

V8

PRESS INFORMATION • VOLVO XC90 V8 • 2004

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# VOLVO XC90 GETS STATE-OF-THE-ART V8 POWERTRAIN

The first V8 ever from Volvo Cars comes in an extremely compact package thanks to a number of smart solutions, including a 60-degree angle between the engine banks instead of the traditional 90-degrees. This makes a transverse installation possible - meaning that the frontal crumple zones in the XC90 can be kept intact.

The new V8 produces 315 horsepower and a massive 440 Nm of torque at 3900 r/min. It is the cleanest petrol V8 on the market today - meeting the American ULEV II demands.

The powertrain includes a new 6-speed automatic transmission and All Wheel Drive

with a world first - Instant Traction - for enhanced ability.

Volvo Cars plans to sell 15,000 Volvo XC90 V8 a year, with 75 percent of the total production going to North America.

The U.S. is the largest V8 market, followed by Canada and Mexico. Germany takes fourth place and Japan comes in fifth.

Sales will start in the U.S. in early 2005, and the Volvo XC90 V8 will be introduced gradually on other markets.

"Our V8 package feels immensely solid. When it comes to power and performance, we're in the same class as the very best in the segment. And we are sure that a large proportion of these customers will appreciate the fact that the power and driveability can be combined with high safety and good environmental properties" says Hans-Olov Olsson, President and CEO at Volvo Car Corporation.

Le tout premier moteur V8 de Volvo Cars se distingue par sa très grande compacité, fruit de plusieurs solutions astucieuses, dont une inclinaison de 60 degrés entre les deux rangées de cylindres, qui s'écarte du chiffre plus traditionnel des 90 degrés. Le moteur peut ainsi être monté transversalement, préservant les zones de déformation frontales de la XC90.

Le nouveau moteur V8 développe une puissance de 315 ch. pour un couple impressionnant de 440 Nm à 3900 t/min. Conforme aux critères des normes américaines ULEV 11, c'est le moteur V8 le plus propre actuellement.

Le nouveau moteur bénéficie d'une nouvelle transmission automatique à 6 vitesses et d'un système de transmission intégrale (AWD) avec une fonctionnalité inédite - la traction instantanée, pour de meilleures performances.

Volvo Cars prévoit de vendre 15 000 Volvo XC90 V8 par an, 75 % de la production totale étant destinée à l'Amérique du Nord.

Les États-Unis sont le plus gros marché pour les V8, suivi par le Canada et le Mexique.

Viennent ensuite à la quatrième place, l'Allemagne, et à la cinquième, le Japon.

Les ventes commenceront aux États-Unis début 2005, après quoi la Volvo XC90 V8 sera introduite progressivement sur les autres marchés.

« Notre version V8 est d'une solidité à toute épreuve. En termes de puissance et de performances, nous nous rangeons dans la même catégorie que les meilleurs de ce segment. Nous avons la certitude qu'une grande partie des clients apprécieront le fait que la puissance et la facilité de conduite peuvent aussi être associées à une sécurité élevée et à un grand respect de l'environnement », déclare Hans-Olov Olsson, Directeur général, Volvo Car Corporation.

## LA VOLVO XC90 REÇOIT UN MOTEUR V8 ULTRA-SOPHISTIQUÉ



Volvo Car Corporation

## PRESS INFORMATION

# Volvo XC90 with V8 powertrain – building further on success

- **V8 powertrain extends market potential**
- **The volume aim is 15,000 Volvo XC90 V8s a year**
- **75 percent of production to North America**

A Volvo XC90 with V8 power under the bonnet not only puts added performance on the tarmac – it also sharpens Volvo's competitive edge in the tough SUV segment.

In the USA, about 30 percent of all SUVs sold in the premium segment have V8 engines.

This means that five- and six-cylinder versions of the Volvo XC90 have thus far only exploited 70 percent of the market potential – yet still achieved a resounding success.

The 30 percent gap has now been covered.

“Our V8 package feels immensely solid. When it comes to power and performance, we're in the same class as the very best in the segment. What's more, we're sure that a large proportion of these customers will appreciate the fact that the power and driveability can be combined with high safety and good environmental properties. It's important that we can launch a V8 without compromising on our core values,” says Volvo Cars President and CEO Hans-Olov Olsson.

### **Powertrain with compact V8 and technological breakthrough**

Most of the attraction behind the new Volvo XC90 V8 lies in the powertrain, that is to say the engine in combination with a compact new six-speed automatic transmission and the world's first system for All Wheel Drive with Instant Traction™, which gives enhanced grip on poor surfaces.

Thanks to intelligent engineering, the engine is the most compact on the market – making it possible to install the new engine transversely within the existing crumple zones.

From the environmental viewpoint, this is the first launch of a petrol V8 that meets the American ULEV II vehicle emissions standard.

### **Spotlight on driving characteristics and performance**

The excellent safety and environmental properties add a healthy measure of extra spice to a V8 market where buyers often base their choices on emotional arguments such as driving pleasure, power – and even engine sound.

In the world of V8 development, engine sound is a science in its own right. A traditional American V8 has a throaty offbeat growl, while Europeans favour a slightly smoother, sportier rumble.

“Our V8 has what it takes to attract American buyers. That classical V8 throb is there, but it’s overlaid with a more sophisticated touch that clearly announces that this is a European premium SUV,” explains Hans-Olov Olsson.

### **Three-quarters to North America**

Volvo Cars plans to sell 15,000 Volvo XC90 V8s a year, with 75 percent of total production going to North America.

The USA is without comparison the largest V8 market, followed by Canada and Mexico. Germany takes fourth place and Japan comes in fifth.

Sales will start in the USA in early 2005, after which the Volvo XC90 V8 will be introduced gradually on other markets.

### **Award-winning sales success**

The Volvo XC90 has been an enormous sales success for Volvo Cars. The original production volume of 50,000 cars a year has been successively increased, and since spring 2004 annual XC90 production in the company’s Torslanda factory in Sweden has been raised to 90,000.

What is more, the Volvo XC90 has received more international awards in a shorter period of time than any other Volvo.

“When we introduced the Volvo XC90, we claimed that we were the first manufacturer with the next-generation SUV. Now we know that our customers share that view. The combination of a compact SUV with up to seven seats, a high level of safety, the driving properties of a passenger-car, and competitive environmental properties, has helped make the Volvo XC90 one of the automotive world’s most highly acclaimed models,” says Hans-Olov Olsson.

The Volvo XC90 V8 will be offered only in left hand drive version.

HÅ

2004-09-23

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Volvo Car Corporation

## PRESS INFORMATION

# Volvo XC90 gets the state-of-the-art V8 powertrain

- The first V8 from Volvo Cars – and extremely compact
- Transversely installed for optimum protective safety
- 4.4 litres and 232 kW/315 hp (311 SAE)
- 440 Nm at 3900 r/min
- First launch of a petrol V8 meeting ULEV II
- Exclusive engine design
- New 6-speed automatic transmission
- AWD with Instant Traction™ for enhanced ability – a world first

The Volvo XC90 reinforces its position as one of the most successful SUV models in the premium segment.

An entirely new powertrain featuring a V8 engine, 6-speed automatic transmission and the latest-generation AWD system further broadens the customer base for the Volvo XC90. The new Volvo XC90 V8 will make its debut at Paris Motor Show 23 September.

The new V8 engine marks a new turning-point in Volvo Cars' history. It is the first V8 the company has produced since it was founded in 1927, and the Volvo XC90 is the first model to be powered by the new engine.

“An SUV in the premium segment needs a V8, especially on the North American market where we sell about 60 percent of all the XC90s we make,” explains Hans Wikman, Vice President, Vehicle Line Large Cars.

One absolute requirement for the new V8 engine was that it had to be installed transversely in the engine compartment, just like all other Volvo engines.



“A transverse engine is helpful in maintaining the frontal crumple zones in the XC90 and thus not compromise on protective safety,” says Hans Wikman. For this reason, extremely compact external dimensions were essential for the new engine. This also explains the choice of just 60 degrees between the two banks of cylinders – as opposed to the more conventional 90 degrees.

The imbalance that is a natural consequence of a 60-degree ‘V’ configuration between the banks of cylinders is prevented by a counter-rotating balancer shaft.

### **V8 tailor-made for the XC90**

In order to maintain overall compactness, all the ancillary units such as the alternator are fitted directly onto the engine itself without any space-stealing brackets. The starter motor is fitted above the transmission for the same reason.

What is more, the exhaust camshafts are driven by secondary chains running off the inlet camshafts, saving additional space.

The left-hand cylinder bank is offset half a cylinder ahead of the right bank, contradicting normal practice in the automotive world – so the engine can slot neatly into the structural beam network of the XC90 and thus enhance collision safety.

“We’ve tailored this V8 specifically for the XC90,” confirms Hans Wikman. The result is a V8 that is just 754 mm long and 635 mm wide – the most compact on the market compared to engines of equivalent volume.

As a result of these compact dimensions and the fact that both the block and cylinder head are cast in aluminium, Volvo’s new V8 weighs just 190 kg – an important consideration when aiming for low fuel consumption.

### **First launch of petrol V8 to meet ULEV II**

The new engine from Volvo is the cleanest petrol V8 on the market today. It meets the American ULEV II (Ultra Low Emission Vehicle, stage II) – which no other petrol V8 has yet managed.

“This is an achievement we’re really proud of,” says Jörgen Svensson, Chief Programme Engineer.

ULEV II have been met with the help of:

- Four catalytic converters. Two of these are of Close Coupled Catalyst type and fitted to one exhaust manifold each. The other two are installed under the car floor.
- Higher idling speed at cold start, about 1250 r/min, and optimised ignition for faster warming of the engine at cold start and thus also the catalytic converters
- Lean air/fuel mixture for lower emissions at cold start

The result is extremely low emissions before the catalytic converters are activated – which takes place just 15 to 20 seconds after the engine starts up.

“It is during these 15–20 seconds that the majority of the emissions of environmentally harmful substances take place,” explains Jörgen Svensson.

The 4-valve engine also features continuous variable inlet and exhaust valve timing (CVVT). This system adjusts the valve opening times so they suit the engine’s current revs and load conditions. The engine is thus utilised more efficiently, cutting fuel consumption, lowering emissions and increasing performance

### **Distinct V8 sound**

The Volvo XC90 V8 produces 315 horsepower and its torque – the most important characteristic of a V8 engine – is a massive 440 Nm at 3900 r/min. And at the sort of revs at which most driving takes place, around 2000 r/min, no less than 370 Nm of torque is at the driver’s disposal.

To increase the low end torque, the Volvo V8 has a valve in the inlet manifold that is closed below 3200 rpm. In this mode the air flow between the two cylinder banks is cut off, which creates a broader and more even torque curve.

“We chose to give our new V8 a sporty yet sophisticated appeal, with masses of power in reserve even as the revs rise,” explains Jörgen Svensson.

Acceleration from 0 to 100 km/h takes 7.0 seconds and fuel consumption is 13.0 litres/100 km (preliminary figures). Top speed is limited to 210 km/h (190 km/h in the USA).

The engine note is an important detail for buyers of a car with V8 power, and this is something to which Volvo Cars paid careful attention during the development of the new engine. In the hunt for that characteristic V8 rumble, it is the position of the inlet manifolds that is the main deciding factor.

“Our new V8 has just the right sort of charismatic off-beat V8 burble, but it is somewhat more muted in the European fashion rather than producing the more traditional meaty American throb. We feel this provides better audio comfort for the car’s occupants,” comments Jörgen Svensson.

### **New 6-speed automatic transmission**

The power from Volvo’s V8 engine passes through an entirely new 6-speed automatic transmission dimensioned to handle the high torque. This unit too is of particularly compact dimensions so as not to interfere with the car’s overall structure. Sixth gear is a pure overdrive ratio to ensure quiet cruising and low fuel consumption.

“We get simply massive ‘take-off’ force with this auto transmission,” says Jörgen Svensson.

“And at the same time, it has a very sporty nature and does not change up in the middle of a curve, for instance, but instead stays in the same gear until the bend straightens out.”

The new 6-speed transmission is of Geartronic type, which means that it can also be shifted manually. There is also a possibility for Lock-up, and slipping Lock-up, on all gears.

To ensure the optimum balance between driving properties, performance and fuel consumption the engine and transmission are treated as one unit. This is achieved with new software developed by Volvo, called CVC (Complete Vehicle Control). CVC is part of the integrated software package used, both in the engine control module and the transmission control module.

Among the many benefits of this approach was the possibility of integrating an overdrive 6th gear while still maintaining good driving performance by adjusting functionality, gear and torque to suit current conditions.

#### **AWD with Instant Traction™ – a world innovation**

The third ingredient in the new Volvo Cars V8 powertrain is the electronic AWD four-wheel drive system, which now features Instant Traction™. This new technology – which Volvo Cars is the first automaker in the world to introduce – improves the scope for quick getaways and provides enhanced traction on slippery surfaces. It has been developed by the Swedish company Haldex.

“A non-return valve allows us to use software to control the base torque that is programmed into the AWD system. When starting off from standstill, 80 Nm of torque is pre-charged in the system since the non-return valve prevents the unit from becoming totally drained of hydraulic fluid.

“This reduces the usual wheelspin of about one-seventh of a turn that the current system permits before the power is delivered to the rear wheels,” explains Jörgen Svensson.

The AWD system has also been upgraded to handle the power of the V8 engine. Maximum short-term torque at the rear wheels has been increased by 50 percent compared to current XC90

### **Specific V8 exterior design**

“Masculine without being macho, powerful without being aggressive.” That was how Volvo Cars’ chief designer at the time, Peter Horbury, characterised the appearance and stance of the Volvo XC90 at its launch in 2002.

On the new XC90 V8, a V8 badge appears in the grille and on the tailgate to indicate the power under the hood. But there are also other design details that set the XC90 V8 apart.

- New 18" wheels
- Side mouldings and door handles painted in the car’s body colour
- Graphite-grey grille
- New chrome-plated trim around the bumper air intake
- New twin exhaust pipes

Volvo’s design department has also taken considerable care over the appearance of the engine itself.

The V8 is the first example of a new design language for the engine compartment in Volvo’s coming models.

“We want there to be no doubt that this is a V8, and a modern and technically advanced V8 at that. We therefore chose not to hide the engine beneath large covers but instead to enhance the V-configuration and the eight inlet pipes,” says Anders Myrberg, head of engine compartment design at Volvo Cars.

On the inlet manifold, Volvo’s classic ‘iron’ symbol can be clearly seen in relief against a background of brushed aluminium and complemented with an elegant V8 emblem.

Påf

2004-09-23

# Volvo XC90 V8

## ENGINE

Type	<b>B8444S</b>
Configuration	8 cylinders naturally aspirated
Displacement, cm <sup>3</sup>	Transversal, All Wheel Drive
Engine cylinder block material	4414
Cylinderhead material	Aluminium
Combustion chamber type	Aluminium
Compression ratio	Pent roof
Valves, no/cylinder	10.4:1
Camshafts	4
Engine management system	4
Ignition sequence	Microprocessor controlled fuel and ignition system with self diagnostic
Engine idling speed	1-8-4-3-6-5-7-2
Fuel, rec. octane	675rpm
Max output, kW (hp)/rpm.	91-98 RON
Max torque, Nm/rpm.	232(315)/5850
	440/3900

## TRANSMISSION

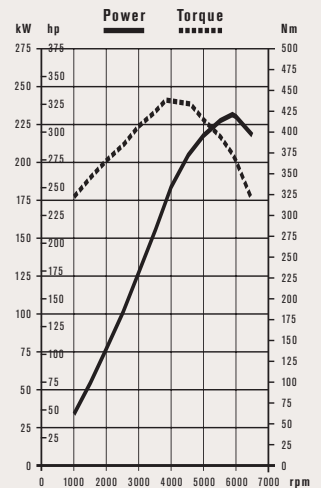
6-speed adaptive automatic transmission with Geartronic, electronically controlled, with lock-up and winter mode selection.

Ratio	AW F21
First	4,15
Second	2,37
Third	1,56
Fourth	1,16
Fifth	0,86
Sixth	0,69
Reverse	3,39

## PERFORMANCE

Gearbox	AW F21
Acceleration, 0-100 km/h (sec)	7.3 (preliminary figure)
Top speed, km/h	210* (EU) 190* (US)
Fuel consumption l/100 km (EC 199/100, combined)	13.0 (preliminary figure)
CO <sub>2</sub> g/km	310 (preliminary figure)

\*Electronically controlled top speed



## 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		12.5 m
Turns of steering wheel end to end		2.7
Braking system		ABS system with EBD. Ventilated discs front and rear.
Brake disc diameter		
Front/Rear		336/308 mm

## MEASUREMENTS AND VOLUMES

Exterior measurements (cm)		Interior measurements (cm)	
Length	480	Headroom with sunroof (front/rear)	101/99
Width	190	Headroom without sunroof (front/rear)	102/100
Height	174	Passenger compartment width at shoulder height (front/rear)	148/146
Wheelbase	286	Luggage volume, litres (ISO V213/V211) 5-seat/7-seat	613/249
Track, front	163	Load length 5-seat/7-seat	112/57
Track, rear	162	Load length with rear seat(s) folded down	189
Ground clearance	21.8	Load length with rear seat(s) and front passenger seat folded down	291
Load height	87	Height of luggage compartment	87
<b>Weights/Miscellaneous</b>		Width of luggage compartment between wheel arches	113
Weight, kg 5-seat/7-seat	1982/2046		
Fuel tank, l	80		
Max. trailer weight, kg	2250		
Drag coefficient	0.36		