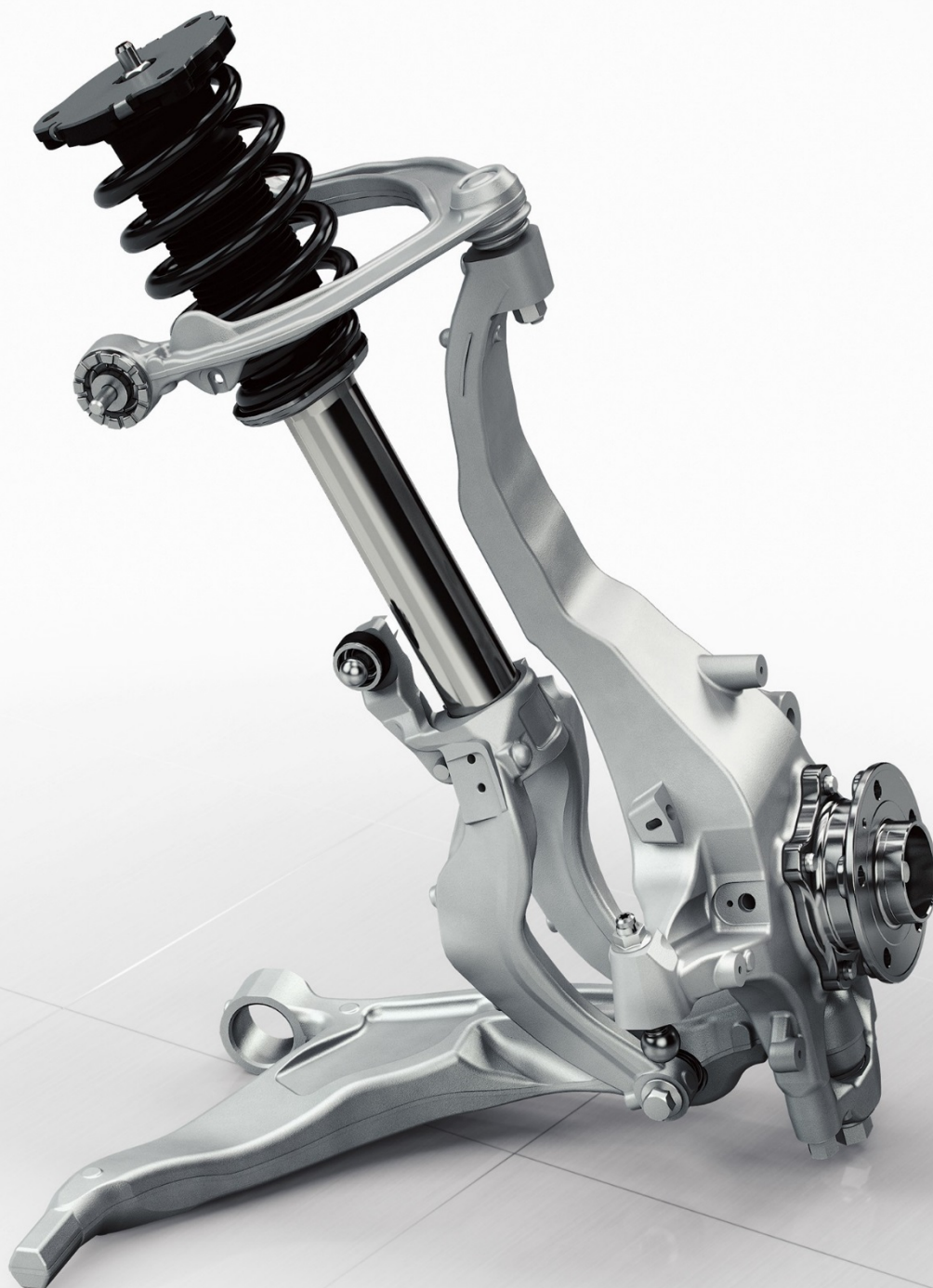


VEHICLE DYNAMICS

A factsheet on Volvo Cars' chassis technology
in the new V90 Cross Country





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Relaxed Confidence

“With the introduction of our Scalable Product Architecture and new chassis components we have been able to redefine the Volvo Cars’ driving experience based on what we call Relaxed Confidence – a comfortable mix of engaging driving dynamics, predictable handling that delivers a feeling of ultimate control.”

*Dr Peter Mertens, Senior Vice President
Research & Development at Volvo Car Group.*

Controllable Predictable Comfortable



Volvo Cars’ approach to Vehicle Dynamics is based on a deep understanding of the Volvo customer. We understand that our customers want a comfortable, and relaxed driving experience that delivers predictable, yet responsive handling characteristics.

We call it ‘Relaxed Confidence’. Although the chassis characteristics will differ from model to

model based upon real-life usage, our aim as a brand is to be consistent across our product portfolio.

To achieve this our Vehicle Dynamics engineers have a clearly defined Volvo driving character that is the basis for their development work.

Chassis Simulation

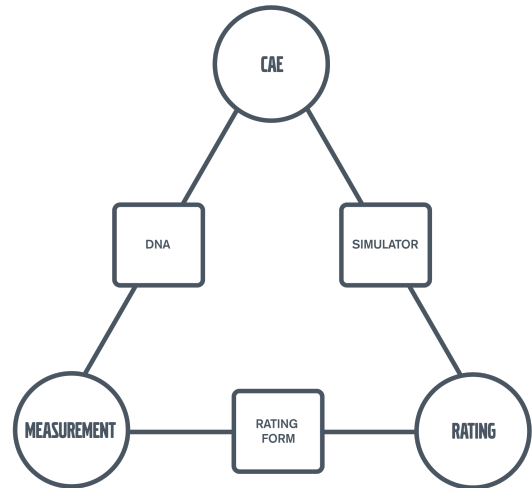
Connecting objective testing to human experience

Volvo Cars' state-of-the-art driving and chassis simulation rig, from Vi-Grade, is one of the most advanced in the auto industry.

The simulator offers exciting virtual environments including Germany's renowned Nürburgring as well as test tracks at Volvo Cars' own secret testing facility in Sweden.

It allows Volvo Cars to conduct extremely early stage development work on high speed stability, balance and individual drive mode settings, leading to the development of cars that are more responsive, more rewarding and even more enjoyable to drive.

A physical and virtual world approach to vehicle dynamics



Testing facilities

Investing in Volvo Cars chassis development



Compliance rig

Once model characteristics are added to the base Volvo driving profiles in the simulator it is time to begin real-world testing using pre-production cars or early stage testing 'mules'.

Chassis testing takes place at advanced proving grounds in northern Sweden, the United States and in other locations when required to ensure consistent behaviour in a wide range of environments and climate conditions.



Shake rig

Based on the results of track testing characteristics are continually refined using the simulator and other calibration methods to ensure stability, ease of manoeuvrability, precision and predictability.

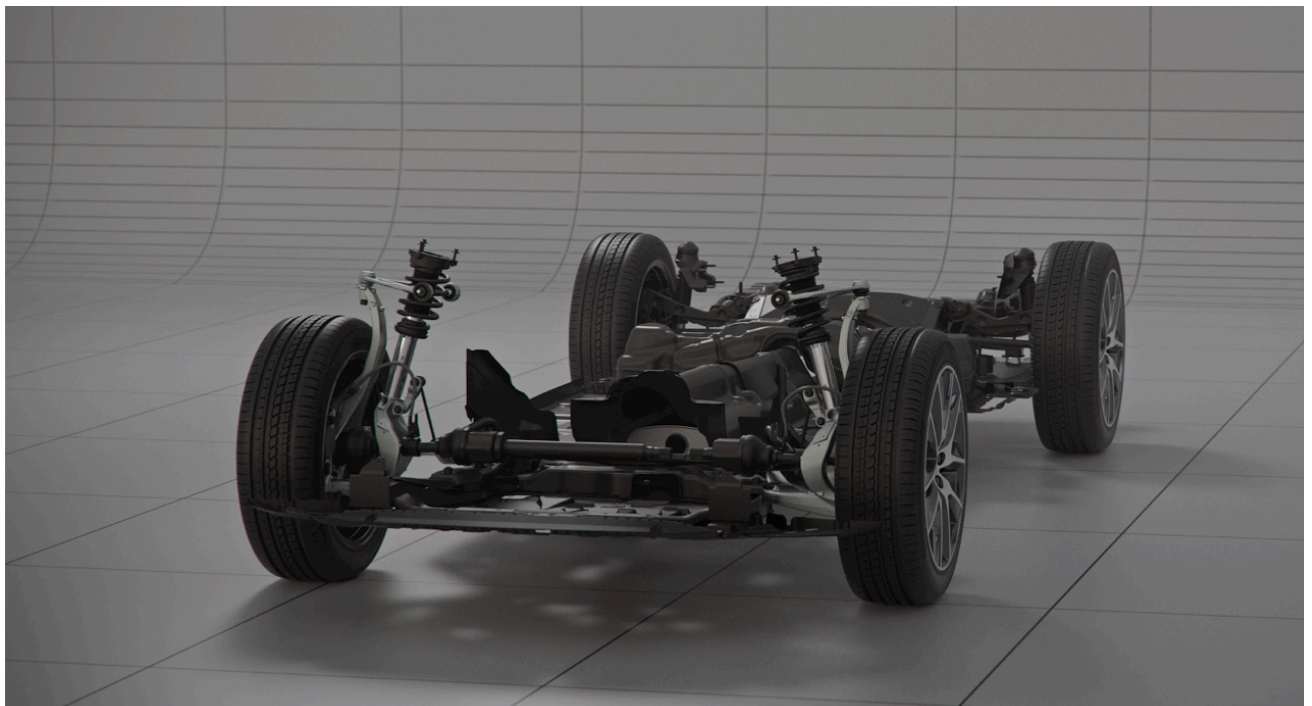
Components

Volvo's Scalable Product Architecture

Double Wishbone Front Axle

A double wishbone enables Volvo's Vehicle Dynamics engineers to carefully control the motion of the wheel throughout suspension travel, controlling such parameters as camber angle, caster angle, toe pattern, roll centre height, scrub radius, scuff and more.

Among the many benefits are increased grip because of high camber gain and small king pin angle. Reduced disturbances because of small king pin offset. Parallel roll because of low roll centre height migration and low unsprung mass because of many aluminium parts.



Integral link rear axle

Volvo's integral link rear axle helps to deliver high levels of grip due to high camber gain. Camber stiffness and grip enable increased steering precision.

The benefits of matched roll centre height migration to the front ensures a level of smooth parallel roll.

The integral link solution is light due to the use of many aluminium parts and Volvo's new composite transverse leaf spring solution.

Scalable Product Architecture

Steering system

Volvo's 90 Series cars have a rack-assisted electro-mechanical rack and pinion steering system.

This system delivers high precision in all weather and an optimised feel in winter conditions thanks to its innate stiffness.

Standard speed-dependant steering makes tight manoeuvres, such as parking, a lot easier with confident feedback at all speeds.

Volvo's new steering system also delivers the capability to personalise steering feel to suit individual driver preferences.



Drive Modes

Thanks to the versatility of Volvo Cars' new chassis configuration on the company's Scalable Product Architecture, a selection of Drive Modes have been developed to deliver the refined and personal feedback that individual customers can enjoy. Each mode is designed to offer a variation on Volvo's driving dynamics – what we call 'Relaxed Confidence'.



ECO: Most efficient drive

COMFORT: Default mode

DYNAMIC: Best performance and response

OFF-ROAD: XC90 and V90 Cross Country only

INDIVIDUAL: Driver defined

In addition to the pre-set Drive Modes there is the facility for the driver to design their own preferred Drive Mode by adjusting several parameters including:

- Steering efforts
- Brake pedal feel
- Throttle response / powertrain characteristics
- DIM
- Energy save
- Computer controlled dampers (optional)

V90 Cross Country

Highways and Byways

“We were very careful from the very beginning to ensure that the Cross Country concept was not just an exercise in rugged styling. We placed high demands on real-world capability, and as we developed the segment we added the comfort and convenience elements that Volvo drivers have come to expect.”

*Dr Peter Mertens, Senior Vice President
Research & Development at Volvo Car Group.*



Since the introduction of the first Cross Country almost 20 years ago, Volvo Cars has become synonymous with the rugged all-road, all-weather product category, with a growing stable of Cross Country models.

Volvo Cars' Cross Country models fulfil an increasingly important part of the Swedish automaker's product portfolio as luxury car buyers seek out a more experienced-based lifestyle that occasionally takes them off the beaten track.

With Volvo Cars' Scalable Product Architecture providing the underpinnings, the V90 Cross Country has undergone rigorous testing to ensure that it can survive the extremes in which it will ultimately find itself.

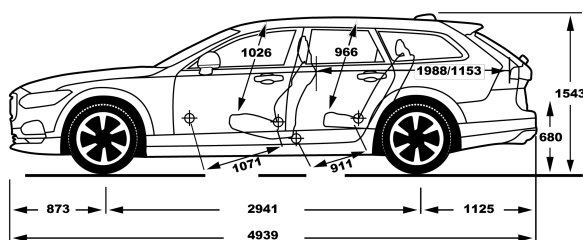
A key refinement in the new V90 Cross Country means that it retains the high-speed stability and precision of its 90 Series siblings, but with added off-road capability.

From secret testing facilities in the frozen north of Sweden, where temperatures regularly hit -40 degrees centigrade to the searing desert heat of Arizona, where Volvo Cars performs its high temperature testing program, the V90 Cross Country has been built to last.

V90 Cross Country

Ground Clearance

One of the key differentiating factors of Cross Country models is increased ground clearance. Designed to enable off-road capability in all seasons, The V90 Cross Country has been raised by 65 millimetres when compared to the V90. This increased approach and departure angle helps to protect the front and rear in steep slopes and on uneven surfaces.



V90 Cross Country Chassis

Optional Rear Air Suspension with Four-C

This optional system delivers a number of real-world benefits for the driver.

Rear Air Suspension adds to increased comfort thanks to its automatic levelling capability, ensuring a stable and smooth ride on all kinds of surface.

Rear Air Suspension can also be specified with Four-C – computer controlled dampers that add yet another level of comfort and handling capability.



Tyres

As with every Volvo car, new tyres are developed in close cooperation with tyre manufacturers to ensure a stable, high performance driving experience.

Optimised for individual models, the tyres on the new V90 Cross country have been designed for increased ride comfort and grip in both on- and off-road driving conditions.

SPA CHASSIS

V90 CROSS COUNTRY



V O L V O