

Press Release

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The new Volvo S80 powered by new in-line 6-cylinder engine

For immediate release

GÖTEBORG (January 31, 2006) – Volvo Car Corporation has unveiled a new, efficient, in-line 6-cylinder engine featuring an advanced induction system that contributes to both good performance and impressive fuel economy. Through innovative engineering, the compact engine can be installed transversely in the 2007 Volvo S80's engine bay, a design that contributes to the new luxury car's performance, interior space and collision safety.

The compact 6-cylinder engine, designed by Volvo Cars, features a main structure that is made entirely of aluminum. In spite of its compact dimensions, the new engine has a larger displacement than its predecessor -- 3.2 litres compared to 2.9 litres. The new engine's output has also been improved, with 232-horsepower and 221 lb.-ft. of torque, representing an increase of 41-horsepower and 30 lb.-ft.

"The engine has been designed to be mated to the new Volvo 6-speed automatic transmission," says Derek Crabb, Vice President Powertrain at Volvo Cars. "And the entire driveline has been designed together with the rest of the car to create a harmonious, high-class driving experience in every respect."

Two engines in one

The engine features a range of technologies designed to improve fuel efficiency and power delivery. Through an advanced valve train and a variable intake system, the engine can be exploited efficiently throughout the rev range, improving throttle response.

The valve train features Variable Cam Timing (VCT) and Cam Profile Switching (CPS) to control valve lift and duration on the inlet side – two key elements in providing the engine with excellent flexibility. CPS determines valve lift; the VCT system controls duration over a wide range of operation.

With CPS, the camshaft is designed to lift the inlet valves to two different heights, depending on engine speed and load. In normal driving with normal throttle opening and low engine revs, fuel consumption is modest yet torque is sufficient to provide good drivability.

In more enthusiastic driving, which involves full throttle and high engine revs, the engine response is near instantaneous, providing a thrust of power at both low and at high engine speeds.

"In principle, Cam Profile Switching creates two engines in one," explains Crabb. "We can unite widely differing demands on the engine, and easily meet the requirements of customers with entirely different wishes. For instance, we can satisfy customers who prioritize performance as well as those who are more interested in driving comfort and fuel economy with equal ease."

A Variable Intake System (VIS) has been equipped with two throttle flap valves which adjust the intake manifold volume to suit the current driving situation. This results in a uniformly high and broad torque curve.

“Through precise interplay with the flap valves we actually get three different torque curves that are integrated with one another,” says Crabb. “Consequently, we can exploit the engine’s capacity to the maximum and extract the highest possible power throughout the rev range. The result is alert response to the accelerator pedal at both low and high speeds, with generous power and good drivability.”

Compact format contributes to impressive safety

Despite the engine’s 3.2 litre displacement, the exterior dimensions are extremely compact. The complete engine package is only about 3 mm (0.1 inches) longer than the Volvo 5-cylinder engine. The total engine length is less than 625 mm (25 inches).

“A compact format contributes to safety,” explains Crabb. “It is particularly important that the engine takes up minimal space longitudinally in the vehicle. Volvo’s engines are fitted transversely and a compact engine thus has more space to move inside the engine compartment in the event of an impact that deforms the car’s front. This helps reduce the risk of engine penetration into the passenger compartment.”

The engine itself cannot be made all that much smaller since the cylinder spacing and block structure are roughly the same as in the five-cylinder engine. Instead, the focus was on building the entire installation, encompassing the engine, automatic transmission and ancillaries, in as compact a package as possible. One additional condition that had to be taken into account was that the transmission would be a six-speed automatic.

Integrated drive system with shaft-in-shaft design

The compact dimensions of the transversely mounted, in-line 6-cylinder engine are ensured by locating the ancillaries, such as the power steering pump and air conditioning compressor, behind the engine and above the gearbox. Consequently, there is no front-end drive of the ancillaries. Instead they are driven via gears at the rear end of the crankshaft. This engineering solution is known as Rear End Ancillary Drive (READ). The alternator is direct-driven and installed on the engine block. This solution means that the entire engine and transmission package takes up minimum space, particularly in the car’s longitudinal direction.

By designing the drive system in the form of a small gearbox with an intermediate shaft inside the driveshaft – known as a shaft-in-shaft design – it was possible to ensure a very short package. The two shafts are driven by different gears that give them different speeds (one speed for camshaft drive and one for the ancillaries).

“We are very proud of this compact solution,” relates Crabb. “A lot of highly advanced development work was required in order to arrive at a design that ensures smooth and quiet operation.”

The vibration damper, which compensates for vibration in the engine’s relatively long crankshaft, has been moved inside the engine block. The Internal Viscous Damper (IVD) is a fluid type – something not unusually found in passenger cars.

“All told, the new 6-cylinder engine offers a premium experience in every respect,” comments Crabb. “This applies to its performance and fuel efficiency, and also to its driving comfort and the sound of the engine. The fact that the engine’s design also helps enhance safety isn’t something the customer usually thinks about, but it is naturally a central part of the Volvo product concept.”

Built in Wales

The new 6-cylinder engine will be built in Ford’s modern engine factory in Bridgend, Wales. The factory was built in 1980 and had already manufactured ten million engines by 2001. In recent years, considerable investments have been made to meet the stringent quality requirements imposed by Ford’s Premium Automotive Group (PAG).

“Bridgend is a dedicated engine production unit,” explains Crabb. “The factory builds many of the six- and eight-cylinder engines for the PAG brands. Although the new Volvo engine is being built in Bridgend, it was specified, designed, engineered and developed entirely by Volvo. The engine will start production in March, 2006.”

Engine specifications

Engine type: 6-cylinder in-line engine, gasoline, normally aspirated

Engine location, drive: Transverse, front-wheel drive

Cylinder displacement: 3,192 cc
Cylinder bore x stroke: 84 mm x 96 mm
Engine block, material: Aluminum
Cylinder head, material: Aluminum
Valves per cylinder: 4
Number of camshafts: 2
Maximum power output: 232-horsepower at 6,300 rpm
Maximum torque: 221 lb.-ft. at 3,500 rpm
Fuel injection: Port Fuel Injection (PFI)
Fuel consumption: TBD
Emissions levels: ULEV II, Euro 4
Weight: 180 kg (396 Lbs)

Volvo Cars of Canada Corp. is part of the Volvo Car Corporation of Göteborg, Sweden. The company provides marketing, sales, parts, service, technology and training support to the 43 Volvo automobile retailers across the country. The company's product range includes the flagship S80 luxury sedan, the versatile V70 wagon, the S60 sports sedan, the compact and sporty S40 and V50, and an XC-line of vehicles that includes the rugged XC70 and the award-winning XC90 sport utility vehicle. For 2006, the company is proud to introduce the second-generation C70 convertible with a new retractable three piece hardtop.

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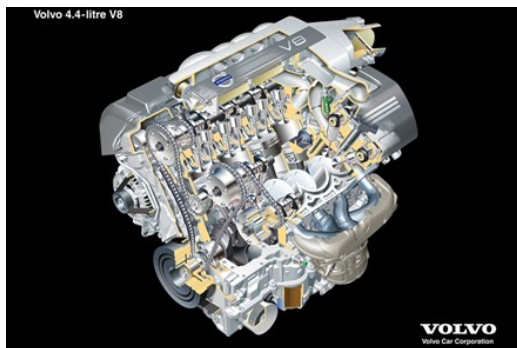
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