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Volvo Car Corporation

The Volvo S60 R and V70 R: Combining Traditional Functionality With Innovations In Performance

Intelligent Functionality is a hallmark of the Volvo brand. With the new Volvo S60 R and Volvo V70 R, the driving experience really takes off thanks to unique integrated technologies thinking outside of the box.

The S60 R is a true performance sedan, while the V70 R is an exceptional performance wagon. "The Volvo `R' cars are built from the inside out with safety at its core," says Hans Nilsson, Volvo Car Corporation, R Car Line Manager. "Our design provides control and excitement, without compromise."

The `R' cars' extremely sophisticated technology is controlled with a rather simple human interaction. The interface between driver and machine is easily accessible through a very smart, functional package of three settings - Comfort, Sport, and Advanced Sport.

With the touch of a button, the driver can transform the `R' car from the relaxing ride of a day out with the family to the exhilarating experience that comes from cornering with agility. "The technology is seamless so the driver can immerse themselves in the pure joy of control and performance," said Nilsson.

The `R' concept is nothing new to Volvo. Beginning in 1995 with its introduction of a bright yellow T -5R wagon, Volvo has used the mark as an enhancement of driving pleasure.

The mission of the new `R' cars is to reinforce "driving excitement" as a Volvo virtue. "We have always incorporated leading edge technology into our `R' cars," states Nilsson, "with the level of technology currently available, and with our innovative applications, ...we feel that we can send a very strong message about the Volvo brand."

The new Volvo S60 R and Volvo V70 R will appear in showrooms during the spring of 2003. Volvo projects sales of 2,500 `R' cars for North America - 7,000 worldwide.

The target audience for the vehicles is expected to be male-dominated, by as much as 94 percent in the United States. "The American buyer has a more relaxed attitude, looking for a top-of-the-line car that's fun to drive," Nilsson said in indicating the Volvo `R' cars are ideal vehicles for the American road, and the American driver.

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Volvo S60 R with Four-C Technology - The Most Advanced Active Chassis on the Market

Four-C Technology (Continuously Controlled Chassis Concept) is the command center of the new Volvo S60 R sedan. Considered the world's most advanced active performance chassis, the Four-C helps bring the promise of the Volvo Performance Concept Car (introduced in Paris, 2000) to production reality.

Volvo S60 R delivers the uncompromising road contact of an extreme sports sedan, but it's also capable of providing the comfort essential for a drive with the family. With the versatility to combine both, the S60 R presents performance unmatched on the road today.

The Continuously Controlled Chassis Concept (Four-C)

What differentiates the Volvo Four-C from other chassis concepts is its ability to process enormous amounts of information. Strategically placed sensors on the chassis measure the longitudinal, lateral, and vertical acceleration of the car relative to driving conditions.

There are sensors to measure:

- the rotational speed and vertical movement of each wheel
- steering wheel deflection and velocity
- cornering (yaw rate)
- engine torque (calculated)
- braking interventions by ABS and DSTC

In much the same manner as the human brain, the sensory information is received and immediately acted upon. The Four-C's sophisticated microprocessor computes the motions of the car to adapt the hardness of the shock absorbers. The result is that the car is always fluid with the surface of the road.

While the S60 R negotiates varying terrain, the shock absorbers are updated with new information 500 times a second. In essence, the system makes adjustments continuously, and instantaneously.

The Four-C is a first in the world of cars. To develop this totally new technology Volvo collaborated with high-tech system developer Öhlins Racing AB and shock absorber manufacturer Monroe (both leaders in their fields).

The computerized electrical system of the Volvo S60 R, known as Multiplex, also sends information to the Four-C system. Under severe braking for instance, the Four-C system receive the braking information a few milliseconds before the brake pads touch the brake disc. By then the Four-C microprocessor has computed how much the braking will cause the front end of the car to dive, and uses this information to set the shock absorbers to maximize control and tire grip.

When the car is accelerating, Four-C receives the corresponding information from the longitudinal acceleration sensor. Similarly, the system passes on information about a sharp deflection of the steering wheel a few milliseconds before the car actually changes direction.

So Four-C can predict what is going to happen, making the pun in its name (foresee) highly appropriate.

Electronically-Controlled AWD System

The Volvo 560 R shares a similar electronically controlled AWD system as the Volvo XC90 and 560 2.4T AWD. The four-wheel-drive system is optimised for performance, road holding and stability, and is also connected to the Multiplex system of the car. This means that the AWD system can interact in a unique way with the DSTC (Dynamic Stability and Traction Control) system, which in turn means that the car can deliver precisely the driving characteristics the driver wants.
The short cut-in and cut-out times of the AWD system, less than 100 milliseconds, allow the driver to compensate and control oversteer and understeer situations.

When parking, the AWD system is controlled to prevent the front and rear axles working against each other in tight turns, making the Volvo S60 R and V70 R easy to maneuvers.

When braking, the AWD system is deactivated so that ABS can operate without interference, ensuring high stability and short stopping distances.

Similarly, DSTC deactivates the AWD system to help keep the car under control and to prevent a skid.

Brakes to match performance

Quick, precise steering response is vital for high-performance cars. The Volvo

speed of the car. Programmed to give maximum servo assistance during parking manuvers, the system gradually increases steering force as speed builds. The servo assistance function is minimal at top speed.

The braking capabilities of the Volvo S60 R match the overall performance of the car. The Brembo aluminium brake callipers have four pistons. The aluminium contributes to rapid heat dissipation and reduces un-sprung weight. The lower the un-sprung weight, the better the tire makes contact with the road. The ventilated brake discs are all of 12.9 inches in diameter.

The S60 R is a true performance sedan, designed for an exhilarating driving experience without compromising the safety and functionality characteristic of a Volvo. The 2004 model, along with its performance wagon counterpart - the Volvo V70 R, will arrive to dealer showrooms Spring, 2003.

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Volvo R Cars: Refined turbo technology for top performance

The Volvo S60 R and V70 R, unveiled at the Paris Motor Show, are packaged with the most powerful engine in the Volvo range. Volvo's newly developed five-cylinder 2.5 liter in-line turbo-charged power plant produces 300 horsepower and 295 ft. lbs. of torque between 1.950 and 5,250 rpm.

The R engine's power output per liter of cylinder displacement places it among market leaders for performance efficiency. The engine reaches maximum torque at 1,950 rpm, thanks to the larger cylinder bore and a new turbo from KKK, with a maximum charging pressure of about 1 bar. The high charging pressure significantly raises the temperature of the intake air, so the S60 R and V70 R are fitted with twin intercoolers.

The engine is equipped with Dual Wide Range CWT continuously variable valve timing, on both the intake and exhaust camshafts. CWT adjusts the valve opening times to suit the engine speed and load, lowering fuel consumption and reducing emissions, while increasing performance. The emission standards of the R engine satisfy American LEV requirements and conform to the European Euro 4 standard.

To withstand the increased stresses, pistons and connecting rods have been heavily reinforced and cylinder head cooling has been improved. The oil sump has been re-designed to safeguard oil supply to the engine under extreme G-forces.

New six-speed manual gearbox

The new Volvo six-speed manual gearbox was specially designed to handle the high torque delivered by the engine. The short-throw shifter allows fast gear changes enhancing the connectivity between the car and driver.

The optional 5 speed Geartronic automatic transmission offers the best of both worlds: the gearbox takes care of all gear changes automatically, or the driver can change gears manually, without a clutch.

The automatic transmission is also adaptive. It monitors the drivers' driving style and adapts the gearchanging pattern accordingly. It also has a "Sport" mode selector in which the automatic transmission changes gears at a higher engine speed and downshifts faster.

Performance by Volvo also means the safety of handling and control that comes from the unique Volvo Four C (Continuously Control Chassis Concept). With this active chassis system, which compensates for road variances using a sophisticated network of sensors, Volvo's Haldex all-wheel-drive system, DSTC (Dynamic Stability and Traction Control), and "performance on demand" versatility, Volvo engineering is taking performance to the next level.

The Volvo S60 R and V70 R will be delivered during Spring 2003.

For More Information and Photographs, Go to:
http://www.volvocars-pr.com

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Volvo S60 R

Preliminary figures

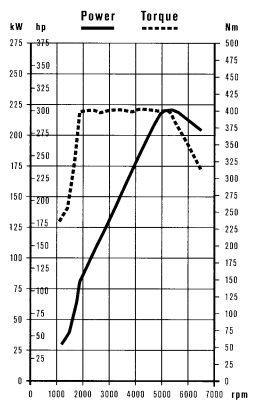
ENGINES

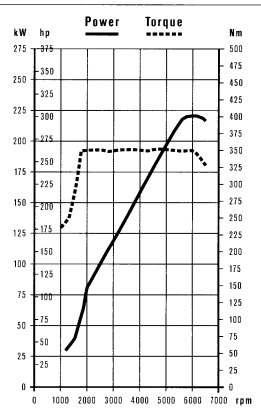
	B5254T4 (manual gearbox)	**B5254T4** (automatic gearbox)
Type	In-line 5 cylinder, with turbo	In-line 5 cylinder, with turbo
Configuration	Transverse, all wheel drive	Transverse, all wheel drive
Displacement, cm^3	2521	2521
Engine cylinder block material	Aluminium	Aluminium
Cylinderhead material	Aluminium	Aluminium
Combustion chamber type	Pent-roof	Pent-roof
Compression ratio	8.5	8.5
Valvetrain	DOHC, 4 valves/cylinder. Continously Variable Valve Timing (CVVT) on inlet and exhaust	
Ignition sequence	1-2-4-5-3	1-2-4-5-3
Engine idling speed	720	720
Fuel, rec. octane	98 RON	98 RON
Max engine speed (rpm)	6500 (6800 3 sec)	6500 (6800 3 sec)
Max output, kW (hp)/rpm.	220,6 (300)/5500	220,6 (300)/6000
Max output, kW (hp)/rpm. ///figures for US ///	224 (300)/5500	224 (300)/5500
Max torque, Nm/rpm.	400/1950–5250	350/1850–6000

TRANSMISSIONS

6-speed manual gearbox. 5-speed automatic with geartronic, electronically controled with Sport Mode selection.

Ratio	M66	AW 55-51
First	3.38	4.66
Second	2.05	3.03
Third	1.43	1.98
Fourth	1.09	1.34
Fifth	0.87	1.02
Sixth	0.7	
Reverse	3.20	5.11





Manual gearbox/final drive	M66/3.77	M66/3.77
Automatic transmission/final drive	AW55-51/2.65	AW55-51/2.65
Installation	Electronically controlled AWD (All Wheel Drive)	

PERFORMANCE

Gearbox	Manual	Automatic
Acceleration, 0–100 km/h (sec) / 0–60 mph (sec)	5.7/5.4	7.5/(7.2)
Top speed, electronically controlled km/h / mph	250/155	250/155
Fuel consumption l/100 km* (EC 17/1999, combined) (Figures within brackets valid for lower inertia class)	n.a.	n.a.
CO_2 g/km (EU04, LEV1)	n.a.	n.a.

CHASSIS

Semi active chassis with 3 driving modes		
Suspension	front	Spring-strut, lower link, anti-roll bar
	rear	Individual Multi-link coil spring, anti-roll bar
Steering		Rack and pinion, power assisted, speed sensitive
Turning circle		13 m
Turns of steering wheel end to end		2.5
Braking system		ABS system with EBA* and EBD**.
Ventilated discs front and rear		
Four piston callipers front and rear		
Brake disc diameter (front/rear)		330/330 mm***
Stoping distance		100–0 km/h (m) 36
10 repeated stops (AMS) (m) 37		
Wheel dimension		8x17", 8x18"
Tyre dimension		235/45 17", 235/40 18"

MEASUREMENTS AND VOLUMES

Exterior measurements (cm)	
Length	460.6
Width	180.4
Wheelbase	271.5
Track, front	155.7
Track, rear	154.2
Interior measurements (cm)	
Headroom with sunroof (front/rear)	99/96
Headroom without sunroof (front/rear)	98/96
Passenger compartment width at shoulder height (front/rear)	143/141

Luggage volume, litres (DIN V210)	424
Load length	105
Load length with rear seat folded down	173
Load length with rear seat and front passenger seat folded down	276
Loading height between cargo floor and parcel shelf	44
Width of luggage compartment between wheel arches	114

*EBA (Electronic Braking Assistance) **EBD (Electronic Braking Distribution) *** 12.9/12.9 inch

October 2002

Volvo V70 R

Preliminary figures

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Compression ratio	8.5	8.5
Valvetrain	DOHC, 4 valves/cylinder. Continously Variable Valve Timing (CVVT) on inlet and exhaust	
Ignition sequence	1-2-4-5-3	1-2-4-5-3
Engine idling speed	720	720
Fuel, rec. octane	98 RON	98 RON
Max engine speed (rpm)	6500 (6800 3 sec)	6500 (6800 3 sec)
Max output, kW (hp)/rpm.	220,6 (300)/5500	220,6 (300)/6000
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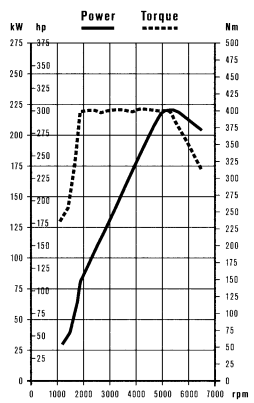
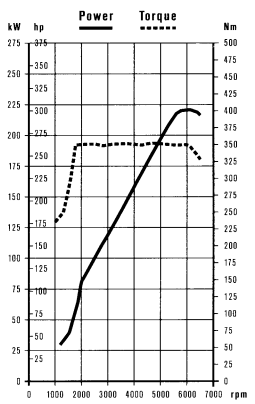
Reverse	3.20	5.11





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Top speed, km/h / mph	250*/155*	250*/155*
Fuel consumption l/100 km* (EC 17/1999, combined) (Figures within brackets valid for lower inertia class)	n.a.	n.a.
CO_2 g/km (EU04, LEV1)	n.a.	n.a.

* Electronically controlled top speed.

CHASSIS

Semi active chassis with 3 driving modes		
Suspension	front	Spring-strut, lower link, anti-roll bar
	rear	Individual Multi-link coil spring, anti-roll bar
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Turns of steering wheel end to end		2.5
Braking system		ABS system with EBA* and EBD**.
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Stoping distance		100–0 km/h (m) 36
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Wheel dimension		8x17", 8x18"
Tyre dimension		235/45 17", 235/40 18"

MEASUREMENTS AND VOLUMES

Exterior measurements (cm)	
Length	471.0
Width	180.4
Wheelbase	275.5
Track, front	155.7
Track, rear	154.2
Interior measurements (cm)	
Headroom with sunroof (front/rear)	100/99
Headroom without sunroof (front/rear)	100/99
Passenger compartment width at shoulder height (front/rear)	143/142

Luggage volume, litres (DIN V211/V212/V214)	485/745/1641
Load length	109
Load length with rear seat folded down	185
Load length with rear seat and front passenger seat folded down	282
Height of luggage compartment	81
Width of luggage compartment between wheel arches	113

*EBA (Electronic Braking Assistance) **EBD (Electronic Braking Distribution) *** 12.9/12.9 inch

October 2002