

## Press Release

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# Upgraded D5 engine with enhanced performance and reduced fuel consumption

The upgraded versions of the Volvo V70, XC70 and S80 are the first in the model range to feature sharpened versions of the five-cylinder D5 and D3 turbodiesels.

In the D5 engine Volvo Cars' engine experts have boosted performance and torque from 205 hp/420 Nm to 215 hp and 440 Nm while at the same time reducing fuel consumption by eight percent.

This means that the fuel consumption of the Volvo S80 D5 with manual gearbox and start/stop is now just 4.9 l/100 km (EU Combined), corresponding to 129 g of CO<sub>2</sub> per kilometre.

The quest for better driveability combined with lower fuel consumption and less environmental impact has led to increased focus on internal friction inside the engine.

"It's actually all about improvements in several areas that together make the cars both more enjoyable and cheaper to drive. This is the science of the small incremental steps. The engines are already so optimised that it takes many man-hours to identify and refine the tiny details that can make them even more efficient," says Derek Crabb, Vice President, Powertrain Engineering at Volvo Cars.

### Already best in class in 2008

With advanced solutions such as sequential twin-turbo technology, ceramic glowplugs and piezo-electric fuel injectors, the new five-cylinder 2.4-litre D5 turbodiesel had among the best fuel economy figures in its segment when it was presented in the Volvo S80 at the end of 2008. What is more, it was the first Euro 5 engine in its class.

At its introduction, the high-performance D5 engine offered 205 hp and maximum torque of 420 Nm.

One new feature was a twin-turbo setup with two different-sized turbochargers operating in tandem to provide added power across a wider rev band. This configuration gives alert response and fast, powerful acceleration high up the rev range.

Advanced injection technology using piezo-electric fuel injectors was another new feature, ensuring highly precise distribution of fuel in the combustion chamber. This promotes efficient fuel incineration and low emissions. At the same time, this technology and its efficient combustion system help create a pleasant engine note.

### Scaled-down D3 with shorter stroke

The medium-performance D3 with 163 hp and 400 Nm of torque was introduced in the Volvo S60 and V60 in 2010. It is in principle the same engine as the 2.4-litre version, but with a shorter stroke that reduces displacement to 2.0 litres.

Its injection system has the same type of piezo-electric fuel injectors as the D5, but tailored for the smaller engine. The injectors reduce combustion with exceptionally quick and precise injection sequences under high pressure. The result is particularly effective combustion.

In order to give the car even better driving properties, it is fitted with a variable-geometry turbocharger.

### A range of upgrades

Now upgraded versions of both engines are being launched to coincide with the latest enhancements to the Volvo V70, XC70 and S80.

The refined D5 engine now offers 215 hp and maximum torque is no less than 440 Nm, while the

D3 remains at 163 hp and 400 Nm. However, the two-litre diesel engine's driveability is now far improved thanks to fine-tuning of the turbocharger. This is an excellent example of the fact that efficiency enhancement in modern combustion engines is now taking place at microscopic levels. "When comparing modern diesel engines, torque is of far greater interest than the number of horsepower. It is the available torque that gives the diesel the sort of acceleration and potent driveability that many petrol engines can barely match," explains Derek Crabb.

### **The enhancements in a nutshell**

Most of the latest engine-related improvements apply to both the D5 and D3 engines:

- Both the camshafts and connecting rods have been weight-optimised, that is to say they do the same efficient job using a smaller amount of steel.
- The new piston rings are of low-friction type.
- The oil pump is chain-driven.
- With the piston cooling valves controlled solely by demand instead of opening regularly, consumption can be reduced.
- The new vacuum pump has been optimised to affect the engine as little as possible.
- The D5 engine now gets the same lighter type of connecting rod that the 2-litre D3 had when it was introduced in 2010.
- All six-speed manual versions also get start/stop, which switches off the engine when the car is at a standstill. The engine fires up immediately when the driver presses the clutch pedal.
- All variants are also available with a six-speed automatic transmission.
- In autumn 2011 the Volvo S80 and V70 with D3 engine and automatic transmission will become available with the start/stop function.

### **Lower fuel consumption**

The improved driving properties of the turbodiesels are accompanied by lower fuel consumption figures for both engines. The upgraded D5 engine, for instance, uses around eight percent less diesel fuel than the previous variant in an S80 with manual gearbox.

This means that the fuel consumption (EU Combined) of a Volvo S80 D5 is now just 4.9 l/100 km (129 g CO<sub>2</sub>/km) with manual gearbox and start/stop. The corresponding figures for the automatic version are 6.0 l/100 km (158 g/km).

The figures for a Volvo V70 are 5.1 l/100 km (134 g/km) with the manual gearbox and 6.2 l/100 km (164 g/km) with the automatic. Fuel consumption in the XC70 is 5.6 l/100 km (149 g/km) in the FWD version with manual gearbox and 6.8 l/100 km (179 g/km) with the automatic.

The corresponding figures for the D3 engine with manual gearbox are 4.9 l/100 km (129 g/km) in the Volvo S80, 5.2 l/100 km (137 g/km) in the V70 and 5,5 l/100 km (144 g/km) in the XC70 (DRIVE version).

### **DRIVE engine with increased performance**

The four-cylinder 1.6-litre diesel is now available in a Euro 5 variant with horsepower increased from 109 to 115. Maximum torque remains at 270 Nm. This engine is fitted to the DRIVE variants of the Volvo S80 and V70, both with manual gearbox, start/stop and CO<sub>2</sub> emissions of 119 g/km.

### **FlexiFuel on certain markets**

In certain markets, both the S80 and the V70 can also be specified with a 1.6-litre engine in an ethanol-powered FlexiFuel version. The customer can choose between Powershift and a manual gearbox.

## **Keywords:**

Press Releases, 2012, XC70 (2008-2016), V70 (2008-2016), S80 (2008-2016)

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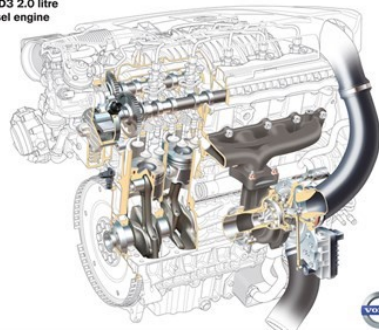
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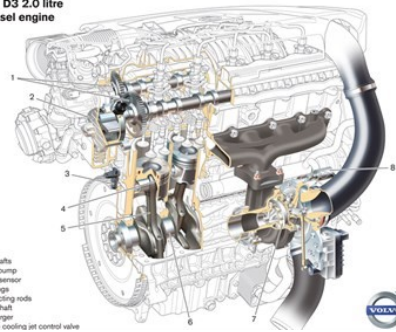
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