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Press Information

First-Class turbo-diesel power: the Mercedes-Benz S 320 CDI

Mercedes-Benz Australia/Pacific Corporate Communications
A Daimler Company

Mercedes-Benz S 320 CDI: powerful six-cylinder diesel engine with latest-generation CDI technology

Sydney – The top-of-the-range luxury saloon from Mercedes-Benz is now available with a further-optimised version of the popular 3.0-litre turbo-diesel V6, the same power unit that has impressed with it prodigious torque, remarkable fuel economy and exceptional emission levels in other Mercedes-Benz passenger car models. The S 320 CDI is now available in Mercedes-Benz showrooms and is priced from $190,900 (excluding dealer delivery and statutory charges). This is the first time Mercedes-Benz has offered turbo-diesel power in the S-Class to Australian customers. The newly developed CDI (Common-rail Direct Injection) six-cylinder engine will join the range of engines for the award-winning S-Class. It has an output of 173 kW, topping the figure for the engine in the preceding S 320 CDI (not sold in Australia) by 15 percent. Maximum torque has increased by eight percent, from 500 to 540 Newton metres which is available between a low 1600 and 2800 rpm. These remarkable values make the direct-injection diesel unit one of the most powerful in its displacement class. Combining this exceptional engine with the 7G-TRONIC seven-speed automatic transmission as standard equipment ensures the best possible use of its outstanding output and torque potential in any driving situation.

Lightweight construction as a factor in exemplary diesel driving pleasure

The choice of materials, technical design, fuel injection and engine management system of the V6 diesel engine reflect the state of the art.

Mercedes-Benz has developed an aluminium crankcase with cast-in grey iron cylinder liners for this unit, which makes a major contribution to weight reduction. As a result, the new six-cylinder engine weighs a total of only around 208 kilograms (acc. to DIN) and achieves a remarkable power-to-

weight ratio of 0.83 kW/kg; a major contribution to the outstanding agility and handling offered by the S 320 CDI by the new engine.

Piezo-injectors for finely metered fuel injection

Third-generation common-rail direct injection is a further technical highlight of this engine. It produces significant improvements in terms of fuel consumption, exhaust emissions and combustion noise.

Instead of the previous solenoid valves, the injectors are equipped with piezo-ceramics whose crystalline structure changes within milliseconds under an electric voltage.

This lifts the needle jet at the tip of the injector with a precision of only thousandths of a millimetre and thereby achieves an extremely fine jet of fuel.

Moreover, piezo injectors are considerably lighter and operate at twice the speed of conventional solenoid valves. With a response time of only 0.1 milliseconds, the fuel injection process can be even more precisely suited to the current load and engine speed situation, with favourable effects on emissions, fuel consumption and combustion noise.

Five fuel injections per power stroke at a peak pressure of up to 1600 bar are possible thanks to this piezo-ceramic technology.

An electrically controlled intake port shut-off modifies the swirl characteristics of the air flowing into the cylinders, which also optimises the combustion process with the aim of reducing the fuel consumption and exhaust emissions even further.

The likewise newly developed electronic control unit manages all the engine functions – from the quick-start glow system and automatic start function to control of the high-pressure pump. The VNT turbocharger (Variable Nozzle

Turbine) with electrically adjustable turbine blades, exhaust gas recirculation with a control valve and intake air throttling are also regulated as the situation requires on the basis of measured data.

Catalytic converters and a particulate filter for emission values below the EU-4 limits

Thanks to this precise engine management system, the nitrogen oxide and particulate emissions of the V6 engine are within the strict limits of the EU4 standard. Two oxidising catalytic converters are responsible for conversion of the carbon monoxide and hydrocarbons: a so-called starting converter located near the engine and a main converter in an underfloor location.

To reduce soot emissions even further, Mercedes-Benz offers a maintenance-free particulate filter system which is standard equipment in the new S 320 CDI in various markets. The filter regenerates without the use of additives by selective adjustment of different engine functions.

Depending on the operating parameters and filter condition, the variable third-generation common-rail technology allows up to two precisely coordinated post-injections with the aim of specifically increasing the exhaust temperature. This means that the particles trapped in the filter are burned off in a controlled manner.

Key data for the V6 turbo-diesel engine in the new S 320 CDI:

	S 320 CDI
Cylinder arrangement/ valves per cylinder	V6/4
Displacement	2987 cc
Cylinder angle	72°
Distance between cylinders	106mm
Bore/stroke	83mm x 92mm

Compression ratio	18 : 1
Maximum power	173 kW
Maximum torque	540 Nm at 1600-2800 RPM
Fuel consumption Combined l/100 km according to ADR 81/01)	8.3
Price (excludes dealer delivery and statutory charges)	$190,900
Available	Now

Mercedes-Benz S-Class: Superlative in design and technology

The introduction of the current-model award-winning S-Class (model code W 221) ushered in technical innovations which make the flagship Mercedes model an example for others to follow.

Pioneering safety features and exemplary comfort are once again the outstanding attributes of the S-Class. The range-leader of the Mercedes saloon family also sets standards with its agile handling, while offering an even more effortless driving experience thanks to its range of powerful and economical powertrain combinations.

For more than five decades, the letter "S" in the model designation of Mercedes cars has signified a special aura, intelligent technology and the highest quality.

The S-Class not only continues this tradition, but lends a new meaning to it. A dozen technical innovations entered series production for the first time on board the current S-Class – from Brake Assist PLUS with radar sensors to dynamic multicontour seats with an extended massage function, from night view assist with the latest infra-red technology to the new COMAND system, and from anticipatory PRE-SAFE® occupant protection to the Active Body Control (ABC) suspension system.

The flagship model by Mercedes-Benz is available in a choice of two body lengths - 5076 or 5206 millimetres – which is 33 and 43 millimetres more, respectively, than the previous S-Class it replaced. The wheelbase is 3035 (standard wheelbase) and 3165 millimetres in the long wheel base version. These dimensions create the basis for an interior space concept which offers all the passengers first-class comfort.

Suspension: AIRMATIC and ABC for even greater comfort with agile handling

Most models in the S-Class range (S 320 CDI, S 350, S 350 L, S 500 and S 500L) come fitted with a clever air suspension system called **AIRMATIC** as standard equipment. This suspension system contributes to the high level of ride comfort experienced in the S-Class.

Mercedes-Benz combines this air-springing system with the Adaptive Damping System (ADS), which continuously regulates the shock absorber characteristics and takes the road conditions, driving style and vehicle load into account. The system adapts the damping forces for each individual wheel to the current situation within just 50 milliseconds.

The Adaptive Damping System has been optimised by means of degressive shock absorber characteristics. This provides a greater ratio between the compression and rebound damping forces, thereby contributing greatly to the agile handling characteristics of the saloon.

Thanks to an improved calculation process, the system also detects the road surface conditions more precisely, and these are taken into account for adaptive control of the shock absorbers.

The "S/C/M" key in the centre console is another special feature of the S-Class. This enables the driver to alter the characteristics of the saloon from "comfortable" to "sporty", and to adjust the suspension, vehicle level and transmission mode individually. From 120 km/h and in the Sport mode, the suspension is automatically lowered by up to 20 millimetres to further improve the handling, aerodynamics and fuel consumption.

The **Active Body Control** active suspension system (optionally available on the S 500 and S 500L, standard equipment on the S 63 AMG, S 600L and S 65 AMG) is widely regarded as a milestone in automotive engineering. Body movements under hard driving are greatly reduced (by as much as 60

percent more compared with the previous model S-Class, model code W 220). As a result, the S-Class combines sporty handling with equally noticeable gains in comfort.

At a glance: suspension in the Mercedes-Benz S-Class

S-Class Model	AIRMATIC	Active Body Control (ABC)
S 320 CDI	Standard	Not Available
S 350 & S 350 Long Wheelbase	Standard	Not Available
S 500 & S 500 Long Wheelbase	Standard	Optional
S 63 AMG	Not Available	Standard
S 600 Long Wheelbase	Not Available	Standard
S 65 AMG Long Wheelbase	Not Available	Standard

Performance: over 26 percent more output from the new V8 engine

Australian S-Class customers can choose from six different engines when specifying their new range-leading saloon.

The **S 350** (available in both standard and long wheelbases) is powered by a 3.5-litre 200 kW petrol V6 engine which delivers 350 Nm of torque. The combined-cycle fuel consumption of this model is 10.2 litres per 100 kilometres (according to ADR 81/01). The S 350 accelerates from zero to 100 km/h in 7.3 seconds.

The stunning S 500 (also available in both standard and long wheelbases) is propelled by the same smooth 5.5-litre eight-cylinder petrol engine that powers numerous other models in the Mercedes range.

This power unit generates 285 kW of output and is among the most powerful engines in its displacement class. Maximum torque is also impressive: 530 Newton metres, and is available within a wide engine speed range between 2800 and 4800 rpm. As a result the eight-cylinder powerplant offers driving pleasure more typical of a sports car.

The **S 500** accelerates from zero to 100 km/h in 5.4 seconds. Remarkably, despite the 26 percent increase in output over its predecessor model (which produced 225 kW), the combined fuel consumption of 11.9 (standard wheelbase) and 12.0 (long wheelbase) litres per 100 kilometres remains the same.

This month sees the new 173 kW V6 turbo-diesel engine added to the award-winning S-Class range. This power unit supersedes the previous in-line six-cylinder unit of the previous-model **S 320 CDI** (not sold in Australia), improving output by 15 percent. Maximum torque has increased from 500 to 540 Newton metres, which is available from 1600 rpm for outstanding flexibility. This up-to-date direct-injection diesel unit consumes 8.3 litres of fuel per 100 km (combined cycle) and is equipped with a maintenance-free particulate filter as standard.

Leading the way in the S-Class range is the superlative **S 600**. Thanks to its breath-taking bi-turbo petrol engine, the twelve-cylinder S 600 saloon develops an output of 380 kW. Maximum torque has increased is an eye-opening 830 Newton metres, while fuel consumption is 14.3 litres per 100 kilometres. The V12 engine accelerates the S-Class from zero to 100 km/h in just 4.6 seconds.

Mercedes-AMG has also waved its magic wand over the luxurious S-Class range, offering the stunning S 63 AMG and S 65 AMG.

The **S 63 AMG** (available in standard wheelbase only) is powered by AMG's own all-aluminium 6.2-litre high-performance engine, the same race-derived power unit found in other exciting AMG-enhanced models such as the E 63

AMG saloon and estate and ML 63 AMG SUV. Its power output of 386 kW and torque of 630 Nm makes it one of the most exciting luxury cars available, and returns performance figures reminiscent of today's fastest dedicated sports cars: 0-100 km/h in 4.6 seconds on the way to a top speed of 250 km/h (electronically limited).

Partnering the exciting S 63 AMG is the stunning **S 65 AMG**. Under the bonnet of this luxurious saloon is an AMG-enhanced 6.0-litre V12 biturbo petrol engine, producing an impressive 450 kW of power at 4800 RPM. What's more, this twin-turbo engine generates a staggering 1000 Nm of torque between only 2000 and 4000 RPM, making for a 0-100 km/h time of 4.4 seconds and the same electronically limited top speed of the S 63 AMG, 250 km/h.

The V6 and V8 models in the new S-Class are equipped as standard with the 7G-TRONIC 7-speed automatic transmission, which is unique worldwide. A further innovation is DIRECT SELECT, an attractively styled steering-column selector lever which can be gently nudged to operate the 7G-TRONIC.

The S 63 AMG transfers its power to the road via the AMG SPEEDSHIFT 7G-TRONIC transmission and AMG steering wheel-mounted gearshift paddles.

Making use of all 1000 Nm of torque in the S 65 AMG is the AMG SPEEDSHIFT 5-speed automatic transmission, also operated by AMG steering wheel-mounted gearshift paddles.

Safety: Brake Assist with radar and latest-generation PRE-SAFE®

Mercedes-Benz showcases well-proven safety systems such as Brake Assist and PRE-SAFE® with the S-Class. These high-tech innovations greatly help to prevent accidents, improve occupant protection and assist the driver.

The **Brake Assist PLUS** system (BAS PLUS) registers vehicles ahead by radar and gives a warning if the gap is too small or the closing speed is too high. If a collision threatens, Brake Assist PLUS calculates the ideal braking assistance in fractions of a second and makes this available immediately – even if the driver applies too little pressure to the brake pedal. This significantly reduces the incidence of rear-end collisions.

Mercedes-Benz combines Brake Assist PLUS with the equally unique **PRE-SAFE®** occupant protection system, which offers even more safety functions on board the S-Class. PRE-SAFE® recognises potential accident situations as they arise: if braking deceleration exceeds a certain level or a skid is imminent, the system tensions the front seat belts as a precaution and inflates air cushions in the multi-contour seats to envelop and support the driver, front passenger and rear seat occupants.

This combination of the new Brake Assist PLUS system and PRE-SAFE® is a further enhancement to occupant protection. Mercedes-Benz was the world's first car maker with a comprehensive safety system of this kind, which goes into action as soon as an accident risk is detected.

DISTRONIC PLUS: assistance system for stop-and-go traffic

Brake Assist PLUS is available in combination with the equally clever **DISTRONIC PLUS** proximity control system. This radar-supported system now operates at all speeds between zero and 200 km/h, and ensures even greater driver convenience.

In stop-and-go traffic DISTRONIC PLUS keeps the new S-Class at the desired distance from the vehicle ahead, automatically brakes the saloon to a standstill if necessary and accelerates it back to the programmed speed when the traffic starts moving again. In this way the assistance system reduces the driver's workload and provides considerable benefits in driver-fitness safety.

The equipment package consisting of Brake Assist PLUS and DISTRONIC PLUS also includes **park assist**, which is based on radar technology. This system provides early warning of an impending collision when reversing.

Night view assist: more safety at night with infrared headlamps

With the innovative **night view assist** system which is premiered in the new S-Class, Mercedes-Benz has made a further, major contribution to reducing the risk of accidents during the hours of darkness. This system is based on infrared light, which is invisible to the human eye and will therefore not dazzle oncoming traffic. Two infrared headlamps illuminate the road, significantly extending the driver's range of vision when on low beam. An infrared camera mounted on the inside of the windscreen records the reflected image of the road ahead and displays this in the instrument cluster.

Bodyshell: High-tech steels for maximum safety

The bodyshell creates important conditions for the comfort, dynamism, durability and other major attributes of the S-Class. The static torsional rigidity of the body - an indicator for safe and comfortable handling - was improved by around twelve percent compared to the previous S-Class, for example, and is central to the car's on-road performance.

Approximately half of the bodyshell components are of high or higher-strength, **high-tech steel alloys** which offer maximum strength with minimum weight - an unprecedented level in car engineering. The bonnet, front wings, boot lid and other components are made of aluminium.

High-quality recyclates and renewable raw materials play an important role in the materials efficiency of the S-Class. A total of 27 components in the S-Class with a combined weight of around 43 kilograms are made from natural materials.

Compared to the preceding model series (model code W 220), this is an increase of approximately 73 percent in the total weight of components made from renewable raw materials.

Interior: Control concept with COMAND controller and direct access buttons

Getting in, driving and feeling at ease - this is the unique experience offered by the new S-Class. From the very first moment, man and machine enter into a harmonious relationship in the new S-Class.

This is also ensured by the car's well-proven **control concept**. The key characteristic is rapid access to functions which are used rather frequently. The system is therefore specifically designed for redundancy: depending on their preferred habits, the driver is able to control functions such as the radio, TV tuner, CD/DVD changer, telephone and navigation system either using conventional switches, via buttons on the multifunction steering wheel or with the help of the COMAND system. The direct control switches in the centre console are so ergonomically positioned that the driver is able to operate them conveniently and without looking down.

The innovative "Cockpit Management and Data System" - COMAND for short –offers a variety of features. In addition to the familiar telematic and audio units, various vehicle functions which traditionally require individual switches have been integrated into the system.

The central operating unit is the **COMAND controller** on the transmission tunnel. It is used to select the main and sub-menus with which the required functions are activated. The handrest can be flipped up to reveal the telephone keypad.

The large, pivoting COMAND colour display is positioned at the same level as the instrument cluster and is therefore even more visible to the driver.

The COMAND system in the S-Class includes a radio, CD/DVD player and a port for computer memory cards (PCMCIA cards) as standard.

Seats: improved multicontour technology and innovative back massage function

Mercedes customers in the S-Class are able to adapt the seats to their personal comfort requirements, as electrically adjustable **12-way front seats** with lumbar supports are standard equipment. Optional high-comfort heated seats with active ventilation (standard on S 63 AMG, S 600 and S 65 AMG), multicontour seats (front and rear) and dynamic multicontour seats for the front (optional equipment, standard on S 63 AMG, S 600 and S 65 AMG) are also available.

The sumptuous front seats are now equipped with eleven air chambers which enable the seat contours to be individually adjusted. New piezo valves on the air chambers operate much more rapidly than the previous technology, noticeably improving the dynamic response function of the multicontour seat.

Depending on the steering angle, lateral acceleration and road speed, the piezo valves vary the inflation pressure and volume of the air chambers in the sides of the backrests within fractions of a second, providing the driver and front passenger with even better lateral support.

The dynamic multicontour seat is also equipped with separate air chambers in the backrest which are successively inflated and deflated in a programmed sequence. Passengers in the S-Class can therefore enjoy a gentle back **massage** which stimulates the back muscles, assists the blood circulation and therefore helps to prevent premature fatigue. The Mercedes multicontour seat – available for the driver, front passenger and rear passengers – bears the seal of approval of "Aktion Gesunder Rücken", a German organisation which tests products for spine-friendly design.

Driver-fitness safety: less stress in the S-Class

The high levels of comfort and modern technology in the new S-Class relieve driver stress and have a positive effect on driver fitness. This is confirmed by a comparative scientific study between the S-Class and competing models on an approximately 500 km route, during which specialists from Daimler Research measured typical stress indicators.

Under the same driving and traffic conditions, the average heart rate of drivers in the Mercedes saloon was up to six percent (or five beats per minute) lower than that of drivers in competing models.

In the view of specialists, this is a clear indication of the high stress-relieving safety provided by the Mercedes flagship model. It enables the driver to concentrate on the traffic situation and maintains their performance reserves for safe, confident responses in critical situations. The first-class comfort of the S-Class therefore not only benefits personal wellbeing, but also general road safety.

The Mercedes-Benz S-Class: the first car in the world with environmental certification

The new luxury saloon by Mercedes-Benz is the world's first automobile to possess **environmental certification**. This confirms the environment-oriented development process for the S-Class, during which significant progress was made in several aspects. This environmental certification also makes the flagship Mercedes model an example and trendsetter in car development where ecological aspects are concerned.

The future of S-Class

2009: S 400 HYBRID sets a new note in the luxury segment

Mercedes-Benz will be launching an S-Class with petrol hybrid power on the market. In the S 400 HYBRID, which will be available from mid-2009 in Europe, the car's 205 kW V6 petrol engine is combined with a hybrid module delivering from the outset 160 Nm and 15 kW. The combined maximum power output is 220 kW, the combined maximum torque amounts to 375 Newton metres.

Announced at last year's Frankfurt International Motor Show, the S 400 HYBRID will accelerate in 7.3 seconds from 0 to 100 km/h and reach an electronically limited top speed of 250 km/h.

Yet even with such excellent performance, this superb combustion engine requires a mere 7.9 litres per 100 kilometres in the NEFZ cycle. This results in CO_2 emissions of just 190 grams per kilometre, making the S 400 HYBRID the most fuel-efficient luxury petrol engine saloon in the world, independently of whether competitors pit a petrol- diesel- or hybrid drive against it.

2010: S 300 BLUETEC HYBRID with 560 Nm and just 5.4 l/100 km

Also announced at last year's Frankfurt International Motor Show was the S 300 BLUETEC HYBRID, due to arrive on the market in 2010, too. This diesel BLUETEC/Hybrid combination develops a maximum torque of 560 Newton metres, comparable with that of a large-volume V8 petrol engine.

When combined with the standard 7G-TRONIC seven-speed automatic transmission, the S 300 BLUETEC HYBRID accelerates from 0 to 100 km/h in just 8.4 seconds, and it can reach a top speed of 240 km/h. Even with this superior performance, fuel consumption stands at just 5.4 litres of diesel per 100 kilometres, corresponding to a mere 142 grams of CO_2 per kilometre -

57 grams, or some 30 per cent, less than the current best saloon in the S-Class segment anywhere in the world.

The S-Class uses the version of BLUETEC with AdBlue injection system. Thanks to the combination of BLUETEC and hybrid technology - the only combination of this nature in the world, delivering the most economical and environmentally compatible premium cars in the world - the S 300 BLUETEC HYBRID has the potential to meet the most stringent emissions standards applicable anywhere in the world – for example, the European EU6 standard or the US 50-state BIN5 standard.

Enjoyable and economical driving from one efficient unit

The compact hybrid module installed in all planned S-Class hybrids comprises a disk-shaped electric engine, which also functions as a starter motor and dynamo. This system offers a double benefit, working on the one hand in various ways to save fuel, and making driving so much more fun.

The main reason for the increased driving enjoyment is what is known as the boost effect, whereby the electric engine supports the combustion engine during the high-consumption acceleration phase with a maximum extra torque of
160 Newton metres. With this high torque the electric engine assists the combustion engine heartily when accelerating from very low engine speeds. As a result, the combustion engine itself needs less time and energy to build up its maximum torque. The only thing the driver notices from this synergy of the two power units is a supremely effortless power output whenever he starts off.

The hybrid module also features a comfortable start-stop function which switches the engine off whenever the vehicle stops, for example at traffic lights. Once the vehicle is ready to move off again, the electric engine starts the main engine again so gently, that it remains virtually unnoticed. This of course also contributes to fuel savings and is kind to the environment: since

the engine starts virtually immediately, virtually no unburned fuel is discharged when starting off. When decelerating, on the other hand, the electric engine functions as a generator, and can recover braking energy in what is known as the recuperation process. This energy is stored in a powerful but compact lithium-ion battery pack in the engine compartment, ready for use when required.

The engine management of this complex system is governed by a powerful control unit, which is also installed close to the engine.

Mercedes-Benz S 320 CDI: technical data

Engine

No. of cylinders/arrangement		6/vee configuration, 4 valves per cylinder
Displacement	cc	2987
Bore x stroke	mm	83.0 x 92.0
Rated output	kW	173 at 3600 RPM
Rated torque	Nm	540 at 1600 – 2400 RPM
Compression ratio		17.7 : 1
Mixture formation		High-pressure injection with common-rail technology, turbocharger, EDC

Power transfer

Transmission		Seven-speed automatic transmission
Ratios	Final drive	2.65
	1st gear	4.38
	2nd gear	2.86
	3rd gear	1.92
	4th gear	1.37
	5th gear	1.00
	6th gear	0.82
	7th gear	0.73
	Reverse	3.42

Chassis

Front axle	Four-link suspension, AIRMATIC fully supporting air suspension with level control, torsion bar stabiliser
Rear axle	Multi-link independent suspension, AIRMATIC fully supporting air suspension with level control, torsion bar stabiliser
Braking system	ADAPTIVE BRAKE hydraulic dual-circuit

	braking system all round with vacuum booster and Brake Assist, internally ventilated front discs, solid rear discs, electric parking brake, ABS, ESP®
Steering	Rack-and-pinion speed-sensitive power steering, steering damper
Wheels	8 J x 17
Tyres	235/55 R 17

Dimensions and weights

Wheelbase	mm	3035
Track width front/rear	mm	1604/1606
Overall length	mm	5076
Overall width	mm	1871
Overall height	mm	1473
Turning circle	m	11.8
Luggage capacity max.*	l	560
Kerb weight acc. to EC	kg	1955
Payload	kg	595
Perm. gross vehicle weight	kg	2550
Tank capacity/reserve	l	90/11

Performance and fuel consumption

Acceleration 0-100 km/h	s	7.8
Top speed (electronically limited)	km/h	210
Fuel consumption comb. (ADR 81/01)	l/100 km	8.3
CO2 emissions	g/km	220

*acc. to VDA measuring method

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