

# Mercedes-Benz E 63 AMG

**Press Information**

## **Contents**

**Page** 29 June 2009

### Short version

#### **Mercedes-Benz E 63 AMG**

The new generation of dynamic sports saloons with day-to-day suitability

2

### Long version

#### **Engine**

Powerful V8 naturally aspirated engine with lower fuel consumption

9

#### **Power transfer**

Exclusive driving pleasure courtesy of AMG SPEEDSHIFT MCT 7-speed sports transmission

15

#### **Chassis and braking system**

Innovative new features for superlative driving dynamics

19

#### **Design and equipment**

Effortless superiority with a decidedly sporty character

25

#### **Safety**

"Intelligent" partner thanks to unique combination of assistance and protection systems

30

#### **Development and testing**

Meeting the toughest of requirements - extreme "accelerated" testing

33

#### **History**

A tradition of top performance

41

#### **Technical data**

46

## The E 63 AMG – the new generation of dynamic sports saloons with day-to-day suitability

**Affalterbach – AMG, the high-performance brand within Mercedes-Benz Cars, is presenting the new E 63 AMG. This dynamic sports saloon with day-to-day suitability is the top-of-the-line E-Class model, offering an impressive combination of outstanding performance, exhilarating driving dynamics and a technology transfer from the SL 63 AMG high-performance Roadster.**

**The new E 63 AMG distinguishes itself from the regular E-Class models with the powerful AMG 6.3-litre V8 engine, the completely newly developed AMG RIDE CONTROL sports suspension with electronically controlled damping and a new front axle, and with its autonomous exterior and interior design. Newly developed ceramic composite brakes are also available as an option for the top-of-the-line E-Class model. Mercedes-AMG has achieved a reduction in fuel consumption of almost twelve percent for the new E 63 AMG, thanks to the concerted use of fuel-efficiency measures. With its unique combination of pioneering driver assistance systems, the E 63 AMG further consolidates the brand's leading position in the field of automotive safety.**

The AMG 6.3-litre V8 engine in the new E 63 AMG develops an output of 386 kW/525 hp and a torque of 630 newton metres, matching the outstanding figures for the SL 63 AMG. The high-performance Roadster has also donated its AMG SPEEDSHIFT MCT 7-speed sports transmission to the new model. This transmission dispenses with a conventional torque converter and uses a compact, wet start-up clutch. In conjunction with the four individual drive modes, the double-declutching and Race Start functions, the resulting direct connection to the powertrain allows an extremely emotional and highly dynamic driving experience.

The drive unit is unique in this segment, and ensures decidedly sporty performance figures: the E 63 AMG accelerates from standstill to 100 km/h in just 4.5 seconds, with a top speed of 250 km/h (electronically limited). The high-revving,

naturally aspirated engine with a displacement of 6208 cc impresses with its agile responsiveness, muscular power delivery and great flexibility. The newly composed AMG V8 sound is a thrilling accompaniment for mile after mile, while the smooth-running engine guarantees typical Mercedes long-distance comfort. A newly designed water cooling system ensures maximum endurance even under the enormous dynamic stresses of the racetrack.

### **Fuel consumption cut by almost twelve percent**

Despite 8 kW/11 hp of additional output versus the preceding model, the fuel consumption of the new E 63 AMG has been significantly reduced: at 12.6 litres of super-premium grade petrol per 100 kilometres (NEDC combined consumption), the fuel consumption of the E 63 AMG is almost twelve percent lower than before, and leads the field among sports saloons developing more than 377 kW/500 hp. This progress has been made possible by a package of efficiency-enhancing measures. These include on-demand delivery of fuel and alternator management with recuperation of braking energy on the overrun, both of which are standard in the new E 63 AMG. In-engine friction is also reduced by the AMG-exclusive twin-wire arc spray coating process used on the cylinder walls.

The AMG SPEEDSHIFT MCT 7-speed sports transmission also makes a decisive contribution to fuel economy: a wet start-up clutch running in an oil bath replaces the previous torque converter. This unit responds extremely rapidly, dynamically and without the losses typical of a torque converter transmission thanks to its low rotational inertia. The transmission is equipped with four drive modes: "C" (Controlled Efficiency), "S" (Sport), "S+" (Sport plus) and "M" (Manual), which can be selected using a rotary electronic switch in the AMG DRIVE UNIT. Partial suppression of individual cylinders by interrupting ignition and injection briefly during gearshifts under full load leads to considerably faster shift times. In M mode the AMG SPEEDSHIFT MCT 7-speed sports transmission allows gearshifts to be performed in 100 milliseconds.

In the even more fuel-efficient drive mode Controlled Efficiency, the transmission shifts the gears decidedly smoothly, and the transmission control unit is pro-

grammed to perform early upshifts to keep engine speeds as low as possible. At the same time the AMG SPEEDSHIFT MCT 7-speed sports transmission meets the most demanding requirements where driving dynamics are concerned: fast, spontaneous multiple downshifts ensure first-class agility in conjunction with the automatic double-declutching and Race Start functions: this enables the E 63 AMG driver to call on the maximum acceleration potential automatically.

### **Electronically controlled damping system and a new front axle**

Sporty or more comfort-oriented? The driver of the new Mercedes-Benz E 63 AMG is not obliged to accept any compromises in this respect. The AMG RIDE CONTROL sports suspension copes equally well with the agile manoeuvres of the race-track and more comfortable, sedate driving. High performance and typical Mercedes long-distance comfort go together as an extraordinary synthesis in the E 63 AMG. This is made possible by the likes of the newly developed AMG RIDE CONTROL sports suspension. While new steel spring struts are used on the front axle, the rear suspension features AMG-specific air springs. The advantage of this solution, which is exclusive to AMG, is that the front steel spring struts ensure more sensitive responses while the rear air struts with their automatic level control system keep the vehicle at a constant height irrespective of the load.

A new, electronically controlled damping system automatically varies the damping characteristics according to the driving situation, reducing the roll angle of the body. The result is instant adjustment to provide the best possible ride comfort together with the greatest possible agility. In addition the driver is able to choose between the three suspension modes of Comfort, Sport and Sport plus at the touch of a button. The E 63 AMG is also equipped with a newly developed, dedicated front axle with a 45-millimetre wider track, a tubular stabiliser, new control arms, new wheel bearings, new elastokinematics and new hub carriers for more negative camber – thereby providing more grip when taking bends at speed. The AMG-specific kinematics also ensure significantly more precision. This is a highly sophisticated axle design whose principle has already proved its

worth in the C 63 AMG. The rear axle likewise has more negative camber, optimised elastokinematics and a new subframe mounting for greater stability at the physical limits.

### **Newly developed power steering and individual 3-stage ESP®**

For more direct responsiveness, the speed-sensitive rack-and-pinion steering is also a new development. The steering ratio of 14 : 1 is 22 percent more direct than in the standard production models, while a more rigid steering column plus the reconfigured characteristic mapping of the speed-sensitive servo assistance ensure better steering precision and improved road contact.

The 3-stage ESP® familiar from the SL 63 AMG and C 63 AMG enables individual settings to be selected – with clear benefits in terms of driving pleasure combined with the same, high level of handling safety. The ESP® button in the AMG DRIVE UNIT allows the driver to choose between "ESP ON", "ESP SPORT" and "ESP OFF" – with the currently active mode shown in the central display of the AMG instrument cluster. Perfect deceleration even when driving extremely briskly is ensured by the AMG high-performance braking system with 360-millimetre, internally ventilated and perforated brake discs all-round. Particularly resistant, motorsports-tested composite technology is used at the front axle. The newly developed, optional ceramic composite brakes with larger brake discs guarantee even better brake performance and lower unsprung masses. The ceramic brake discs will perform reliably at even higher operating temperatures thanks to their greater hardness, all combined with an impressive weight reduction of around 40 percent. Outstanding grip is ensured by the 18-inch AMG light-alloy wheels with a width of nine and 9.5 inches and mixed tyre sizes of 255/40 R 18 at the front and 285/35 R 18 at the rear.

### **Decidedly dynamic interior and exterior**

The decidedly dynamic design of the E 63 AMG is fully in keeping with the uncompromisingly sporty technology. The front aspect is characterised by 17-millimetre wider wings bearing "6.3 AMG" lettering, the new AMG front

apron with large intake air apertures and the AMG-specific daytime driving lights in LED technology. In conjunction with the optional Intelligent Light System, the E 63 AMG is equipped with tinted main headlamps. The striking visual presence is further enhanced by the AMG side sill panels and AMG rear apron with a black insert. As a hallmark of the brand, the AMG sports exhaust system has two newly designed, chrome-plated twin tailpipes.

The newly designed interior of the E 63 AMG is an exciting blend of high-grade materials and functional sportiness. Exclusive features include the dedicated, electrically adjustable AMG sports seats with improved lateral support and the AMG sports steering wheel in a four-spoke design with AMG shift paddles. The AMG DRIVE UNIT provides adjustments for the MCT sports transmission, the ESP functions, the suspension set-up and the AMG drive modes. The AMG E-SELECT selector lever in the centre console is a completely new feature for the DRIVE UNIT. The driver can shift directly between R, N and D simply by nudging the lever, all thanks to drive-by-wire; P can only be selected by pressing a button. Standard equipment also includes high-grade leather upholstery in three different colours, the AMG instrument cluster with an AMG main menu, door entry sills with AMG lettering and a sports pedal cluster – both in brushed stainless steel.

### **Even more individuality with tailor-made AMG extras**

Customers requiring even more sporty individuality are catered for by the AMG Performance Studio: the E 63 AMG can, for instance, be dynamically enhanced even further ex factory, with the Performance package. This includes the following:

- Lightweight, forged 19-inch AMG light-alloy wheels with size 255/35 R 19 tyres at the front and 285/30 R 19 at the rear
- AMG RIDE CONTROL Performance suspension with a stiffer set-up
- AMG rear axle locking differential with 40 percent locking action
- AMG spoiler lip on the boot lid
- AMG Performance steering wheel in a three-spoke design
- Roller blind for rear window

The AMG Exclusive package provides a luxurious touch in the interior. It includes:

- Nappa leather appointments for the seats, top section of the dashboard, the beltlines, the door armrests as well as the centre console and door centre panels
- Roof liner as well as A, B and C-pillars and sun visors in Alcantara®
- AMG floor mats

Optional extras from the AMG Performance Studio are also individually available ex factory:

- Lightweight, forged 19-inch AMG light-alloy wheels with size 255/35 R 19 tyres at the front and 285/30 R 19 at the rear
- AMG rear axle locking differential with 40 percent locking action
- Brake callipers, painted red (scheduled to be available from 4th quarter of 2009)
- AMG Exterior Carbon package
- AMG Performance steering wheel in a three-spoke design with Alcantara® inserts in the grip areas
- AMG carbon trim elements
- Illuminated AMG door entry sills
- AMG Driver's Package (includes restriction of top speed to 300 km/h, attendance at driver training at the AMG Driving Academy, AMG spoiler lip and roller blind for rear window)
- AMG floor mats

### **Active and passive safety at a new level**

The flagship AMG model in the E-Class traditionally meets the very highest expectations with respect to active and passive safety. Naturally this also applies to the new E 63 AMG: standard features include the new drowsiness detection system ATTENTION ASSIST, the unique anticipatory occupant protection system PRE-SAFE®, BAS PLUS, seven airbags and crash-responsive NECK-PRO head restraints. On request the safety features can be brought to a level unprecedented

in this vehicle class with the Lane Keeping Assist and Blind Spot Assist systems,  
the PRE-SAFE® Brake with an automatic emergency braking function, Adaptive  
Highbeam Assist, Night View Assist and Speed Limit Assist.

Page 8

The market launch of the new E 63 AMG will commence in August 2009.

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[www.media.daimler.com](http://www.media.daimler.com)

## Powerful, high-revving V8 naturally aspirated engine with lower fuel consumption

**Powerful power delivery, impressive pulling power, exhilarating agility – coupled with frugal fuel consumption. The AMG 6.3-litre V8 engine in the new Mercedes-Benz E 63 AMG combines these apparently contradictory qualities. All thanks to an entire package of efficiency-enhancing measures.**

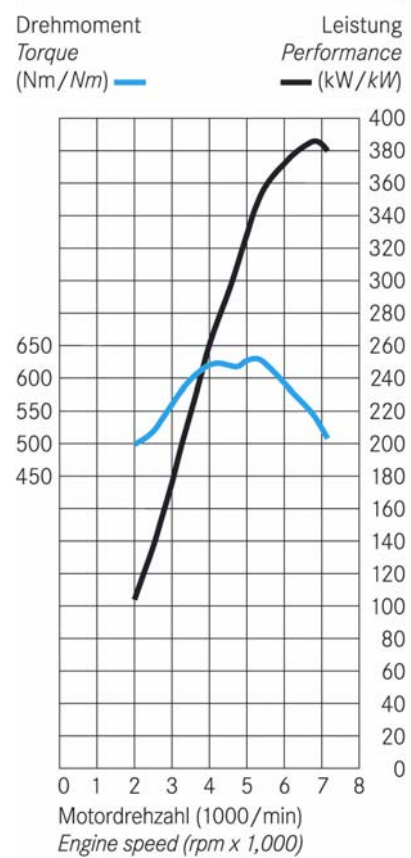
With peak output of 386 kW/525 hp from a displacement of 6208 cc the AMG 6.3-litre V8 engine ranks among the world's most powerful standard-fit eight-cylinder naturally aspirated engines. The rated speed of 6800 rpm and the maximum engine speed of 7200 rpm are the hallmarks of this high-revving engine. But it also boasts enormous pulling power: developing 630 newton metres at 5200 rpm, the AMG V8 offers more torque than any other naturally aspirated engine in this displacement and performance class. High pulling power at low engine speeds, instant responsiveness and exhilarating high-revving flexibility are the strengths of the AMG 6.3-litre V8 engine unveiled in 2005.

With fuel consumption of 12.6 litres per 100 kilometres the new E 63 AMG betters its predecessor by 1.7 l/100 km or 12 percent, despite the extra output of 8 kW/11 hp. As such, the new high-performance saloon leaves the competition standing. This significant reduction in fuel consumption comes courtesy of a wealth of innovative measures: the E 63 AMG is the first AMG model to feature alternator management with braking energy recovery as standard. The controlled fuel supply, friction-optimised twin-wire-arc-sprayed (TWAS) coating on the cylinder walls and the AMG SPEEDSHIFT MCT 7-speed sports transmission with the Controlled Efficiency consumption-optimised transmission mode and wet start-up clutch, which replaces the torque converter, (see page 15) are crucial elements in improving efficiency.

	<b>Mercedes-Benz E 63 AMG</b>
<b>Cylinder arrangement</b>	V8
<b>Cylinder angle</b>	90°
<b>Valves per cylinder</b>	4
<b>Displacement</b>	6208 cc
<b>Bore x stroke</b>	102.2 x 94.6 mm
<b>Cylinder spacing</b>	109 mm
<b>Compression ratio</b>	11.3 : 1
<b>Output</b>	386 kW/525 hp at 6800 rpm
<b>Output per litre</b>	62.2/84.6 kW/hp
<b>Max. torque</b>	630 Nm at 5200 rpm
<b>Torque per litre</b>	101.5 Nm
<b>Maximum engine speed</b>	7200 rpm
<b>Engine weight (dry)</b>	199 kg
<b>Fuel consumption NEDC combined</b>	12.6 l/100 km
<b>CO<sub>2</sub> emissions</b>	299 g/km
<b>Acceleration 0-100 km/h</b>	4.5 s
<b>Top speed</b>	250 km/h*

\* electronically limited

**Mercedes-Benz E 63 AMG**  
**Leistungsdiagramm**  
**Power Output Graph**



## **Recuperation: generating energy during braking**

Page 11

Alternator management on the new E 63 AMG takes advantage of the engine's overrun phases and braking to recover kinetic energy. This energy is then used to charge the battery, rather than being wasted by simply generating heat. This recuperation assists the driver not only during braking action but also helps convert the braking energy into electrical energy. Conversely, the alternator is switched to no-load operation during acceleration, thus reducing the load on the engine. All of which saves fuel: some 0.15 litres per 100 kilometres as per NEDC ratings and up to 0.2 l/100 km on urban roads with frequent overrun and braking phases.

The twin-wire-arc-sprayed (TWAS) coating on the cylinder walls – used exclusively by AMG – produces outstanding low friction while reducing fuel consumption at the same time. The electronically controlled fuel supply works in the same way: depending on the power requirements and outside temperature, the system operates at a demand-actuated fuel pressure of between 3.6 and 4.5 bar and is regulated at lightning speed. The engine management system translates the command from the accelerator within milliseconds into the corresponding fuel pressure setting. Such control ensures rapid vehicle response and a sporty thrust across all load ranges and at all engine speeds.



**Technology transfer from motor racing: the AMG 6.3-litre V8 engine**

### **Know-how from motor racing went into the design**

In typical AMG fashion, the design of the AMG 6.3-litre V8 engine has been based closely on its motorsports counterparts. As customary with the thoroughbred racing engines, the AMG engineers opted for a closed-deck design with the crankcase made entirely out of aluminium for the eight-cylinder unit. To produce a crankcase with superb torsional stiffness, the bottom section of the crankcase has been designed as a bedplate. This produces a very stiff tunnel for the crankshaft which can easily withstand the high combustion pressures and reduces flow losses within the crankcase. The resulting improvement in mechanical efficiency helps reduce fuel consumption. An oil scavenger integrated into the bedplate reduces engine oil foaming.

The finely balanced crankshaft is designed for the highest stresses, consists of the high-quality forged steel alloy 42CRMo4V, rotates in five crankshaft bearings and features six counterweights for perfectly balanced masses. Torsional rigidity, long-term structural strength and inertia characteristics are also to the very highest standards. Two lightweight connecting rods forged by the cracking process are connected to each of the four crank pins. During this process, the utmost production precision is made possible by a predetermined breaking point created by a laser beam. Extremely close weight tolerances between the eight connecting rods are also ensured by precision machining. The same principle is also used for the cast, lightweight pistons. They are made from a durable high-temperature alloy. Pressure-controlled oil spray nozzles in the crankcase ensure optimal cooling of the highly stressed piston crowns.

### **Variable intake manifold with two internal throttle flaps**

The aerodynamically designed intake system with large cross-sections and the variable intake manifold made of magnesium with two integrated throttle flaps ensure superlative cylinder charging. Its task is to ensure a strong torque curve by lengthening the airflow distance at low engine speeds. At higher engine speeds the intake manifold switches to short airflow distances to achieve a high

peak performance. The two throttle flaps can be opened to their maximum in just 100 milliseconds at full throttle, and the driver perceives this as extraordinary responsiveness.

### **Rigid valve train, four overhead camshafts**

The 32 valves in the cylinder heads are operated by bucket tappets. Their space-saving design allows a stiff valve train and therefore high engine speeds with large valve opening cross-sections, which in turn benefits output and torque. The large intake valves have a diameter of 40 millimetres, while their opposite numbers on the exhaust side measure 34 millimetres.

All four overhead camshafts are continuously variable over a range of 42 degrees. Both the intake and exhaust camshafts are adjusted as a function of engine load and engine speed, ensuring extremely high output and torque values and smooth idling, and especially low exhaust emissions. Depending on the engine speed, the valve overlap can be varied to ensure an optimal supply of fuel/air mixture to the combustion chambers and efficient venting of the exhaust gases. The system is driven by a duplex roller chain and intermeshing pairs of gear wheels.

### **Sophisticated engine cooling solution**

A powerful oil pump is used for the oil cooling system on the engine. As in thoroughbred racing engines, the engine is cooled on the sophisticated cross-flow principle. In the interests of optimal in-engine friction and fuel economy, the temperature of the coolant is also variably controlled. The lightweight, compact and powerful cooling module – located behind the large apertures in the AMG front apron – for coolant, engine, transmission and power-steering oil ensures non-critical operating temperatures – even under the extreme stress of the race-track. The hot air from the suction-type fan used for engine oil cooling is vented via the side apertures in the AMG front apron.

## **Distinctive AMG V8 vocals, efficient emission control system**

Page 14

The newly composed AMG V8 vocals fully live up to the expectations of a powerful high-performance saloon: a powerful engine sound when accelerating coupled with restrained running characteristics during smooth cruising, providing hallmark Mercedes long-distance comfort. The AMG experts have resolved this conflict of aims with a newly developed AMG sports exhaust system; it comes with carefully matched tube cross-sections and two newly designed chrome-plated twin tailpipes.

Thanks to efficient emission control technology, the E 63 AMG meets current EU 5 exhaust emission standards and all requirements of the U.S. market (LEV-II standard, On-Board Diagnosis II and oxygen sensor diagnosis).

## **Engine production – tradition of hand-built excellence**

The AMG 6.3-litre V8 engine has traditionally been built by hand. In the AMG engine workshops, which were opened in 2002, a highly qualified engineer assembles an eight-cylinder engine according to the company's philosophy of "one man, one engine" in compliance with the most stringent quality standards. The engineer's signature on the characteristic AMG engine plate is testimony to the highest standards of workmanship. Production takes around three hours.

In the coveted "International Engine of the Year Awards 2009", the AMG 6.3-litre V8 engine carried off two awards: in the "Best Performance Engine" and "Above 4 litres" categories, this high-revving, naturally aspirated engine took first place by a wide margin in each case.

## Exclusive driving pleasure courtesy of AMG SPEEDSHIFT MCT 7-speed sports transmission

**Seven gears, four drive modes, double-declutching and Race Start function – the power transfer on the new E 63 AMG promises superb emotion and pure driving pleasure. At the same time, the AMG SPEEDSHIFT MCT 7-speed sports transmission contributes substantially to reducing fuel consumption.**

The AMG SPEEDSHIFT MCT 7-speed sports transmission is an innovative power transfer system that made its debut in the high-performance SL 63 AMG Roadster in 2008. It combines the sporty, direct and agile feedback of a manual transmission and the maximum convenience of an automatic transmission. Fitted with seven speeds, four drive modes, a double-declutching and Race Start function, the AMG SPEEDSHIFT MCT 7-speed sports transmission offers superb versatility. MCT stands for Multi-Clutch Technology and only employs clutch elements to perform gearshifts.

A wet start-up clutch, which runs in an oil bath, replaces the conventional torque converter. Thanks to its low rotational inertia, the transmission responds instantaneously and dynamically without the losses typical of a torque converter transmission – thereby helping to save fuel. The AMG sports transmission also impresses with its low weight of just 80 kilograms, which has been made possible through the use of lightweight magnesium for the transmission housing. Vibrations are effectively eliminated by a new, two-stage torsion damper, with resulting benefits in perceived passenger comfort.

### **Consumption-optimised drive mode "C" (Controlled Efficiency)**

During development of the E 63 AMG the AMG engineers paid special attention to the new drive mode "C" (Controlled Efficiency). The emphasis was on delivering minimum engine speed coupled with a reduced number of gearshifts in all driving situations. When moving off in "C", the MCT transmission always selects sec-

ond gear and shifts decidedly early to next higher gears if the driving style permits. At 60 km/h for instance, sixth gear will already be engaged – not only improving fuel consumption but noise levels, too. Controlled Efficiency also means convenient gearshifts and a "soft" accelerator response set-up for outstandingly smooth power transfer.

The powerful electronic control unit and the integrated 80 MHz processor ensure spontaneous downshifts at the same time – say when approaching traffic lights or if the driver suddenly needs power for dynamic acceleration.

### **Drive modes "S", "S+" and "M" for even more driving pleasure and dynamism**

The engine and transmission come across as much more agile in the "S" (Sport) mode. Accelerator pedal movements trigger a more direct traction response, making the downshifts more spontaneous. The engine speed is allowed to reach a higher level in each gear, while the gearshifts are around 25 percent faster than in "C". Turning the rotary switch in the AMG DRIVE UNIT a notch further to the right activates "S+" mode. Sport plus shifts the gears another 25 percent faster than in "S". The same applies to the manual shift mode "M". In "S+" and "M" modes, gearshifts at full throttle take just 100 milliseconds.

The engine management system partially suppresses cylinders in "S", "S+" and "M" modes: precisely interrupting ignition and injection under full load for brief periods leads to even faster gearshifts than before. The highly emotional vocals are an appealing side effect of this lightning-fast process.

Ultra-fast, spontaneous multiple downshifts are another forte of the AMG SPEEDSHIFT MCT 7-speed sports transmission. For instance, kickdown lets you move straight from seventh down to fourth gear or from fifth to second. In the Sport, Sport plus and Manual modes the automatic double-declutching function is active. Every manual or automatic downshift is accompanied by precisely metered double-declutching – from "S" through "S+" to "M" incrementally. And this not only adds to the driver's emotional experience: the load-free downshift minimises

load-change reactions, which pays dividends particularly when braking into a bend on the racetrack and also enhances safety in the wet or on ice.

In manual “M” mode the driver also benefits from the high torque of the V8 engine, as there is no automatic downshift under full load and kickdown; the transmission remains steadfastly in the selected gear. Moreover, the AMG MCT sports transmission does not perform an automatic upshift in manual mode when the rev limit is reached. In “M” mode the AMG instrument cluster displays the current gear and alerts the driver to the need for an upshift just before the needle reaches the red zone. This means that a particularly sporty driver can use the superior performance potential to its fullest extent. When approaching the lower rev limit, e.g. when braking the vehicle, there is an automatic downshift to the next lower gear.

### **AMG DRIVE UNIT with Race Start function**

The AMG DRIVE UNIT is the central control unit for the AMG SPEEDSHIFT MCT 7-speed sports transmission and all driving dynamics functions. The driver can change gears either using the new AMG E-SELECT selector lever or via the AMG steering-wheel shift paddles. On the left next to the selector lever is the electronic rotary switch to select the four drive modes including activation of the Race Start function. Underneath are three buttons for additional functions: the first controls the ESP<sup>®</sup> function, the second the AMG RIDE CONTROL sports suspension. The third adorned with AMG lettering is used to store the personal set-up. Briefly pressing the AMG button brings up the configuration options, whilst holding down the button allows you to program the required set-ups - this is confirmed by an acoustic signal. The current settings may be viewed in the AMG instrument cluster by pressing the AMG button at any time.

The Race Start function delivers maximum dynamism: while the vehicle is at a standstill, the driver needs to activate the ESP<sup>®</sup> sports function and press the brake pedal with their left foot. Having preselected the Race Start program using the rotary switch, a confirmation message comes up on the AMG central display. The driver then simply needs to confirm the Race Start function by pulling the “Up” shift paddle once, fully depressing the accelerator and taking his foot off the brake. The optimum start-up engine speed is set fully automatically and the

E 63 AMG accelerates away with flawless traction – all the way up to top speed, if so required. The driver does not need to shift gear manually; the AMG transmission changes gear with lightning-fast shift times. Page 18

## Innovative new features for superlative driving dynamics

**High cornering speeds, exhilarating driving dynamics coupled with typical Mercedes long-distance comfort – when it comes to the chassis and braking system, AMG has developed innovative systems that ensure the new E 63 AMG consolidates its leading position in the high-performance saloon segment.**

The sophisticated AMG RIDE CONTROL sports suspension on the E 63 AMG combines steel suspension at the front, while an all-air suspension system is used at the rear. This exclusive solution guarantees a sensitive response from the front springs while the vehicle is kept at a constant height thanks to the automatic level control system – irrespective of the load. The top-of-the-line AMG model differs from the other E-Class variants with its newly developed three-link front suspension with wider track – 45 mm wider than the E 500. In conjunction with new hub carriers for more negative camber at the front, this provides much more grip when taking bends at high speed.

Another feature of the AMG RIDE CONTROL sports suspension is the electronically controlled damping system: the system varies the damping characteristics instantly according to the driving situation, road speed and load status, reducing the roll angle of the body. For the driver this means instant, continuously variable adjustment between the greatest possible agility and optimum ride comfort – depending on the driving style and route. The damping can also be individually adjusted by pressing the appropriate button in the AMG DRIVE UNIT. A push of a button is all it takes for the electronics to switch from "Comfort" to "Sport" or "Sport plus." The selected mode is displayed in the AMG instrument cluster.

"Comfort" delivers a sensitive response with soft damping characteristics, while the shock absorber response is an average 40 percent firmer in "Sport". "Sport plus" is ideal for challenging laps on a racetrack: in addition to the higher damp-

ing force, this mode comes with specific control algorithms that have been tailor-made for a decidedly sporty driving style on level road surfaces. The E 63 AMG can be dynamically enhanced even further ex factory, with the Performance package: The Performance package includes the AMG RIDE CONTROL Performance suspension with its even firmer set-up, lightweight forged 19-inch AMG light-alloy wheels, and a rear axle locking differential with 40 percent locking action (see also page 27).

### **Eleven sensors for electronic damper control**

The electronic damper control utilises four sensors to permanently monitor the drive and brake torque along with steering angle and lateral acceleration. Four position sensors are also used to determine the ride height and to ascertain the direction of motion. Three acceleration sensors help identify the absolute body roll.

Powerful control electronics that interact constantly with the engine and transmission control units instantly adjust the forces at the four shock absorbers.

### **New axle components and more direct steering**

The high-grade axle components provide further testimony to the painstakingly redesigned AMG RIDE CONTROL sports suspension. New steering knuckles, wishbones, torque strut bearings and head bearings at the front provide extra stability and improved road contact. A weight-optimised, thicker tubular stabiliser reduces body roll on fast S-shaped bends. The rear suspension has also been substantially reworked in the interests of enhanced handling stability: new track rods, push-pull rods and far more rigid mountings for the subframe – on which the rear axle is mounted –, translate into enhanced dynamics when cornering. The AMG-specific kinematics and the new elastokinematics on both axles also noticeably increase precision during cornering – a solution that has already proven itself on the C 63 AMG.

Added to which is the newly developed rack-and-pinion steering: the selected steering ratio which is 22 percent more direct (14 : 1), together with the reconfigured characteristic mapping of the speed-sensitive servo assistance conveys more agile cornering. More feedback in all driving situations comes courtesy of the Hardy disc made out of a rubber compound that is 33-percent harder; it sits between the steering shaft and steering coupling.

### **3-stage ESP<sup>®</sup> with Sport function as in the SL 63 AMG**

The 3-stage ESP<sup>®</sup> is also consistently tailored to the superb dynamic qualities of the E 63 AMG: familiar from the SL 63 AMG and C 63 AMG, the Electronic Stability Program supports three individual control strategies at the push of a button: the ESP<sup>®</sup> button in the AMG DRIVE UNIT allows the driver to choose between "ESP ON", "ESP SPORT" and "ESP OFF" – with the currently active mode shown in the display of the AMG instrument cluster. In "ESP ON", the onset of handling instability leads to braking intervention at one or more of the wheels, accompanied by a reduction in engine torque.

Briefly pressing the ESP<sup>®</sup> button activates "ESP SPORT". In this mode the braking intervention to counter oversteer or understeer, as well as the accompanying reduction in engine torque, allows a higher dynamic threshold and, for instance, corresponding drift angles – providing the driver with the benefit of far greater driving pleasure. Operating the brake pedal restores all the normal ESP<sup>®</sup> functions. Prolonged pressure on the ESP<sup>®</sup> button activates "ESP OFF". There is no intervention to control the handling dynamics and generally no reduction in engine torque – thus increasing driving enjoyment even further. "ESP OFF" should only be used by experienced drivers on dedicated racetracks. In this mode too, operating the brake pedal restores all the normal functions of ESP<sup>®</sup>.

The system's traction logic is active in all three ESP<sup>®</sup> modes. If one of the drive wheels starts to spin, specific brake pressure is applied to virtually create the effect of a mechanical differential lock. This means that the engine power is transferred to the road even more effectively.

## **New AMG ceramic composite brakes as an option**

Page 22

As you would expect from an AMG high-performance car, the new E 63 AMG also comes with an ultra-powerful braking system. Internally ventilated and perforated brake discs with their generous 360-millimetre dimensions are fitted front and rear. The highly stressed front discs featuring composite technology that has been tried and tested in motor racing help offset temperature peaks more effectively. Grey-painted brake callipers with white AMG lettering and six-piston (front) and four-piston (rear) technology provide spontaneous, fade-resistant deceleration and extremely short stopping distances.

All-new AMG ceramic composite brakes are available as an option – instantly recognisable with their gold-painted brake callipers with the "AMG Carbon Ceramic" logo. Thanks to the special materials and production technology used to manufacture the discs from carbon-fibre-reinforced ceramic in a vacuum at 1700 degrees Celsius, the ceramic discs are much harder. This not only increases the service life many times over compared with a grey cast iron disc, but also their resistance to extreme loads and heat. The result is extremely short stopping distances, exact pressure point and much higher fade resistance even under extreme operating conditions. The larger ceramic discs – front: 402 x 39 millimetres; rear: 360 x 32 millimetres – also feature a composite design and are connected with a floating radial mount to an aluminium bowl.

Compared with the conventional composite brake discs, the ceramic brake discs are around 40 percent lighter. The further reduction in unsprung masses not only boosts driving dynamics and agility but also improves steering response as well as ride comfort and contact characteristics. Six-piston fixed callipers are fitted at the front with a brake lining surface of  $2 \times 154 \text{ cm}^2$ ; four-piston fixed callipers with a brake lining surface of  $2 \times 73 \text{ cm}^2$  are used at the rear.

	<b>Composite braking system</b>	<b>Ceramic composite braking system</b>
<b>Front:</b>		
<b>Brake calliper</b>	6-piston aluminium fixed calliper	6-piston aluminium fixed calliper
<b>Brake disc</b>	Composite technology, internally ventilated, perforated	Ceramic composite technology, internally ventilated, perforated
<b>Diameter</b>	360 mm	402 mm
<b>Thickness</b>	36 mm	39 mm
<b>Weight*</b>	13.6 kg	7.9 kg
<b>Rear:</b>		
<b>Brake calliper</b>	4-piston fixed calliper	4-piston fixed calliper
<b>Brake disc</b>	Solid, internally ventilated, perforated	Ceramic, solid, internally ventilated, perforated
<b>Diameter</b>	360 mm	360 mm
<b>Thickness</b>	26 mm	32 mm
<b>Weight*</b>	11.1 kg	6.6 kg

\* weight of brake disc

Numerous functions of the AMG high-performance braking system enhance comfort and safety. Take the practical HOLD function: if the E 63 AMG has come to a stop, the driver simply needs to press the brake pedal a little bit firmer. The vehicle is now held by the brake – even if the driver takes their foot off the brake pedal. This prevents the vehicle from unintentionally rolling forward in stop-and-go traffic or inadvertently rolling back on an uphill slope. The HOLD function is automatically disengaged once the vehicle is driven forward. Another useful feature comes in the shape of the hill-start assist. If the sensor technology detects that the driver has stopped on an incline, the brake pressure is automatically maintained constant for a short period. This means the E 63 AMG will not roll back and the driver has sufficient time to switch their right foot from the brake to the accelerator pedal without having to use the parking brake.

If the driver of the AMG saloon suddenly switches from the accelerator to the brake pedal prior to emergency braking, the braking system increases the pressure in the brake lines and applies the pads to the brake discs, so that they can grip instantly with full force when the brake pedal is pressed. The system supports the standard-fit Brake Assist by means of this 'priming'. Further standard features include the brake-drying function, which uses brief braking impulses to ensure the film of water on the brake discs is removed in the wet, thus considerably improving the responsiveness of the brakes.

#### **AMG 18 or 19-inch light-alloy wheels**

The AMG light-alloy wheels in an 18 or 19-inch design play a major part in the dynamic, stable handling of the new E 63 AMG. The saloon comes as standard with titanium grey, high-sheen five-spoke wheels measuring 9.0 x 18 or 9.5 x 18 and 255/40 R 18 tyres at the front and 285/35 R 18 at the rear. As an option, the AMG Performance Studio includes forged 19-inch AMG twin-spoke light-alloy wheels painted titanium grey with a mirror finish, shod with 255/35 R 19 (front) and 285/30 R 19 (rear) wide-base tyres.

## Effortless superiority with decidedly sporty character

**The new Mercedes-Benz E 63 AMG fulfils its role as the powerful, top-of-the-line E-Class model with effortless superiority. The exterior design conveys presence, precision and typical Mercedes dynamism. Functional sportiness, top quality and consummate business class comfort combine in the interior. In short: it comes across as sporty without being showy.**

Dominant, masculine, dynamic – take a look at the new E 63 AMG and you instantly get a sense of these three attributes. The distinctive wings immediately catch the eye in the front section of the high-performance saloon. They are 17 millimetres wider on each side to accommodate the new front axle with its larger track width and the 255/40 front tyres.

The striking AMG front apron is an integral part of the characteristic AMG bodystyling. A central air intake and two side apertures provide an efficient supply of fresh air to the cooling module placed behind. The side air vents in the front apron serve to expel the hot air from the oil coolers. The AMG-specific LED daytime driving lights are another eye-catching detail. In conjunction with the optional Intelligent Light System, the E 63 AMG is equipped with tinted bi-xenon main headlamps.

From the side, the eye is drawn to the 18 or 19-inch AMG light-alloy wheels as well as the "6.3 AMG" lettering integrated stylishly into the wings; this lettering is testimony to the powerful eight-cylinder powerpack under the bonnet. The side sill panels pick up the sweeping line of the spoiler edges on the front apron, extending it through to the AMG rear apron – the same line also emphasises the saloon's width: the two newly designed chrome-plated twin tailpipes of the AMG sports exhaust system, the characteristically black insert and the overlying light-catching contour provide further visual highlights on the muscular rear section.

## **Sporty and high-grade interior ambience**

Page 26

Luxurious quality, high-grade materials, consummate business class comfort combined with a noticeable degree of dynamism and sportiness – the interior of the E 63 AMG in a nutshell. Dedicated, newly developed electrically adjustable, heated AMG sports seats and AMG badges await the driver and front passenger. All the seats, armrests and door centre panels are trimmed in exquisite leather, the seat centre panels with perforated leather. Three different appointment colours are available: black, mocha brown/almond beige and reef grey/alpaca grey. The perfect finishing touch comes courtesy of the black ashwood trim.

The AMG sports steering wheel in a four-spoke design with a 385-millimetre rim is trimmed with perforated leather in the specially moulded grip areas. Gear selection can be performed manually by means of the AMG aluminium shift paddles with "up" and "down".

## **AMG main menu and AMG DRIVE UNIT**

Behind the steering wheel lies the equally new AMG instrument cluster with a 320 km/h speedometer scale and silver-coloured backplate. The five classic dial instruments come with a new look, red needles and all-new lettering. AMG lettering adorns the speedometer while "6.3 V8" lettering adds a special touch to the rev counter. The AMG main menu is integrated into the central display of the speedometer, which can be operated conveniently using the multifunction buttons on the AMG sports steering wheel. The three modes "Warm Up", "Set Up" and "RACE" keep the driver well informed: "Warm Up" indicates the engine oil and coolant temperature, "Set Up" indicates the current ESP<sup>®</sup> mode, the suspension setting "Comfort", "Sport" or "Sport Plus" and the transmission mode "C", "S", "S+" or "M". In "RACE" the RACETIMER is ready; this allows the driver to record lap times on private racing circuits.

The AMG DRIVE UNIT, which is familiar from the SL 63 AMG, is angled towards the driver and enables individual settings to be selected for the MCT sports transmission, the ESP functions, the suspension set-up and the AMG drive modes. A completely new feature for the DRIVE UNIT comes in the shape of the AMG E-

SELECT selector lever in the centre console. The driver can shift directly between R, N and D simply by nudging the lever, all thanks to drive-by-wire, Briefly pressing the P button is sufficient to activate the parking lock.

The wide range of standard equipment includes (selection):

- Adaptive brake lights
- AMG door entry sills in brushed stainless steel
- AMG sports pedal cluster in brushed stainless steel
- Child Safety package
- THERMOTRONIC automatic climate control

The wide range of optional extras includes (selection):

- COMAND APS
- DAB – digital radio
- Driving Assistance package
- Rear-seat entertainment system
- Speed Limit Assist
- Intelligent Light System
- KEYLESS-GO package
- Heated steering wheel
- Media interface
- Memory package
- Night View Assist Plus
- PARKTRONIC incl. Parking Guidance
- Tyre pressure monitoring system
- Reversing camera for PARKTRONIC
- Heated/climatized seats
- Sun Protection package
- Lane Tracking package
- Surround-sound system
- TV tuner

Customers requiring even more sporty individuality are catered for by the AMG Performance Studio: the E 63 AMG can be dynamically enhanced even further ex factory, with the Performance package. This includes the following:

- Lightweight, forged 19-inch AMG light-alloy wheels with size 255/35 R 19 tyres at the front and 285/30 R 19 at the rear
- AMG RIDE CONTROL Performance suspension with a stiffer set-up
- AMG rear axle locking differential with 40 percent locking action
- AMG spoiler lip on the boot lid
- AMG Performance steering wheel (365 mm) in a three-spoke design
- Roller blind for rear window

The high-quality interior ambience of the E 63 AMG can also be substantially enhanced with the AMG Exclusive package. It includes:

- Nappa leather appointments for the AMG sports seats, top section of the dashboard, the beltlines, the door armrests, the centre console and door centre panels
- Roof liner, A, B and C-pillars and sun visors in Alcantara®
- AMG floor mats

Optional extras from the AMG PERFORMANCE STUDIO are also individually available ex factory:

- Lightweight, forged 19-inch AMG light-alloy wheels with size 255/35 R 19 tyres at the front and 285/30 R 19 at the rear
- AMG rear axle locking differential with 40 percent locking action
- Brake callipers, painted red (scheduled to be available from 4th quarter of 2009)
- AMG Exterior Carbon package
- AMG Performance steering wheel in a three-spoke design with Alcantara® inserts in the grip areas
- AMG carbon trim elements

- Illuminated AMG door entry sills
- AMG Driver's Package (restriction of top speed to 300 km/h, attendance at driver training at the AMG Driving Academy, AMG spoiler lip and roller blind for rear window)
- AMG floor mats

### **New designo range for the E 63 AMG**

The new designo range for the E 63 AMG, which will be available from the end of the year, offers further individualisation options. The designo colour chart includes a total of ten eye-catching colours, including three new matt finishes: designo magno platinum, designo magno allanite grey and designo magno cashmere white. Nine different single-tone designo leather upholstery options and three designo trim elements are available in the interior.

## "Intelligent" partner thanks to unique combination of assistance and protection systems

**For more than 50 years, the E-Class Saloons and their predecessors have been the acknowledged trendsetters in the field of automotive safety. The new top-of-the-line E 63 AMG model continues this tradition with an unrivalled combination of the very latest assistance and protection systems whose concept and development are based on what actually happens during accidents.**

The systems turn the E-Class into an "intelligent" partner that is able to see, feel, respond reflexively in dangerous situations and act autonomously to prevent accidents or mitigate their effects. With this concept the new E 63 AMG not only protects its own occupants, but also contributes greatly to the safety of other road users.

The new E-Class is the first car in the world to be equipped with headlamps which adapt to the traffic situation and respond automatically to provide the best possible road illumination in a given situation and avoid dazzling other road users. The optional Adaptive Highbeam Assist uses a camera on the windscreen to recognise oncoming traffic and vehicles in front and to control the headlamps so their beams do not reach the other vehicle. The range of the dipped headlamp beams can be extended from the current 65 to as much as 300 metres. If the road ahead is clear, the system performs a gentle transition to high beam. Mercedes-Benz offers this new system in a Light package that includes bi-xenon headlamps, the Intelligent Light System and LED daytime driving lights.

The Lane Tracking package for the E 63 AMG includes Blind Spot Assist familiar from the S-Class, and as a new development, Lane Keeping Assist which seeks to prevent the vehicle from leaving the road unintentionally. When the system recognises that the car is drifting from its lane, the driver is prompted to take countersteering action by three brief but unmistakable vibrations of the steering

wheel. The images from the windscreen camera are also used by the new, optionally available Speed Limit Assist, which recognises speed limit signs as the car passes them, then displays the relevant speed limit in the speedometer.

Night View Assist Plus is now also available as an optional extra for the E 63 AMG. Mercedes-Benz has improved this system with a special pedestrian detection function: as soon as Night View Assist Plus recognises pedestrians ahead of the car, they are highlighted in the onboard display to provide a greatly enhanced warning effect.

#### **Detection of drowsiness based on 70 parameters as standard**

Thanks to an innovative technology, the new E 63 AMG is very sensitive to its driver's attention level, and warns him or her of drowsiness in good time. This new ATTENTION ASSIST drowsiness detection system, which is standard equipment, is equipped with highly sensitive sensors that continuously monitor more than 70 different parameters. Observing the driver's steering behaviour has proved to be a particularly strong indicator: several years of practical research by Mercedes engineers have shown that drowsy drivers make minor steering errors which they often correct very rapidly in characteristic ways. These corrections are recognised by a highly sensitive steering angle sensor.

#### **Automatic emergency braking when a collision is imminent**

The well-proven, radar-based assistance systems from the S-Class are now also optionally available to E-Class customers. An enhanced long-range radar sensor now has a range of 200 metres (previously 150 metres), and is able to monitor the mid-distance so that dynamic events such as a vehicle ahead suddenly pulling out to overtake can be detected even more effectively. The two wide-angle short-range radar sensors, which have a range of around 30 metres, continue to be included in the system.

The radar-supported systems are able to assist the driver with emergency braking. Their sensors are linked to the BAS PLUS system, which automatically calcu-

lates the braking pressure to prevent a collision in critical situations. The driver is given an audible and visual warning at the same time. When the brake pedal is pressed, the system immediately provides the calculated level of braking assistance.

If the driver fails to respond to the warnings, the radar system first initiates partial braking action. As a second stage, if there is still no driver response and a collision is unavoidable, emergency braking is initiated. This can reduce the severity of an impact considerably as the system can be regarded as a kind of "electronic crumple zone".

### **Seven airbags and PRE-SAFE® as standard**

During the course of its development, the new E-Class was subjected to more than 150 high-speed crash tests. The crumple zone principle invented by Mercedes safety pioneer Béla Barényi has been continuously honed by the engineers in Sindelfingen. The front-end deformation zone of the E-Class acts on four independent levels, and is even more effective than before. The increased use of extra-high-strength steel alloys also helps to ensure that the bodyshell is able to withstand high impact forces. Around 72 percent of all the body panels are made from these high-tech steels – yet another unrivalled figure in passenger car development.

With seven airbags as standard, belt tensioners, belt force limiters, crash-responsive head restraints and ISOFIX child seat attachments, the E 63 AMG has even more extensive safety features than the preceding model. Another standard feature is the unrivalled anticipatory occupant protection system PRE-SAFE®. In potentially hazardous situations this reflexively activates precautionary protective measures for the vehicle occupants, so that the seat belts and airbags are able to fulfil their protective function to the full during an impact.

## Meeting the toughest of requirements – extreme "accelerated" testing

**High speed in South Africa, high-temperature test in Arizona, cold shock in the Arctic Circle, chassis and suspension testing on the Nürburgring *Nordschleife* (North Loop) – the development phases for the new Mercedes-Benz E 63 AMG were as diversified as they were unforgiving. Over a period of 19 months and a distance of 1.25 million test kilometres, the new-generation dynamic sports saloon offering everyday practicality was made ready for series production – and ambitious targets were achieved in terms of efficiency.**

Before the first disguised test vehicles rolled through the factory gates at Affalterbach, the concept phase had to be completed. The purpose of the packaging tests which commenced in November 2005 was to test the entire car for functioning and feasibility. Whether it was the suspension tuning, radiator and cooler efficiency, the airflow through the engine compartment or the durability of all the components – everything had to be analysed in advance by the AMG experts using a computer-based digital prototype (DPT). At the same time, the first engines and transmissions had to prove their performance capability and durability on various test rigs. Permanent stress in "accelerated" tests: full throttle from a standstill at a simulated 30 degrees C below zero, racetrack profiles with a high proportion of driving under full load and stop-and-go traffic in the city at 45 degrees C in the shade. Only once the precisely predefined development stages had been negotiated was the coveted go-ahead given.

At the same time, inconspicuous E 63 AMG models from the current W 211 series were on the road as component carriers or "mules". Equipped with numerous components from the successor model – such as the 6.3-litre V8 engine, SPEEDSHIFT MCT 7-speed sports transmission and RIDE CONTROL sports suspension – they help ensure effective testing of the new technologies before the new models (in-house code W 212) are even available. State-of-the-art measuring techniques provide the AMG engineers with invaluable data, with the focus on the tempera-

tures of the coolant, transmission fluid and brake discs as well as the lap times on the handling course at the test track in Idiada, Spain and at the Nürburgring *Nordschleife* (North Loop), for example. Page 34

### **Concept approval in autumn 2007 signals the start for the "real" prototypes**

In this preliminary stage, the specialist departments define every aspect of the new E 63 AMG: bit by bit, they narrow down the choice of axle kinematics, radiator and cooler dimensions, springing and damping rates, and tyre compounds for further testing – not forgetting the crucial interaction between the different control units for the engine, transmission and dynamic handling control systems as well as their respective software versions. Following this concept approval, granted in autumn 2007, the first "real" AMG prototypes of the E 63 AMG were built – signalling the start of the extensive, standardised AMG development and testing programme.

This is when things get really serious for the 20 disguised test vehicles: tests in all of the world's climatic regions, from 85 metres below sea level in Death Valley in the US right up to Pikes Peak at an altitude of over 4400 metres. And from a bone-chilling minus 40 degrees in Swedish Lapland to plus 40 degrees in Arizona, USA. "We deliberately go to the extremes. It greatly helps us to save time and deal with the various aspects efficiently," says Tobias Moers, Head of Overall Vehicle Development at Mercedes-AMG.

### **AMG-specific test routes for loads that take it to the limit and beyond**

It is simply not enough to consider the individual criteria such as heat, altitude and driving dynamics in isolation. It's rather a question of finding test routes that offer an opportunity to depict a combination of these three parameters. "We therefore take it to the limit and beyond, subjecting the car to far more load than any AMG customer ever will. And the new E 63 AMG has to overcome these tortures without a murmur of discontent," reports Oliver Wiech, Head of Overall E-Class Development.

High-speed test runs on a country road in South Africa, stretching for several miles and as straight as a die, are just as much part of the test procedure as driving at full throttle for many hours on the circular course in Nardo, southern Italy or at the proving ground in Arizona, USA. The E 63 AMG prototypes have to prove that the oil and water temperatures can stay in the green and that all of the seals and hose clamps are capable of withstanding the immense loads and stresses. The toughest test of all is saved for last: here the saloon has to race across the proving ground at top speed in temperatures of some 45 degrees plus before going straight into a garage where there is no draught and no wind – the engine's only relief being provided by the fan motor. Highly-sensitive electronic measuring systems with up to 500 measuring points per vehicle reveal even the most minor problems, which the AMG experts are able to pinpoint and put right immediately.

The high-temperature tests in Death Valley, USA are similarly extreme – albeit far less spectacular at first glance. Here, too, the summer temperatures approach the magical 50-degree mark, but slow cruising rather than hurtling at top speed is the order of the day here. Oliver Wiech: "We drive at an average of 35 km/h with maximum payload, climbing a steady ascent to the Daylight Pass – in the blazing sunshine and with a tarmac temperature of 80 degrees. The route is only 20 kilometres long, but there is no shade. Because the car is travelling so slowly, hardly any air flows through the radiator and engine compartment." No question about it: if a new high-tech performance car such as the E 63 AMG passes this test, it can also survive the daily stress of stop-and-go traffic in Shanghai or Dubai.

### **Vast know-how and wealth of precision engineering ensure low fuel consumption figures**

But it is not all about extreme loads. Achieving the ambitious fuel-consumption targets also requires the developers' full concentration – as explained by Friedrich Eichler, who is in overall charge of engine and powertrain development: "To achieve an NEDC consumption figure of 12.6 litres per 100 kilometres, we put in a great deal of work in two areas: alternator management and transmission control." The system for recuperating braking energy when the vehicle is decelerat-

ing – being used at AMG for the first time – had to be tested and verified using every conceivable speed and drive profile. As did the new C (Controlled Efficiency) mode for the AMG SPEEDSHIFT MCT 7-speed sports transmission: "The deliberately early upshifts and low engine speeds play a key role in reducing fuel consumption," adds Eichler. Here it was a question of perfectly harmonising the AMG seven-speed sports transmission – equipped with a wet start-up clutch and four modes (C, S, S+ and M) – with the powerplant's response and vibration characteristics. A key part of this set-up involves ensuring that the dynamic power delivery of the AMG V8 engine developing 386 kW/525 hp and a torque of 630 Nm is provided at lightning speed when requested by the driver – a challenge which can only be overcome with vast know-how and a wealth of precision engineering, not to mention many simultaneous tests on public roads, test tracks and test rigs.

The brake tests on the Grossglockner Alpine pass road in Austria are a true test of endurance for the AMG high-performance braking system with internally ventilated discs all round and composite technology tested on the racetrack on the front axle. In contrast to the tests on the high-speed circuits, where the saloon is braked to a standstill from 250 km/h on countless occasions to test absolute performance, the focus here falls on a different aspect: fading. Loaded up to their permissible GVW, the E 63 AMG prototypes are sent from an altitude of just below 2600 metres through numerous hairpin bends down into the valley lying at 1151 metres. Meanwhile, the MCT sports transmission is simply idling, providing no engine braking whatsoever. As if this weren't enough, the test drivers also apply the brakes lightly between the switchbacks to generate additional heat – all of which places relentless thermal load on the brake discs, callipers, pads and fluid. What's more, the low speed prevents effective cooling of all the components. All the brake tests are carried out with the AMG high-performance braking system as well as with the new ceramic braking system.

### ***Nordschleife* proves the ultimate test for man and machine**

The series of tests on the notorious Nürburgring *Nordschleife* (North Loop) – considered to be the world's toughest racing circuit – is equally extreme. Measuring 20.8 kilometres in length, the "big dipper" with its 73 bends stretches the E 63

AMG and its test drivers to the very limit. Every kilometre covered on the *Nordschleife* is equivalent to around seven kilometres on a normal road – the ultimate "accelerated" test for every new AMG model. This is where all the people who matter can be found: the suspension and tyre specialists, the handling dynamics experts, the transmission gurus and the team responsible for overall vehicle development. "If our 3-stage ESP® works here, it will work on any road in the world," laughs Tobias Moers, who gives his personal approval for every new AMG high-performance vehicle on the *Nordschleife*. Without exception.

Mercedes-AMG also runs its own test centre in the Eifel region to carry out its extensive development work: workshops, offices and test facilities devoted to customised development work occupy some 700 m<sup>2</sup>, all within earshot of the Nürburgring.

The tests in the wind tunnel are just as important as the test drives: here it is not just a question of simulating all routes and climatic conditions. The rapid change from hot to cold is of great assistance to the development engineers in their quest to take the vehicle and its components to the limit. Whether it be temperature, humidity, the angle of solar radiation or the airflow velocity – a state-of-the-art wind tunnel is an indispensable tool for every AMG vehicle.

### **Permanent exchange of information with AMG headquarters in Affalterbach**

Testing, analysing, optimising – it all comes together at AMG headquarters, located at number 1 Daimlerstrasse in the Swabian town of Affalterbach. It is in this small town with a population of around 4600, situated to the north of Stuttgart in an idyllic location between fruit plantations and vineyards, that the development engineers meet up to discuss the topics raised and e-mailed in by colleagues around the globe. In this way, new parts and components can be sent from Affalterbach to Arjeplog by overnight express. And new software updates can be sent to Denver, USA via the internet.

"The precisely defined development processes at Mercedes-AMG ensure the hundred-percent quality standard. We owe our discerning customers this much. This

is the only way the new E 63 AMG can achieve that which everyone has ultimately been working towards: overall vehicle approval," says Volker Mornhinweg, Chief Executive Officer of Mercedes-AMG GmbH.

The major test stages at a glance:

#### Development testing of the engine, transmission and powertrain

- Altitude tests in Denver, Colorado (USA), Lesotho (South Africa), Mont Ventoux (France) and Granada (Spain)
- High-temperature tests at Death Valley, California (USA), Upington (South Africa), Idiada proving ground (Spain) and Phoenix, Arizona (USA)
- Driving trials in Los Angeles, California (USA)
- Cold-temperature tests in Arctic Falls (Sweden)
- Climate-tunnel tests in Stuttgart

#### Development testing of the cooling and fuel systems

- Various driving trials on the high-speed tracks in Nardo (Italy) and Papenburg
- Trials in Upington (South Africa) and Death Valley, California (USA)
- Wind-tunnel tests in Stuttgart

#### Development testing of the braking and control systems

- Brake testing on the high-speed track in Nardo (Italy) and the Grossglockner Alpine pass (Austria)
- Testing of dynamic handling control systems at the Idiada proving ground (Spain), in Arjeplog (Sweden) and at the Boxberg proving ground

In addition to these tests, individual components such as the engine, powertrain, transmission, axles and brakes, as well as the complete body structure, are tested to their limits on test rigs.

#### **"Accelerated" endurance testing under the toughest of conditions**

The extensive programme of vehicle development is supplemented by an endurance test which simulates an entire vehicle lifetime under the toughest of condi-

tions in just a short time. The aim is to ensure the necessary degree of maturity before vehicle production can commence at the Mercedes-Benz plant in Sindelfingen.

The endurance testing at a glance:

Long-term testing on a variety of different roads:

- All the components and systems are tested together in everyday operation. Loaded up to their permitted gross vehicle weight, the test cars are put through a precisely defined test programme on country roads, on motorways and in city traffic.

"Heide" endurance testing:

- In this case, the developers focus on the durability of the chassis and suspension components, the entire bodyshell and the integral subframe on which the front axle, steering and engine are mounted. The test cars are loaded up to their permitted gross vehicle weight.

"Accelerated" endurance testing:

- Testing of the entire vehicle, focussing on the powertrain, chassis and suspension. Special features of the AMG programme include 10,000 kilometres on the Nürburgring *Nordschleife* (North Loop) and 10,000 kilometres in city traffic.

Full-load endurance testing:

- Extreme acceleration and braking manoeuvres with a high proportion of full-load operation, making extreme demands on the cooling, fuel-delivery and braking systems.

Corrosion endurance testing:

- Corrosion testing of the entire vehicle simulates the toughest dynamic and climatic environmental influences.

Final board approval:

Page 40

- All-inclusive verification of the degree of development and production maturity.

These tests are supplemented by extensive crash simulations and real crash tests to provide the necessary evidence for country-specific certifications without which no registration would be possible.

## A tradition of top performance

**AMG and the Mercedes-Benz E-Class – an intense relationship that now goes back more than four decades. What culminates in the new E 63 AMG in 2009, had its origins in the Mercedes-Benz 300 SE in 1965. AMG founders Hans Werner Aufrecht and Erhard Melcher made the saloon faster, as it notched up victory after victory on the racetrack.**

After Mercedes-Benz had officially withdrawn from motor racing in 1955, series-production-like touring cars were the only vehicles in use in the early sixties – for instance the 300 SE from the W 112 series. However, those in charge regarded the approval process, which had been put in place in 1965, as too time-consuming and costly. As such, Mercedes-Benz threatened to disappear entirely from the racing scene. Hans Werner Aufrecht and Erhard Melcher, both working at Mercedes-Benz in Untertürkheim, were unwilling to let that happen and, together with Manfred Schiek, a member of staff from the motor sports department, put together a race-ready 300 SE.

Aufrecht and Melcher fine-tuned the charmingly dubbed "Tail Fin" saloon with a 175-kW/238-hp six-cylinder in-line engine for the racetrack. Success would follow when in 1965 Manfred Schiek immediately walked away with the German Touring Car Championship. Since the Mercedes motor sports department could not offer any extra power, many private drivers were looking for more hp – which only Aufrecht and Melcher could deliver. In 1967, the two set up their own business by founding AMG. The company was based in the Old Mill in Burgstall, north of Stuttgart.

Victories on the racetrack are undoubtedly the best form of advertising and so more and more Mercedes drivers turned to AMG for powerful engines for their road-going vehicles. For the fledgling company, this heralded in an era of refining all Mercedes-Benz models – regardless of whether it was the SL, SLC or S-Class. Initially it was just a question of pure additional power, although modifications to the transmission, suspension and the brakes would soon take centre stage.

With the successor model, the W 114 or the mid-range saloon also known as the /8, AMG moved up a gear from 1968 onwards, offering various output ratings. The 96-kW/130-hp six-cylinder in-line engine on the Mercedes-Benz 250 was "souped up" to 114 kW/155 hp. Another ten hp came from increasing the displacement to 2.8 litres and commissioning additional work on the cylinder head and the exhaust system. The maximum configuration was a 147-kW/200-hp engine with an injection system.

### **Everyone's talking about AMG: victory at the 24-hour race in 1971**

In 1971, the 300 SEL 6.8 AMG notched up a historic class victory and second overall ranking in the 24 Hours of Spa-Francorchamps – AMG became famous overnight. In the same year, the new top-of-the-line model in the Mercedes W 114 series, the 280 CE, made its debut. The 136-kW/185-hp six-cylinder in-line engine with two overhead camshafts took AMG up to 154 kW/210 hp. The saloon's suspension was modified to cope with the increased power: firmer shock absorbers, lowered suspension, negative camber on both axles, wider wheels – plus a differential lock also available as an option. Decor strips with AMG lettering, front spoiler, light-alloy wheels, sports seats and a leather-trimmed sports steering wheel also joined the line-up. The combination of "small car with powerful engine" went down extremely well with AMG customers – and AMG continued to grow. In 1976, AMG already had 40 staff and moved into new premises in Affalterbach.

### **280 CE 5.0 AMG: the first eight-cylinder unit in its class**

A year later the new mid-range model series, the W 123, was launched. AMG's power range was even more compelling, with the six-cylinder engine in the 280 CE now developing a maximum 230 hp. The crowning glory came in 1983 when AMG fitted the five-litre eight-cylinder engine in the 500 SE to the 280 CE. But there was more to come. Thanks to a wealth of innovative features, the V8 was uprated from 231 hp to 279 hp. The result was a discrete mid-range coupé with sports-car-like performance. At the same time, the 280 CE 5.0 AMG was virtually unrivalled since nobody had hitherto dared to combine a high-displacement

eight-cylinder engine with a relatively compact body. The courageous vision of AMG founder Hans Werner Aufrecht and the motto "A vehicle like a tailor-made suit" still hold true today – looking back, the 280 CE 5.0 AMG is regarded as the founding father of all powerful eight-cylinder saloons, right through to the current E 63 AMG with its 386-kW/525-hp V8 engine.

### **300 E 5.6 AMG: first saloon to break the 300-km/h barrier**

When the all-new Mercedes-Benz E-Class was launched in December 1984, the power range was barely different from that of its predecessor. The most powerful engine, the three-litre six-cylinder unit in the 300 E, developed 138 kW/188 hp. Yet AMG had the answer for power-hungry Mercedes drivers: increasing the displacement to 3.2 litres and other measures uprated the output to 180 kW/245 hp – the top speed of the 300 E 3.2 AMG was still 262 km/h. But AMG wanted more: 300 km/h. The 300 E 5.6 AMG was designed to exceed this magical speed limit. In 1987, the four-door saloon took part in a head-to-head test organised by German motoring magazine "*auto motor sport*". The result: 303 km/h, a record for a saloon car. Reverent AMG fans in the US dubbed the mighty four-door saloon with its all-powerful eight-cylinder engine "The Hammer".

The all-new AMG eight-cylinder engine with its copious 265 kW/360 hp of power and 5.6 litres of displacement delivered sports-car-like performance. The V8 also came with an independently developed four-valve technology – another piece of pioneering work from the Affalterbach engine workshops. Incidentally, the 300 E 5.6 AMG reached its top speed with a four-speed automatic transmission – in the most serene, unperturbed, uneventful manner possible. That was quite unprecedented: for the first time, a fully-fledged saloon with enough room for four people, a large boot, hallmark Mercedes comfort and unerring straight-line stability was capable of the sorts of speeds which had previously been the preserve of capricious sports cars – whose owners often had to contend with questionable endurance, strenuous handling characteristics and inadequate comfort.

The car ultimately evolved into the 300 E 6.0 AMG brought out in 1987, boasting a whole six litres of engine capacity, an output of 283 kW/385 hp and 566 new-

ton metres of peak torque. It can therefore be said that AMG created with its V8 models the forerunner of the Mercedes-Benz E 500 series-production saloon, which would not arrive on the market until 1990.

### **E 50 AMG: keeping true to the eight-cylinder philosophy**

AMG unveiled the E 50 AMG as the worthy successor to the W 124 models in 1996. The saloon in the new W 210 series offered the ever growing fan base five litres of displacement, 260 kW/347 hp and 480 newton metres of torque. A five-speed automatic transmission directed the drive power to the rear wheels, with an AMG sports suspension including 18-inch AMG light-alloy wheels and a powerfully proportioned AMG high-performance braking system also making up part of the standard specification.

The world premiere of the new E 55 AMG was celebrated in autumn 1997 at the IAA International Motor Show in Frankfurt/Main. In addition to a few visual modifications, the successor to the E 50 AMG differed with its newly developed 5.5-litre eight-cylinder engine with three-valve cylinder heads and dual ignition. With a displacement of 5430 cc, the engine developed 260 kW/354 hp at 5500 rpm and 510 Nm of torque at 4800 rpm. The V8 top-of-the-line model, which was initially only offered as a saloon, was also available from 1988 as a versatile estate; 1999 saw the launch of the E 55 AMG 4MATIC with permanent all-wheel drive.

### **E 55 AMG featuring supercharged V8 engine and 350 kW/476 hp**

The most powerful E-Class of all time – this accolade went to the E 55 AMG based on the new Mercedes W 211 series from 2002. The V8 powerpack, which AMG fans were already familiar with from the SL 55 AMG, produced 350 kW/476 hp and maximum torque of 700 newton metres thanks to supercharging. Performance on a par with a sports car became possible: the E 55 AMG took 4.7 seconds from 0 to 100 km/h; 200 km/h was reached in 16.1 seconds. The top speed was 250 km/h (electronically limited). The dynamic driving experience came courtesy of the air-sprung, semi-active AMG sports suspension AIRMATIC DC and the

AMG high-performance braking system with all-round internally ventilated and perforated brake discs. In 2003, the Mercedes-Benz E 55 AMG was also launched as a highly practical estate.

### **E 63 AMG: everyday express with new high-revving, naturally aspirated engine**

Fast business saloon, spacious sports estate and dynamic family car – from 2006 the new E 63 AMG proved a more compelling proposition than virtually any other model with its universal qualities. The all-new AMG 6.3-litre V8 engine that had been developed entirely by AMG was complemented by a large dose of sportiness. The combination of high-revving concept and large displacement generated 378 kW/514 hp of power and 630 newton metres of torque. The E 63 AMG Saloon accelerated from 0 to 100 km/h in 4.5 seconds (Estate: 4.6 s.); the top speed was electronically limited to 250 km/h. The AMG SPEEDSHIFT 7G-TRONIC with three drive modes and AMG steering wheel shift paddles offered just as much individuality as the AMG sports suspension based on the semi-active air suspension system AIRMATIC DC. Outstanding handling safety was guaranteed by the new AMG high-performance braking system with its composite technology.

## Mercedes-Benz E 63 AMG

Page 46

### Engine

Number of cylinders/arrangement		8/V, 4 valves per cylinder
Displacement	cc	6208
Bore x stroke	mm	102.2 x 94.6
Rated output	kW/hp	386/525 at 6800 rpm
Rated torque	Nm	630 at 5200 rpm
Compression ratio		11.3 : 1
Mixture preparation		Microprocessor-controlled petrol injection, HFM

### Power transfer

Drive system		Standard drive system
Transmission		AMG SPEEDSHIFT MCT 7-speed sports transmission
Ratios	Final drive	3.06
	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 and suspension

Front		Three-link suspension, anti-dive, coil springs, AMG RIDE CONTROL electronically controlled gas-filled shock absorbers, stabiliser
Rear		Multi-link independent suspension, anti-squat and anti-lift, AMG RIDE CONTROL full air suspension system with electronically controlled damping system, stabiliser
Braking system		Composite disc brakes, internally ventilated and perforated at the front, internally ventilated and perforated disc brakes at the rear, drum-type parking brake at the rear, ABS, Brake Assist, ESP®
Steering		Speed-sensitive rack-and-pinion steering, steering damper
Wheels		Front: 9 J x 18; rear: 9.5 J x 18
Tyres		Front: 255/40 R 18; rear: 285/35 R 18

### Dimensions and weights

Wheelbase	mm	2874
Track, front/rear	mm	1625/1594
Overall length	mm	4891
Overall width	mm	1872
Overall height	mm	1442
Turning circle	m	11.3
Boot capacity*	l	540
Kerb weight (EC)**	kg	1840
Payload (basis: ready-to-drive state as defined by EC)	kg	550
Perm. gross vehicle weight	kg	2390
Tank capacity/incl. reserve	l	66/14

### Performance and fuel consumption

Acceleration 0 - 100 km/h	s	4.5
Top speed	km/h	250***
Fuel consumption, NEDC comb. l/100 km		12.6
CO <sub>2</sub> emissions	g/km	295

\* acc. to VDA measuring method; \*\* incl. 75 kg for driver and luggage; \*\*\* electronically limited.