

## VOLVO V70

### DRIVING DYNAMICS

#### ENGINES

The Volvo V70 is available with a wide range of engines reflecting the varying needs and aspirations of customers in this sector.

There's a choice of five-cylinder petrol units including plenty of turbocharged power from the high-performance V70 R. This is complemented by Volvo's refined turbodiesel and a Bi-Fuel model that has lower, cleaner emissions and changes between running on gas or petrol at the press of a button.

- Wide range of engines reflects requirements of customers
- All five-cylinder, aluminium petrol engines with power outputs ranging from 140bhp to 300bhp
- Volvo's 2.4-litre, five-cylinder turbodiesel uses direct injection and common rail technology to combine strong refined performance with Combined consumption of 43.5mpg
- 2.4-litre Bi-Fuel engine can be specified to run on either LPG or CNG, with petrol as the reserve fuel

The Volvo V70 is available with a wide range of normally aspirated, turbocharged, turbodiesel and environmentally friendly Bi-Fuel engines to suit the variety of needs of its owners.

#### Technical specifications:

Engine	Size	Bhp	Torque Nm@rpm	co2 g/km	Comp ratio	Bore x stroke, mm	Top Speed mph	0-62 mph sec	Kerb* weight Kg	Ins grp	MPG Urban/Extra urban/Comb
2.0T	1984cc	180	240@1850	217	9.5:1	81 x 77	137	9.0	1565	13E	22.2/40.4/31.0
2.4 (140)	2435cc	140	220@3300	214	10.3:1	83 x 90	127	10.5	1528	13E	22.8/40.9/31.4
2.4 (170)	2435cc	170	225@4500	220	10.3:1	83 x 90	137	9.0	1525	13E	22.4/39.2/30.7
2.5T	2521cc	210	320@1500	219	9.0:1	83 x 93	143	7.5	1569	16E	21.9/39.8/30.7
2.5TAWD	2521cc	210	320@1500	237	9.0:1	83 x 93	140	7.6	1657	15E	20.8/36.7/28.5
D5	2401cc	163	340@1750	171	18.0:1	81 x 93	130	9.8	1611	13E	32.5/54.3/43.5
D5 AWD	2401cc	163	340@1750	194	18.0:1	81 x 93	130	10.3	1710	13E	30.1/47.1/38.7
T5	2401cc	260	350@2100	226	8.5:1	81 x 93	155	6.8	1600	16E	22.1/38.2/29.7
R	2521cc	300	400@1950	256	8.5:1	83 x 93	155	5.9	1732	18A	19.2/33.2/26.4
Bi-Fuel: LPG	2435cc	140	214@4500	195	10.3:1	83 x 90	127	10.6	1587	13E	17.4/29.1/23.3
Petrol	2435cc	140	220@3300	225	10.3:1	83 x 90	127	10.5	1587	13E	22.1/37.3/30.1
Bi-Fuel: CNG	2435cc	140	192@4500	169	10.3:1	83 x 90	127	11.0	1609	13E	21.6/38.7/30.1
Petrol	2435cc	140	220@3300	215	10.3:1	83 x 90	127	10.5	1609	13E	22.8/40.9/31.4

\* minimum kerbweight. (Actual kerbweight dependent on spec)

Steering/tyres	Rack and pinion with 205-235 (16in-18in) section tyres.
Turning circle, m (ft)	11.9 – 12.0 (39ft – 39ft 4in). V70 R: 13.2 (43.3)
Transmission	5 speed manual (2.0T, 2.4, 2.5T, D5, Bi-Fuel) 6 speed manual (T5, D5 AWD and V70 R) Auto: 5 speed
Brakes: front discs	15in – 286mm Ventilated (2.4, D5, Bi-Fuel) 16in – 305mm Ventilated (2.0T, 2.5T, 2.5T AWD, D5 AWD)
Rear discs	16.5in – 316mm Ventilated (T5) 15in – 288mm Ventilated (2.4, D5, Bi-Fuel) 16in – 288mm Ventilated (2.0T, 2.5T, 2.5T AWD, D5 AWD) 16.5in – 288mm Ventilated (T5)
Fuel Tank litres (gallons)	70 (15.4) (D5 AWD 68 (15.0)). Bi-Fuel: LPG 50 (11.0)/Petrol 29 (6.4); CNG 23Nm <sup>3</sup> /petrol 29 (6.4)
Load capacity: litres (cu ft)	
Rear seats up, to glass line	485 (17.1)
Rear seats down, to glass line	745 (26.3)
Rear seats down, to roof	1641 (58.0)
Load length: rear seats up	1077mm
Load length: rear seats down	1848mm
Dimensions: (mm)	
Length	4710
Width (excluding mirrors)	1804
Unladen height	1465 (AWD: 1490)
Wheelbase	2755
Front track width	1551
Rear track width	1548

(Full technical data, prices and options information available on separate file/section, or [www.media.volvocars.co.uk](http://www.media.volvocars.co.uk))

Volvo's 'RN' range of five-cylinder, all-aluminium petrol engines feature four valves per cylinder, a twin cam head, centrally mounted spark plugs and either single or dual continuously variable valve timing (CVVT). The latter helps optimise the combustion process and operates in two ways. On normally aspirated engines, it works on the inlet cam in order to improve low-end torque and driving characteristics. But on engines fitted with a turbo, it operates on both the inlet cam and the exhaust cam in order to maximise torque and minimise emissions, especially when the engine is cold.

#### 2.4 (140) and 2.4 (170)

The 2.4-litre normally aspirated five-cylinder petrol engine is available in two states of tune. In the entry-level car it develops 140bhp and 220Nm of torque, mixing impressive refinement with ample performance – 0-62mph takes 10.5sec and it reaches 127mph.

A step up in performance is offered by the 170bhp version of the same engine. The peak torque output rises to 225Nm and the 0-62mph time is reduced to 9.0sec, with a 137mph top speed. Both of these engines average over 30mpg on the official Combined cycle and meet the strict European EU 2005 emissions requirements.

## 2.0T

The 180bhp 2.0T engine received some retuning for the 2005 model year to increase its torque at lower engine speeds making the maximum 240Nm of torque at 1,850rpm instead of 2,200rpm. It achieves 0-62mph in 9.0sec, with a top speed of 137mph and emissions of 217g/km.

## 2.5T and 2.5T AWD

A more powerful 2.5T engine employs a low-pressure turbo to develop 210bhp and an impressive 320Nm of torque, which is available from 1500-4500rpm. Developed to appeal to sportier drivers, it powers the Volvo V70 from 0-62mph in 7.4sec and on to a maximum speed of 143mph. But despite this impressive performance, it still manages to return an average of 30.7mpg on the Combined cycle.

The 2.5T engine is one of the engines available in the Volvo V70 AWD. Even allowing for the additional weight of the AWD system, the manual 2.5T Volvo V70 AWD sprints from 0-62mph in 7.6sec and reaches 140mph, while returning an average of 28.5mpg on the Combined cycle.

## T5

The ultimate in performance and driving experience is offered by the T5 and V70 R models, which employ either a low or high-pressure turbo to devastating effect. The T5's five-cylinder engine was upgraded from 2005 model year to 2401cc to produce a mighty 260bhp at 5500rpm, with 350Nm of torque is available all the way from 2100-5000rpm. When mated to Volvo's new six-speed manual gearbox, it enables the Volvo V70 T5 to sprint from 0-62mph in 6.8sec and can return 29.7mpg on the Combined cycle with emissions of 226g/km.

## V70 R

The five-cylinder, 2.5-litre high-pressure turbo engine in the Volvo V70 R provides dramatic performance with all the load carrying capacity of more humble V70 models. The peak power output is 300bhp and there's 400Nm of torque available from just 1950rpm with the six-speed manual transmission, ensuring that the engine is as flexible as it is potent, and can rocket from 0-62mph in 5.9sec and on to an electronically limited top speed of 155mph.

## D5 and D5 AWD

Volvo's refined 163bhp 'D5' turbodiesel features the latest common rail direct injection technology. A common rail system enables the fuel to be distributed under very high pressure via a single 'common' fuel line or 'rail'. The combustion can be controlled very precisely, reducing emissions and maximising performance and refinement.

The D5 engine develops 163bhp at 4000rpm and 340Nm of torque from 1750-3000rpm for excellent mid-range flexibility and a useful turn of speed - 0-62mph takes 9.8sec and it will reach 130mph. But despite its pace, the Volvo V70 D5 manages 43.5 miles on a gallon of diesel on the Combined cycle with carbon dioxide emissions of 171g/km. The engine is also available in the V70 AWD, where it takes 10.3sec from 0-62mph with emissions of 194 g/km and achieves 38.7mpg on the Combined cycle.

### Bi-Fuel

Low emissions and running costs are also a major benefit of the Bi-Fuel engine. In contrast to some of its rivals, Volvo's Bi-Fuel cars are built on exactly the same production line as the petrol and diesel models, are fully crash tested, and enjoy full type approval as well as Volvo's three year/60,000 mileage warranty.

The provision of Bi-Fuel power was also integral to the V70's original design and so the additional fuel tank has been accommodated beneath the boot floor without a diminution of luggage capacity.

The 2435cc, five-cylinder Bi-Fuel engine can be specified to run on either LPG (Liquefied Petroleum Gas) or CNG (Compressed Natural Gas), with a smaller tank of petrol as the reserve fuel. The power output is unchanged at 140bhp, whether the car is running on petrol or gas, but the torque figures do alter slightly.

In petrol form, the V70 Bi-Fuel develops 220Nm of torque, which compares with 214Nm for LPG and 192Nm for CNG. This is reflected in the performance figures. Equipped with a manual gearbox, the Volvo V70 Bi-Fuel sprints from 0-62mph in 10.5sec in petrol mode, while it takes 10.6sec when powered by LPG. The CNG version covers the same increment in 11.0sec.

The benefits of Bi-Fuel, though, can clearly be seen in the exhaust emissions. In petrol mode, both variants emit 219g/km of carbon dioxide, but while operating on LPG and CNG, the Volvo V70 emits 195g/km and 169g/km respectively. This is beneficial both to the environment and to the pay packets of company car drivers, who will enjoy lower Benefit in Kind taxation. All owners will also benefit from reduced fuel bills as both LPG and CNG are taxed less heavily than petrol and can enjoy an exemption from London's congestion charges.

### **CHASSIS**

**The Volvo V70 rubbishes the theory that choosing an estate car means sacrificing driving pleasure. The combination of high torsional rigidity and a sophisticated chassis provides a cushioning ride with entertaining handling and a high level of active safety.**

**An optional Sports Handling Pack is available, as is Volvo's second generation Four-C (Continuously Controlled Chassis Concept) active chassis with Comfort and Sport settings.**

**However, customers seeking the ultimate high-performance all-rounder have the option of the V70 R, using an all wheel drive system incorporating an electronic Haldex coupling as well as Volvo's advanced 'Four-C' active high-performance sports chassis now specifically tuned for the variety of UK roads with Sport, Advanced Sport and Comfort settings.**

**The All Wheel Drive system is also available in the V70 AWD, with a choice of petrol or diesel engines.**

- Entertaining, composed handling with high level of active safety
- High torsional rigidity benefits safety and chassis dynamics
- Sophisticated multi-link rear suspension
- Long wheelbase and wide track provide stability and control
- DSTC (Dynamic Stability and Traction Control) standard on all models
- Sports Handling Pack available (optional)
- Volvo's second generation 'Four-C' active chassis available (optional)
- Volvo V70 R uses Volvo's second generation 'Four-C' active high-performance chassis technology in conjunction with AWD
- Volvo V70 AWD and Volvo V70 R use advanced AWD with Haldex coupling and Volvo's TRACS system to maximise traction in all conditions

The Volvo V70 is proof that owning an estate car does not mean sacrificing driving pleasure. High torsional rigidity, and a sophisticated suspension system shared with the Volvo S60 and Volvo S80, provide an unbeatable combination of comfort, refinement and handling finesse. And in the shape of the high performance V70 R, Volvo has a load carrier capable of outperforming many so-called sports cars. It really does bring new meaning to the word 'versatile.'

A high level of torsional rigidity is crucial to providing a consistent ride and handling balance, and it also enhances a vehicle's crash performance. Volvo's engineers met their rigidity targets through the extensive use of High Strength Steel (HSS) and the application of bonding techniques in place of the more usual spot-welding. Bonding, unlike spot-welding, produces a continuous join that increases the rigidity of the structure and also steals less space in, for example, the luggage area. The technique clearly works, as the latest Volvo V70 is 50 per cent stiffer than its predecessor.

### Suspension

The estate shares its basic suspension set-up with the Volvo S60 and S80. The MacPherson strut front suspension employs dampers and coil springs combined in a single unit and positioned asymmetrically in relation to the strut. Beneath the spring struts are triangular lower links, with an anti-roll bar attached directly to the bottom of the struts themselves. Anti-lift and anti-dive technology also enhances the car's stability in all conditions.

At the rear, a sophisticated multi-link system is mounted in a chill-cast aluminium subframe. This is attached to the body at four points via insulating rubber bushes to keep noise and vibration to a minimum. The use of aluminium helps keep the weight down, while the compact design ensures that there's no encroachment on passenger or luggage space.

Four links on each side – hence multi-link – comprised of two trailing arms, upper and lower links, a track rod and an anti-roll bar, control the movement of the wheels. As with the front suspension, the coil springs and dampers form a single unit. This system permits a small degree of passive rear-wheel steer when cornering, to aid stability. Load-compensating suspension can also be added as an option across most of the range (but not available for models fitted with Four-C active chassis as this has a similar feature built-in).

### Sports Handling Pack

For more responsive handling for the enthusiastic driver, and for an added 'cool' appearance, a Sports Handling Pack includes 18in 235/40 Nebula BBS split rim or Capella alloy wheels, Volvo's Four-C active chassis and speed dependent steering.

### DSTC, EBD and EBA

The carefully honed mechanical set-up is backed by sophisticated dynamic stability and traction control (DSTC) systems with Electronic Brake Distribution (EBD). The system prevents wheelspin by either braking the wheel that has lost traction (up to 25mph) or, at speeds above 25mph, by reducing engine power. It ensures that the driven wheels get exactly as much power as they can transfer to the road. It also uses an array of sensors to detect the onset of a skid. The system then automatically slows the appropriate wheel to restore control.

All V70s benefit from Electronic Brake Assist (EBA), which senses an emergency stop and automatically brings the car to a halt in as short a distance as possible.

### AWD (with Haldex coupling)

For driver's seeking additional control on a variety of road surfaces, Volvo has developed an all-wheel drive (AWD) system, which is fitted to the V70 AWD and the V70 R (as well as the

XC70 and XC90). Developed in conjunction with the Swedish specialist Haldex, it operates independently of driver input, distributing torque automatically between the front and rear wheels for the best possible grip in all conditions. In addition, the Volvo TRACS system ensures that the wheel on each axle with the best grip always gets the most power.

The intelligent AWD system uses a variety of sensors to monitor the road surface and the steering wheel, brake and accelerator pedal positions. In normal driving conditions on dry roads, almost all the power is distributed to the front wheels. However, if the sensors detect slippage, torque is proportionately diverted to the rear wheels via the Haldex coupling to maximise traction. This system responds in just one-seventh of a wheel turn, making an outstanding contribution to active safety and driver enjoyment.

#### Second Generation Four-C Active Chassis

Volvo's second generation 'Four-C' (Continuously Controlled Chassis Concept) active sports chassis system brings a unique character to the V70's performance and has now been specifically optimised for the variety of UK road conditions. The advanced electronics allow the driver to choose between different suspension settings (Sport and Comfort) at the touch of a button on the dashboard for maximum driver control, choice and enjoyment.

The Four-C system is always active and ready to respond to any situation. It continuously monitors the car's speed, wheel movement and steering via Multiplex computer controlled systems that update the suspension settings 500 times per second.

For the ultimate 'performance on demand', the V70 R has the Four-C active high-performance chassis as standard, and works in conjunction with the AWD system for maximum traction, road-holding, safety and stability.

Three buttons on the dashboard give the V70 R driver a wider choice a choice of suspension settings. These are:

**SPORT** – Standard mid-setting for sporty driving. ('Sky hook' control technique)

**ADVANCED SPORT** – Uncompromising sports car handling, prioritising maximum driving pleasure using 'direct road contact' control technology. ('Road Contact' control technique)

**COMFORT** – Optimises ride comfort using 'Sky Hook' control technology to make the car feel like it is suspended from an artificial horizon ('Sky Hook' control technique).

## **STEERING, BRAKES AND TRANSMISSIONS**

The Volvo V70's steering and braking systems have been tuned to maximise driver enjoyment and safety. The ZF rack and pinion steering (also available with optional speed dependent function) is linear in response and offers plenty of feedback, while the anti-lock brakes are boosted by Electronic Brakeforce Distribution (EBD) and Electronic Brake Assist (EBA).

A five-speed manual gearbox is standard across most of the range, with the exception of the Volvo V70 R, T5 and D5 AWD which benefit from a sixth ratio. But for those who prefer to let a computer take the strain, Volvo offers two automatic transmissions. Both adapt their shift points to suit individual driving styles, but the Geartronic variant also permits sequential manual changes for added control.

- Power-assisted rack and pinion steering tuned to optimise feedback and response. Also available with optional speed sensitive steering
- ABS with Electronic Brakeforce Distribution (EBD) and Electronic Brake Assistance (EBA) as standard
- Six-speed manual gearbox standard on Volvo V70 R, T5 and D5 AWD. Five-speed manual standard on all other models
- Spaceball gearlever standard on T5, Sport models and V70 R with manual transmission. (optional on others)
- Five-speed adaptive automatic optional (2.4 140/170, 2.0T, Bi-Fuel)
- Geartronic adaptive auto with a sequential manual shift facility optional on turbocharged petrol and diesel models (2.5T, 2.5T AWD, D5, D5 AWD, T5, R)

The V70 uses a ZF power-assisted rack and pinion steering system that has been developed to optimise driver feedback and response. The steering feel has been improved through careful tuning of the torque build-up during cornering and this helps the driver place the car accurately on the road.

There is also an optional speed dependent system available that provides additional assistance at low speeds and more steering feel as speed increases.

Large disc brakes, which are ventilated at the front, deliver a firm and consistent response, whatever the payload. The T5 has larger 316mm discs at the front, while the V70 R is equipped with large (330mm) four piston Brembo brakes to the front and rear to firmly control its added performance. As you'd expect from Volvo, an anti-lock braking system is fitted as standard and this is joined by Electronic Brakeforce Distribution (EBD) and Electronic Brake Assist (EBA).

EBD constantly distributes braking power between the front and rear wheels to ensure maximum retardation regardless of the road conditions or how the car is laden.

EBA automatically senses when an emergency stop is required and adjusts the braking pressure so that the car comes to a halt in the shortest possible distance.

Every model, with the exception of the Volvo V70 R, T5 and D5 AWD, are supplied as standard with the M56 five-speed manual gearbox. This compact unit uses a three-shaft (one input/two layshaft) system in place of the more traditional two-shaft design, which contributes to the smooth, positive shift quality. The T5, D5 AWD and V70 R upgrade this further to a six-speed gearbox, providing the ultimate in flexibility and control. Like the T5 and Sport models (with manual transmission), it also comes as standard with Volvo's unique Spaceball gearlever, to emphasise its sporting appeal.

For drivers who prefer to let a computer take the strain, Volvo offers a choice of two automatic gearboxes. The entry-level unit is fully adaptive, offers five-speeds and automatically adjusts its shift patterns according to an individual's driving style. A special 'W' (for winter) mode can be selected manually. This starts the car off in a higher gear to prevent wheelspin on slippery surfaces.

On V70 models equipped with a turbocharged petrol or the D5 diesel engine, this is upgraded to a Geartronic system. This is a fully adaptive five-speed automatic that also offers the driver the opportunity to select gears manually. Gears are chosen sequentially by tipping the lever forwards to change up and backwards to change down.