars regards the environment as equally important everywhere.

Adjustable valve timing

The low emissions and the low fuel consumption have been achieved through a number of interacting factors. Here are a few examples:

- All the engines are made of aluminum. This material is lightweight, which helps cut fuel consumption and thus emissions.
- The engines are of Volvo's latest low-friction generation. All the moving parts are designed to offer the least possible resistance.
- The cylinders' combustion chambers are designed to rotate the fuel/air mixture effectively and achieve high compression. This contributes to efficient combustion.
- Three-way catalytic converter.
- CWT (Continuously Variable Valve Timing). This system adjusts valve timing to suit current engine revs and load, thus exploiting the engine more efficiently. This in turn reduces fuel consumption and emissions. The 6-cylinder twin turbo engine, just like the 5-cylinder light-pressure turbo 2.5T unit, features CWT on both the exhaust and inlet sides.

The Volvo XC90 also takes care of the environment inside the passenger compartment itself. The climate unit can be supplemented with the automatic Interior Air Quality System, IAQS.

IAQS consists of a filter and a sensor. The former features a particle trap and an active carbon filter, removing particles such as pollen and unpleasant odours from the incoming air.

The sensor monitors the presence of substances such as nitrogen oxide, carbon monoxide and hydrocarbons in the air entering the cabin. If concentrations are high, the recirculation function is automatically activated to prevent these pollutants from entering the passenger compartment. The system thus contributes to cleaner air inside the vehicle and reduces the risk of allergy-related problems.

Ökotex and PremAir®

All the textiles and leather used in the Volvo XC90 are certified according to Öko-Tex standard 100. Öko-Tex is a European standard used throughout the world, which safeguards that the textiles are free from hazardous and allergenic

substances. Furthermore, the leather is tanned using natural plant substances and the interior door handles have a surface treatment that does not allow nickel contact with the skin.

PremAir®, is the name of Volvo's renowned "ozone-eater", and it is an important part of the overall environmental compatibility of the Volvo XC90. Ground-level ozone is formed through the combination of air pollutants and strong sunlight. It can cause respiratory problems in human beings and it also inhibits plant growth.

Volvo was the first carmaker in the world to tackle the problem of harmful ground-level ozone, with the introduction of PremAir®, in 1999. The car's radiator is coated with a thin catalytic film that converts up to 75 percent of the ground-level ozone as it passes through the radiator, converting it into oxygen.

2002-06-24

påf

Ground breaking audio system - for all passengers

- **Dolby Pro Logic II - the first in the car world**
- **DVD based navigation system**
- **Rear seat entertainment**

In the Volvo XC90, considerable importance has been attached to providing innovative infotainment. One result of this focus is that Volvo is the first carmaker in the world to launch Dolby Prologic II in a car audio system.

Volvo introduced the Dolby Pro Logic Surround Sound system back in 1997, when it was featured in the Volvo C70. It represented a revolution in mobile audio quality. Dolby Pro Logic II is a further development of the system, tailored specifically for the in-car audio environment.

Dolby Pro Logic II creates the conditions for optimum audio perception even for passengers in the rear seat, and the sound profile is both broader and more natural. The Volvo XC90 can be specified with up to 13 loudspeakers, one of which is an 8-inch 140-watt active subwoofer for better bass quality. The Alpine surround amplifier is rated at 305 watts and is combined with an in dash CD-player for either six discs.

Rear-seat passengers have access to their own control unit for the audio system, located conveniently in the C-post. There they can plug in their headphones and listen to a separate audio source than the one playing for, say, the front passengers.

Rear Seat Entertainment

The Volvo XC90 offers more than audio entertainment - it offers pictures as well. The passengers in rows two and three have access to a roof mounted DVD player with a 7-inch wide, retractable color monitor.

The design is extremely compact and the screen is lowered on powered hinges. The functions are remote-controlled and wireless headphones can be used to avoid disturbing other passengers in the car. The DVD player plays ordinary CDs as well.

Navigation made easy

The navigation system (option) is an important part of the infotainment unit on the Volvo XC90. The crystal-clear 6.5-inch widescreen display is recessed into the upper face of the dashboard, from where it pops up at the touch of a button in the steering wheel.

The Volvo XC90 is equipped with the latest generation of Volvo Navigation System, VNS. This means, for instance, that the system is DVD-based and features new ways of logging in the destination, for example via the postal code. A function whereby the system calculates the estimated time of arrival is also included, along with a map that is accurate down to 150 ft.

2002-06-24

påf

Volvo XC90

U.S. Market

ENGINES

Engine Type

Construction

Horsepower

Torque

Displacement

Valvetrain

Compression

Emission

Recommended fuel

Ignition Sequence

Engine management system

Engine Idle Speed

B5254T2

Inline 5-cylinder with
Light-pressure turbocharger
and intercooler

Aluminum block and
cylinder head

208@5000 rpm

236@1500-4500 rpm

2.5 Liter

DOHC, 4 valves/cylinder
Continuously Variable Valve Timing
(CVVT) on inlet & exhaust

9.0:1

Certified ULEV II
(Ultra-Low-Emission Vehicle II)

Premium

1-2-4-5-3

Microprocessor controlled fuel and ignition system with self diagnostics
670 rpm

B6294T

Inline 6-cylinder with
Twin turbocharger
and intercooler

Aluminum block and
cylinder head

268@5100 rpm

280@1800-5000 rpm

2.9 Liter

DOHC, 4 valves/cylinder
Continuously Variable Valve Timing
(CVVT) on inlet & exhaust

8.5:1

Certified ULEV II
(Ultra-Low-Emission Vehicle II)

Premium

1-5-3-6-2-4

650 rpm

TRANSMISSIONS

5-speed/4-speed adaptive automatic transmissions with Geartronic, electronically controlled, with lock-up and winter mode selection.

Ratio	AW55-51	GM4T65
First	4.66	3.28
Second	3.03	1.76
Third	1.98	1.12
Fourth	1.14	0.79
Fifth	1.02	-
Reverse	5.11	2.67

Automatic gearbox/final drive

PERFORMANCE

Gearbox

Acceleration, 0-60 mph (sec)

Top speed, mph

Fuel Economy (US EPA)

CO₂ lb/mile

AW55-51/2.86

Automatic

9.3*

128

n.a.

n.a.

GM4T65/3.69

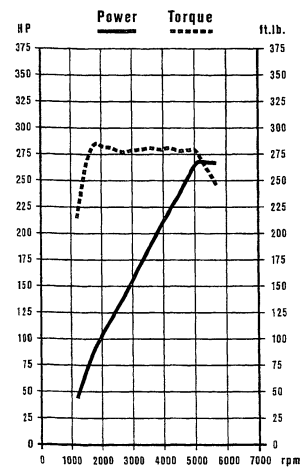
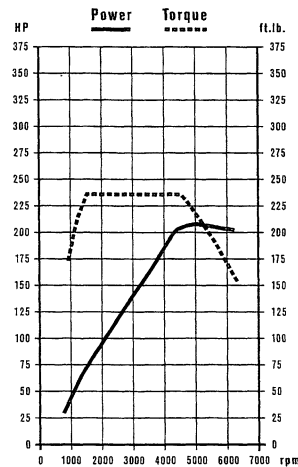
Automatic

8.7*

128

n.a.

n.a.



* Preliminary figures

Volvo XC90 STANDARD EQUIPMENT

	XC90	XC90 AWD T6
2.5L, 5 cylinder engine; light-pressure turbo with intercooler; 208 hp @ 5000 rpm; 236 ft-lbs torque @ 1500-4500 rpm	S	-
2.9L, 6 cylinder engine; twin-turbo with intercooler; 268 hp @ 5100 rpm, 280 ft-lbs torque @ 1800-5000 rpm	-	S
5 speed automatic with Geartronic	S	-
4-speed automatic with Geartronic	-	S
Dual zone, Electronic Climate Control, (ECC)	S	S
B-pillar ventilation	S	S
C-pillar ventilation (Standard with 7 seater)	S	S
Cabin filter	S	S
Tinted Windows	S	S
Whiplash Protection System (WHIPS)	S	S
Side Impact Protection System (SIPS)	S	S
Inflatable Side Curtain (IC) – coverage for 3rd row occupants when ordered with 7 seats	S	S
Driver and front Passenger Supplemental Restraint System – Dual Threshold	S	S
Side Impact Air Bag for Driver and Front Passenger	S	S
Seatbelt and key reminder	S	S
4-channel Anti-lock Brake System (ABS), Electronic Brake Distribution (EBD), Electronic Brake Assistance (EBA)	S	S
Front Crossmember for SUV-to-Car Impact Compatibility	S	S
Pedestrian Protection	S	S
ISO-FIX (LATCH) Attachment System – (2nd row outboard seats)	S	S
Roll Stability Control (RSC)	S	S
Dynamic Stability Traction Control (DSTC)	S	S
Grocery bag holder (5 seat version, NA on 7 seat version)	S	S
Seat belts: 3-point inertia reel with automatic pre-tensioners for all seating positions; front belts include force limiters	S	S
Volvo Guard Alarm	S	S
Safe Approach Lighting	S	S
Home Safe Lighting	S	S
Immobilizer, encrypted ignition key w/rolling code and autorelock	S	S
Security system with siren, battery back-up	S	S
Two step remote entry, central power door locks	S	S
Cargo Cover	S	S
HomeLink®	O	S
Daytime Running Lights (DRL)	S	S
Rear door child safety locks	S	S
Trip computer	S	S
Outside temperature gauge	S	S
8 way Power Driver and Passenger Seats	O	S
8 way Power Driver Seat with Manual Passenger Seat	S	-
Power seat memory, driver	S	S
Adjustable lumbar support	S	S
40/20/40 split rear seat that folds flat	S	S
Flat Folding Front Passenger Seat	S	S
Leather – Seating Surfaces	O	S
Siljan Textile/vinyl Upholstery – with inserts	S	-
Wood Inlays	S	S
Leather Steering wheel	S	S
Audio/Cruise controls in steering wheel	S	S
8 Cup holders (2, covered – front console; 2 adjustable, drawer-type – 2nd Row; 4 – behind 2nd Row/3rd Row)	S	S