

the all new Volvo C70



PRESS INFORMATION

The all new Volvo C70 – Safety

Convertible with unique safety features

- **Volvo's Unique Side Impact Protection System (SIPS) interacts with world-first door-mounted inflatable curtain for enhanced side impact and roll-over protection**
- **Hydro-formed A-pillars in Extra High Strength Steel, in combination with ROPS bars, seat belt pretensioners and door-mounted inflatable curtains, provide more effective roll-over protection**
- **Body structure developed further with reinforced sides to effectively channel the forces backwards in a frontal impact**
- **Volvo's Whiplash Protection System (WHIPS) is standard in the all new Volvo C70**
- **Rigid body and stable chassis make the car easy to control even in unexpected situations**
- **IDIS – advanced information system to support the driver**
- **Security with a steel roof and Private Locking**

The all new Volvo C70 has been developed to make it one of the very safest convertibles on the market, both when it comes to preventive safety and protective safety.

The car has a body structure that offers a range of solutions unique to an open-top car. The lack of a fixed roof has been compensated for with reinforcements and sophisticated technology.

When the first C70 was launched back in 1996, the aim even then was for it to be one of the very safest convertibles on the market. And yet Volvo Cars decided that the second-generation Volvo C70 would be even safer in every area.

“It is a major challenge but today we know considerably more about safety in convertibles,” says Ingrid Skogsmo, head of the Volvo Cars Safety Centre. “We know the type of accident a convertible is exposed to and how protection should be built up. And it is not just a question of protective safety. It is equally important to prevent accidents as a convertible is at times driven a little more actively.”

The all new Volvo C70 has an extensive system of safety solutions that contribute to safer driving, the majority of which are standard. If, despite all this, an accident should occur a series of protection systems come into play.

Different thinking behind advanced side impact and rollover protection

“Our aim was that the all new Volvo C70 should have the same effective side impact protection as the Volvo sedan models,” says Ingrid Skogsmo. “But as the car does not have a fixed roof we were compelled to find alternative solutions.”

To provide optimum protection in a side impact, Volvo’s Side Impact Protection System (SIPS) has been further developed.

In a side collision, the B-pillar is exposed to considerable force. In a sedan model the force is spread up into the roof structure. In a convertible this is not possible as the pillars end at the car’s shoulders. Side impact protection must therefore be built up in a somewhat different way. The forces need to be channelled forwards, backwards and downwards into the body structure, where an integrated system of members and reinforcements interact to keep the passenger compartment as intact as possible.

The B-pillars have extra reinforcements and are linked to each other through a powerful, transverse floor member. In total, there are five transverse members or walls placed along the length of the car. A flexible deformation box between each B-pillar and the transverse member also helps to absorb the collision forces.

The sills have been given a much more powerful profile than in the Volvo sedan models and, being laser-welded, they offer additional strength. They have also been raised behind the B-pillars to offer even better protection, even if the other vehicle happens to be bigger, such as an SUV.

The doors play an important role in side impact protection. They have a diagonally mounted steel profile, which helps prevent intrusion into the passenger compartment. The doors are also designed to hook onto the B-pillars and remain closed when they are subjected to collision forces. The forces can thus be distributed effectively, both forwards and backwards, into the body structure. The transverse members in front of the passenger compartment and a horseshoe-shaped member behind the rear seat channel the forces to the opposite side of the body, thus reducing the risk of intrusion into the passenger compartment.

Interplay with the unique, door-mounted inflatable curtain and pretensioners in all seats

An important part of the side impact and rollover protection is the inflatable curtain, IC. In the all new Volvo C70 it has been given a unique design.

“As there are no roof members to which the curtain can be attached it is mounted in the door,” says Ingrid Skogsmo. “When activated it is directed upwards.”

The curtain has an extra stiff construction with double rows of slats that are slightly displaced in relation to each other. This allows them to remain upright and offer effective head protection even with the window open. The curtain also deflates slowly to provide protection should the car roll over. This is a unique solution in the automotive world.

In addition to the inflatable curtain, the passengers in the front seat have side impact airbags, the size of which is adapted to cover both the chest and hip areas.

The inflatable curtain interacts with the seat belt pretensioners to help provide maximum protection for the front seat occupants in a side impact or a rollover accident. All four seats are equipped with pretensioners.

Hydro-formed A-pillars in Extra High Strength Steel

The all new Volvo C70 has very stable roadholding, due largely to a dynamic, compliant chassis and a very rigid body. The risk of the car rolling over is therefore limited but cannot be ignored. As the car does not have a permanent roof with A, B and C pillars the demands on the windscreen pillars, the so-called A-pillars, are particularly high.

“The A-pillars on the new C70 are designed to withstand very high forces if, despite everything, the car were to roll over,” says Ingrid Skogsmo.

Behind the strength are the material – Extra High Strength Steel – and an advanced production method – hydro-forming. In principle, this method means that a tube is shaped on the inside with the aid of water under very high pressure and at the same time the outside is worked on with a number of rotating hammers. A hydro-formed profile can be designed in one piece with varying shape and thickness. The A-pillars in the all new Volvo C70 can therefore be shaped optimally without joints or sharp angles. They also run all the way down to the body sills.

ROPS bars further developed

As with its predecessor, the all new Volvo C70 has powerful metal bars that come up behind the passengers in the rear seat to provide extra protection should the car roll over. The bars, which are part of the Rollover Protection System (ROPS) have been developed further in several areas. They have been made stronger and are activated with the aid of a pyrotechnic charge, which means that they come into effect much more quickly than previously. As the all new Volvo C70 has a rear window made of real glass the bars are pushed up through the screen if the roof is up. They have therefore been fitted with small, hard metal spikes, to break the glass.

Patented front structure to provide controlled deformation

The all new Volvo C70 has been developed with the aim of achieving the same high level of safety as a sedan model of the same size. The front structure is divided into zones, each with a different task during deformation. The outer zones account for most of the deformation. The more the collision forces approach the passenger compartment, the less the material is deformed. To ensure that each zone has the right characteristics, the quality of the steel has been varied. Four different types of steel are used. Apart from normal body steel, three different grades of high-strength steel are used: High Strength Steel, Extra High Strength Steel and Ultra High Strength Steel.

What distinguishes the convertible from a sedan model is that the collision forces cannot be channelled upwards in the body structure.

“The lack of a fixed roof means that the forces must instead be channelled along the sides of the body in a frontal collision or an offset collision,” says Ingrid Skogsmo.

This means greater demands on the doors, which have been reinforced with a powerful, longitudinal aluminium member along the upper edge. The aim is that it should help keep

the passenger compartment intact by channelling the forces backwards in the body structure. At the bottom, the forces are channelled backwards via the sturdy body sills.

Compact engines and effective packing technique

The engines also contribute to protective safety in the all new Volvo C70 thanks to a compact construction method and an efficient packing technique in the engine compartment. As the engines are mounted transversely, the compact dimensions offer a generous amount of space between the engine and the passenger compartment. In the event of a collision, the engine can be moved 150 mm backwards before the crankshaft comes into contact with the transverse beam beside the cowl.

The steering column can be deformed up to 140 mm. In the event of deformation it is moved horizontally so that the airbag can assume the most effective position for protection in this particular car model.

In a frontal collision the deformation zones interact with the interior restraint system, with dual stage airbags, seat belt pretensioners and load limiters, to help protect the occupants in the most effective way.

Protection for other road users

The rounded shape of the body and the flat surfaces help reduce the risk of injury to pedestrians, cyclists and other road-users in the event of an accident. The front also has a soft, energy-absorbing structure ahead of the bumper to counteract the risk of leg injuries. The bonnet and front wings are designed to absorb energy and contribute to reducing the risk of injury.

Rear-end collision

The all new Volvo C70 is designed to provide effective protection in the event of a rear-end collision.

The rear longitudinal members are deformed in a controlled way. They are linked to the body sills to distribute the collision forces forwards in the body structure. Upwards, the horseshoe-shaped member behind the rear seat and a double metal wall behind the backrest contribute to reducing the risk of intrusion into the passenger compartment. If the roof is down, it works together with the double wall to absorb the collision forces.

The ROPS bars are also pushed upwards in the event of a rear-end collision. The aim is to reduce the risk of the passengers being hit by flying objects from the car behind.

The Volvo system for avoiding neck injuries – WHIPS (Whiplash Protection System) – is one of the most effective on the market and is also standard in the all new Volvo C70. In the event of a powerful rear-end collision, the backrest and head restraint follow the movements of the seat occupant's body.

Preventive safety

“The all new Volvo C70 is great fun to drive,” says Ingrid Skogsmo. “And as driving pleasure goes hand in hand with driving safety at Volvo Cars this also means the car is easy to control, even in unexpected situations. It always behaves consistently and predictably.”

The all new Volvo C70 has twice the torsional rigidity of the earlier C70 model thanks to a body structure that has been further developed and reinforced. Rigidity contributes to stability and predictable driving characteristics. The chassis design, with its broad track and long wheelbase, also has a positive effect on driving stability.

- The track at the front is 1550 mm (29 mm wider than the previous C70 model)
- The track at the rear is 1560 mm (39 mm wider than the previous C70 model)
- The wheelbase is 2640 mm (24 mm shorter than the previous C70 model)

The suspension is independent, with MacPherson struts at the front and a Multilink axle at the rear.

The DSTC (Dynamic Stability and Traction Control) stabilisation system is standard and corrects the car if there is a tendency to skid.

The ABS brakes are extremely effective – with electronic braking force distribution to the rear wheels and automatic emergency brake assistance – EBA.

IDIS – Intelligent Driver Information System

The Intelligent Driver Information System – IDIS – was introduced in 2003 by Volvo Cars.

IDIS continuously monitors certain functions in the car, such as wheel movement, accelerator pedal movement, indicators and braking. This information is processed and at a certain level of activity, information that is not crucial to safety is held back, such as an incoming telephone call or SMS. This can take place in a situation that IDIS interprets as overtaking or braking.

IDIS is standard on all versions of the all new Volvo C70, regardless of whether the car is equipped with an integrated phone or not.

In the future, IDIS will be part of a more extensive information system that can take into account a whole series of factors in the car. The aim is to reduce driver stress even further and thus facilitate driving.

Secure driving with a steel roof

The retractable hardtop offers the C70 owner a dual experience: the pleasure of driving with the top down and the comfort and security of a well-appointed passenger compartment. The steel roof also helps reduce the risk of a break-in.

The rear screen is made of real glass and is significantly larger than the screen in a traditional convertible. It offers considerably better visibility to the rear and helps increase the car's rigidity when the roof is up.

Security in the all new Volvo C70 also includes the possibility of locking away your possessions. Several of the car's storage areas are linked to the car's central locking system for convenient locking using the remote control. A completely new system – Private Locking – is also being launched, whereby certain areas can be locked with the key from the glove compartment. Private Locking is particularly useful in a convertible parked with the roof down.

“It is important for us at Volvo Cars that we can offer a high level of safety even in a convertible,” says Ingrid Skogsmo. “We have tried to find new ways of solving the special problems that arise with an open car.”

KH

2005-09-12