

## Press Release

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# The 2007 Volvo S80 Safety

### **Major advances in active and passive safety usher in a new generation of protection**

In nearly every area of occupant safety – from highly sophisticated crash energy management and new side impact air bags, to swiveling headlights and a new generation of support systems to help the driver make the right decisions – the 2007 Volvo S80 expands Volvo Car Corporation's leadership in both active and passive safety.

In the tradition of the first generation Volvo S80 luxury sedan that introduced innovations like the Inflatable Curtain (IC) head and upper body protection, and the ground-breaking Whiplash Protection System (WHIPS) seating, the second generation S80 is a showcase for the company's safety research and development.

The long list of innovations in protective (passive) safety is impressive and includes sophisticated crash energy absorption systems in the structure, the next generation of WHIPS whiplash mitigation, new Side Impact Protection System (SIPS) side airbags with separate chambers to protect chest and hips, and new protection for pedestrians.

Emphasis on preventative (active) safety has resulted in the introduction of such features as advanced functions to help shorten braking distance, swiveling bi-Xenon headlights that follow the car's steering, collision warning systems and the world's first remote car monitor that allows the car to send messages to an owner outside the car.

#### **Active safety**

"The next generation S80 features a patented advanced body structure, offering high torsional rigidity which very effectively contributes to impact energy absorption," says Silvia Güllsdorf, S80 Project Director at Volvo Cars.

The patented front body structure in the Volvo S80 has been divided into zones, each with a different task during the deformation process in a collision. The outer zones are responsible for most of the deformation. The closer the collision forces get to the passenger compartment, the less the material deforms.

To give each zone the correct properties, the steel grades have been varied. Four different grades of steel are used. Apart from the steel used in conventional bodywork, three different grades of high-strength steel are strategically deployed: High Strength Steel, Extra High Strength Steel and Ultra High Strength Steel.

The design of the drivetrain, including the transverse mounting of the engines and significant engineering to reduce the exterior dimensions of the engines and transmissions, has added additional deformation capacity in the engine compartment. "There is a great deal of creativity and advanced engine technology behind these solutions," says Güllsdorf.

#### **New side airbag**

A new side airbag helps the patented Volvo Side Impact Protection System (SIPS) be even more effective. The new airbags have two separate chambers – one for the hips and one for the chest. As the hips can withstand greater forces than the chest, the lower chamber can be inflated to a

pressure that is up to five times higher than in the upper chamber. The new side airbags interact with the Inflatable Curtains (IC) and the body's structure to optimize protection. Both the sills and the B-pillars have been reinforced.

### **Improved WHIPS system**

Rear impact protection is also enhanced. The groundbreaking WHIPS system in the S80 has been improved to provide better compliance and support for the head in the event of an impact.

### **Pedestrian protection**

Protection for pedestrians and cyclists was also a consideration in the design of the 2007 S80. The front of the car has energy-absorbing features, including a well-proportioned, soft structure in front of the bumper to mitigate the risk of leg injuries. The lower edge of the spoiler has been reinforced and moved forward, almost in line with the bumper, to distribute the impact (on a leg, for example) over a greater area to reduce the risk of injury.

The hood has been raised and a honeycomb structure underneath distributes the load on impact, helping to absorb the forces and reduce the risks of injury.

### **Active safety**

Preventing collisions is a high safety priority for the company, and the S80 incorporates both new and enhanced systems to help drivers avoid an incident.

### **Collision Warning with Brake Support**

The Collision Warning with Brake Support system works in concert with the new Adaptive Cruise Control to help avoid rear-impact collisions or to minimize their effect.

In this system, a radar sensor continually monitors the area in front of the car. The system is activated in different ways at different phases of driving.

If the driver approaches another moving vehicle from the rear, and the driver does not react, a red warning light flashes on the windscreen. At the same time, an audible signal can be heard. In certain situations, this is sufficient for the driver to react and avoid the hazard.

If the risk of a collision increases, despite the warning, the brake support is activated. To shorten the braking distance, the brake pads move against the discs in anticipation of a hard stop. The brake pressure is also reinforced hydraulically, ensuring effective braking irrespective of the pressure applied to the brake pedal.

If a driver brakes hard, the brake lights will flash to warn the drivers behind. Hazard warning lights are also activated when the speed is reduced to less than 30 km/h. There are three sensitivity settings on the warning system to adapt to different conditions and individual driving styles. The sensitivity can be regulated with the car's computer menu.

### **Active bi-Xenon lights**

To produce an optimal range of vision when driving in the dark on winding roads, Volvo Cars has introduced the Active Bi-Xenon Light system – swivelling headlights that follow steering wheel input and the bends in the road. Road situations are measured and analyzed using a mini-processor which then optimizes the lighting. The headlights can be swivelled by up to 15 degrees in each direction, and have the capacity to illuminate a longer distance when the road is winding. To save wear on the system, this function is disconnected automatically in daylight.

The angle of the headlights adjusts to variables such as vehicle load, acceleration, and braking to help reduce the risk of blinding oncoming road users. The headlights are cleaned by means of an electro-mechanical, high-pressure system that washes one headlight at a time to offer the best possible illumination.

### **More – and less – information**

Two previously announced driver information systems will also be available on selected versions of the new S80. The Blind Spot Information System (BLIS) uses cameras near the outside mirrors to detect cars that might be in a blind spot and relays that information to the driver. The Intelligent Driver Information System (IDIS) minimizes distracting information from the car's other systems when it determines the driver is busy.

### **Personal security -- the PCC**

Improved personal security is also a high priority for many buyers, and the Personal Car Communicator (PCC) is a world first from Volvo Cars that will help address their concerns.

The new PCC is an advanced, pocket-sized control module that both sends and receives information from the car. In its personal security role, the PCC provides information which could be crucial to the security of the car owner. By simply pressing a button, the car owner can acquire information within a few seconds:

- Whether the car is locked or unlocked
- Whether the alarm is activated or not
- Whether there is someone in the car (which is determined using a highly sensitive heartbeat sensor and an advanced calculation process)

The information is accessible as long as the distance between the PCC and the car is within approximately 100 metres. The most recent information is stored in the module so that at any time a check can be made to see if the car was actually locked when it was parked.

“Personal security is one of the cornerstones of the Volvo safety profile,” says Gllsdorf. “It is about having your car left undisturbed and avoiding situations that could entail personal risk.”

Volvo Cars of Canada Corp. is part of the Volvo Car Corporation of Gteborg, 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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**Sidebar:**

**Deformation zones in the Volvo S80**

The patented front body structure in the Volvo S80 has been divided into zones, each with a different task during the deformation process in a collision.

**LOW-SPEED DEFORMATION ZONE**

The front bumper incorporates a rigid crossmember made of Ultra High-Strength Steel. The attachments to the body’s longitudinal members are designed in the form of “crash boxes.” These help absorb the forces in a low-speed collision without damage to the other parts of the body structure.

**HIGH-SPEED DEFORMATION ZONE**

Portions of the longitudinal chassis members are made of High-Strength Steel, a very ductile steel that is optimized for high-energy absorption. This zone accounts for most of the deformation.

**BACK-UP ZONE**

The section of the crossmember that turns outward towards the A-pillars act as a barrier to protect the passenger compartment, serving as a back-up to reduce deformation. The design also helps minimize the risk of the front wheel penetrating the passenger compartment. Instead, the

wheel helps to absorb the collision forces. This section is very rigid and is made of Extra High-Strength Steel.

### THREE-WAY ATTACHMENT

A rigid side member links the A-pillars and the lower side members so that they form an extremely rigid three-way attachment on each side. The design contributes significantly to protecting the passenger compartment in a serious collision.

### Other safety technologies in the all new Volvo S80

- A collapsible steering wheel, which during deformation is moved horizontally for the best possible interaction with the airbag
- Pedals with a collapse function
- Airbags with a dual-stage function
- Seatbelt pre-tensioners for all five seating positions
- Seatbelt reminder for all five seating positions
- Force limiters for the front seatbelts
- Reinforced, transversely mounted pipe between the A-pillars (contributes to side impact protection)
- Reinforced and rigid SIPS pipes in the seats and a deformable steel box in the centre of the car
- Optional Self Supporting Tires (run-flat) with tire pressure monitoring system
- Highly advanced brake system with four key enhancements – Hydraulic Brake Assist (HBA), Optimized Hydraulic Brakes (OHB), Ready Alert Brakes (RAB) and Fading Brake Support (FBS)
- Diagonally mounted cross members made of Ultra High Strength Steel in the doors

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Descriptions and facts in this press material relate to Volvo Cars's 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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