

## Press Release

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# Volvo Car Corporation's technological future: New vehicle architecture and focus on four-cylinder engines

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Volvo Car Corporation's technological future is based on two in-house developed strategies:

- A scalable vehicle architecture which in principle means that most Volvo models can be built on the same production line irrespective of vehicle size and complexity.
- A new engine range consisting solely of four-cylinder petrol and diesel engines.

The innovation programme also includes a new Flywheel KERS (Kinetic Energy Recovery System) prototype.

"We're now taking our technological future into our own hands. Both our new architecture and the new engine range will enable us to be on par or even beat our toughest competitors in crucial areas such as driving dynamics and fuel efficiency," says Peter Mertens, Senior Vice President Research and Development at the Volvo Car Corporation.

### **Own Scalable Product Architecture**

The Volvo Car Corporation is promoting economies of scale within the company's own model range via a separate architecture for most of its products.

Within the new joint SPA (Scalable Product Architecture) there are several platforms, groups of cars that share the same basic chassis structure, seat frame, electrical system and driveline. These platforms are the basis for different vehicle clusters, that is to say a number of complete car models. In today's model range, for instance, the Volvo S60, V60 and XC60 form one cluster. It's all about developing a model range consisting of cars based on the same joint modules and interfaces, scalable systems and components, and built in a flexible production system.

"SPA gives us a fresh technological start. When the first SPA model is launched in a few years' time, about 90 percent of its components will be new and unique. What is more, we're raising the bar when it comes to quality and technology level in every area. We will be fully on a par with the very toughest competitors," says Peter Mertens.

In addition to the industrial benefits of common vehicle architecture there are also significant product related advantages:

- Weight
- Electrification
- Driving dynamics
- Design proportions

### **Weight reduction of**

With SPA, the Volvo Car Corporation takes the lead in automotive lightweight design. The highest degree of high strength steel qualities in the industry to date is combined with the extensive use of aluminium in the front structure, doors, chassis and power train.

This means that upcoming SPA models will be 100-150 kg (2-330 lb) lighter than current models of the same size.

The new architecture enables electrification on all levels, from start/stop technology to pure electric drive, without intruding on interior space and load space.

New chassis technologies combined with lower weight and improved weight distribution will make it possible to compete with the very best when it comes to driving dynamics - without compromising ride comfort.

The electrical architecture enables all future multimedia and connectivity solutions - and it forms the backbone of the Volvo Car Corporation's drive to reinforce its leading position in active safety.

### **New proportions promote exciting design**

Overall packaging efficiency has been improved to support more attractive design proportions, while at the same time enabling significant improvements in aerodynamic drag.

Design limitations as regards wheelbase, overhang, vehicle height and the height of the front are changed. This creates greater freedom to give forthcoming Volvo models more exciting lines.

"The proportions can give entirely different appearances even though the components used are exactly the same. The comparison between a donkey and a thoroughbred racehorse is an excellent example: each has a head, a body and four legs. But they are perceived entirely differently because of the proportions of their individual body parts and between their body parts," explains Peter Mertens. He adds:

"For us the new architecture means we can sharpen our design language still further, carving out just the right athletic and dynamic aura that is so important to the most demanding prestige car buyers. Concept You is an excellent example of this. It shows what can be achieved with the new architecture."

### **Four-cylinder engines with the performance of today's sixes**

The new engine range, known as VEA (Volvo Environmental Architecture), consists solely of four-cylinder engines which in certain configurations will benefit from enhanced performance through electrification or other spearhead technology.

"It is time to stop counting cylinders. Focusing on four-cylinder engines is the perfect way to quickly reduce CO<sub>2</sub> emissions and fuel consumption without compromising customer expectations on driving pleasure and performance," comments Peter Mertens, and adds:

"We're aiming to develop four-cylinder engines with higher performance than today's six-cylinder units, along with lower fuel consumption than the current generation of four-cylinder engines."

### **Reduction of parts, weight and fuel consumption**

VEA is a modular range of diesel and petrol engines. Diesel common rail and petrol direct injection are standard. Several levels of turbo charging open up for flexibility that encompasses the whole range from high power and torque variants to fuel-efficient derivatives. In order to cover all customer requirements, certain engines will gain added performance via hybrid drive or other spearhead technology.

The modular format is based on a standard of 500cc per combustion chamber for optimum thermodynamics. It could also be used to develop three-cylinder engines.

VEA offers several advantages:

- The number of unique parts is reduced by 60 percent. This promotes manufacturing efficiency, quality assurance and efficiency of new development projects.
- The new powertrains are up to 90 kg (198 lb) lighter than the present ones.
- Fuel economy is improved by up to 35 percent.
- Modularity and compact transverse design are also ideal for future electrification developments.
- The engines will meet all known emissions legislation worldwide up to 2017.

"At present engine installation varies with each car model. With this holistic solution tomorrow's technology development can focus entirely on engine performance instead of diverting attention to installation modifications. What is more, assembly in the factory will be easier. The development costs are initially high but after that they drop sharply," explains Peter Mertens.

With VEA, the Volvo Car Corporation also introduces a new 8-speed automatic gearbox, that gives the driver a refined drive and excellent fuel economy.

### **First out with road tests of flywheel technology**

Later this autumn, for instance, the Volvo Car Corporation will become one of the first carmakers in the world to test the potential of flywheel drive on public roads.

Flywheel drive, also known as Flywheel KERS (Kinetic Energy Recovery System), is fitted to the car's rear axle, while the engine drives the front wheels. When the brakes are applied, the resulting braking energy causes the flywheel to spin at up to 60,000 revs a minute.

Once the car starts moving again, the flywheel's rotation is transferred to the rear wheels via a specially designed transmission unit. With this arrangement the total power of the engine and KERS is applied to all four wheels.

The energy stored in the flywheel can then accelerate the car or be used to propel the vehicle

once it reaches its cruising speed.

"This system offers the driver an additional 80 horsepower, giving a four-cylinder engine the acceleration of a six. What's more, it has potential for reducing fuel consumption by up to 20 percent. Flywheel technology would be a suitable solution for our large cars such as the Concept You sedan," says Peter Mertens.

## Keywords:

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Descriptions and facts in this press material relate to Volvo Cars' international car range. Described features might be optional. Vehicle specifications may vary from one country to another and may be altered without prior notification.

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