

## Press Release

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### T5 - 2.0 GTDi PETROL ENGINE

- 2.0 litre four cylinder petrol engine, producing the same power as a 2.5 litre five cylinder petrol engine
- Industry's smallest turbo in relation to engine's power output
- Performance and power with reduced emission and fuel consumption

To complement the newly introduced 150PS T3 and 180PS T4 1.6 GTDi engines, and the already well established 304PS T6 petrol engine, Volvo has developed a new 2.0-litre GTDi T5 petrol engine. This new engine delivers 240PS and a healthy 320 Nm torque and is available in the all-new S60, and V60, XC60, V70 and S80. The engine is coupled to a six-speed manual gearbox on the all-new S60 and V60, V70 and S80 while Volvo's six-speed Powershift automatic transmission is also available on these models and fitted as standard on the XC60.

New in-house-developed turbo technology, direct injection and twin variable camshafts produce a unique combination of low fuel consumption, low emissions and a high and broad performance range, all packaged in a very compact format.

Paul Welanders, acting Senior Vice President Product Development at Volvo Cars says, "We have succeeded in making a four-cylinder engine that is as powerful as a 2.5-litre five-cylinder unit - but much more energy-efficient. This is a welcome development both for the environment and for those customers who want high performance and good driveability. One of the most important explanations behind the result is our patented new turbo system which has been tailor-made for smaller, more energy-efficient engines."

The turbocharger is the market's smallest in relation to the engine's maximum power output. The turbo not only offers excellent performance, it also improves after-treatment of the exhaust gases. Another new feature is that the exhaust manifold and turbo are made of sheet steel rather than a heavier casting. Steel is lighter, easier to form and, above all, the system has less heat radiation owing to the layer of extra insulation. This permits high temperature in the gas flow and thus more efficient combustion without noticeably raising engine compartment temperature. It also helps with low-rev torque without compromising high peak power.

A manifold made of sheet steel is nothing new but thus far it has only been used in combination with a cast turbo housing. The new fully integrated sheet steel turbo system is a world first and has been patented by Volvo.

The engine block and cylinder head are made from aluminium while the linings are manufactured from cast steel. The intake manifold is made from glass-fibre reinforced polyamide to reduce weight.

In conventional petrol engines, the fuel is injected into the intake manifold before the intake valves. With direct fuel injection, the petrol is instead injected directly into the combustion chamber with a relatively high pressure of 120 bar for a petrol engine. Direct injection in a petrol engine with a turbocharger creates a more efficient engine with high low-revolution torque and high peak power from a comparatively low cylinder capacity. This has resulted in Volvo being able to offer a 2.0 litre four cylinder engine with the same performance as Volvo's previous 2.5 litre turbocharged five cylinder engine.

Lower cylinder capacity results in lower friction for the relevant workload required to perform. One of the advantages with a direct-injection engine is that the gas mixture in the combustion chamber can be kept cooler in comparison with a conventional port-injection engine. This results in a higher

resistance to knocking which can be utilised to increase engine power.

Another advantage of direct injection includes improved fuel supply direct into the cylinder. In port-injected engines, the fuel can line the walls of the intake and not reach the cylinder at the required time during fast engine speed and load changes, direct injection cures this by directly supplying the cylinder.

Volvo's six-speed twin-clutch Powershift transmission available on the T5 combines the manual gearbox's efficiency and driving dynamics with the automatic transmission's smoothness and convenience. Clutch operation is coordinated so that no torque losses arise during gear-changes. The gearbox disengages the gear if the driver releases the accelerator when the car is rolling in order to create less rolling resistance and improve fuel consumption. The result is the same comfort and seamless drive as a conventional automatic transmission, combined with the performance of a manual gearbox.

The T5 also benefits, as do all Volvo's current engines, from 'Regenerative Charging' which uses a monitoring system located on the car's main battery terminal to ascertain the best time to charge the battery. During braking, the car's own kinetic energy is used to charge the battery without drawing it from the engine, thus putting less strain on the engine and reducing fuel consumption by up to 1.5 per cent. This is used to further enhance the environmental credentials of this new engine.

#### Engine specifications 2.0 GTDi T5:

Engine type	4-cylinder petrol turbo
Displacement	1999 cm <sup>3</sup>
Bore	87.5 mm
Stroke	83.1 mm
Compression ratio	10.0:1
Valves per cylinder	4
Camshafts	DOHC
Max power output	240 PS
Max torque	320 Nm / 1800-5000 rpm
Emissions	Euro 5

NB: Pricing, performance and economy data for each model can be found in the included price lists.

## Keywords:

Old S60, Old V60, Volvo XC60, Press Releases, 2011, V70 (2008-2016), S80 (2008-2016)

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