World premiere of the new Mercedes-Benz A-Class
Matchless design and concept, unrivalled standards of safety and high-class appeal: the new A-Class injects Mercedes finesse into the compact car segment

Stuttgart, Jun 29, 2004

After a production run of seven years and some 1.1 million sales worldwide, Mercedes-Benz is now opening up the next chapter in the A-Class success story by launching a new model boasting even greater appeal and innovative flair. The second edition of the compact car is due to make its debut in the Stuttgart-based car manufacturer's showrooms in autumn 2004.

Underpinned by its singular sandwich construction, the new A-Class boasts a host of tantalising benefits, such as Mercedes standards of occupant safety, exemplary utilisation of space and outstanding versatility. The levels of spaciousness inside the vehicle are a marked improvement on the outgoing model and also better other compact cars. The new A-Class also clearly out-strips its competitors when it comes to high-class appeal, further substantiat-ing its premium billing.

The new A-Class model range comprises two body versions, each with their own distinctive character: the versatile five-door version is now joined for the first time by a three-door model whose sporty, youthful styling is bound to attract admiring glances. Both variants will now come with a choice of seven engines and three different design & equipment lines. Power output of the brand new or reengineered four-cylinder engines has been upped by as much as 38 per cent, whilst fuel consumption has been cut by up to ten per cent.

The one-of-a-kind body concept and the eye-catching one-box design clearly set the Mercedes compact car aside from other cars in its segment. The lines of the body-shell capture the special nature of the new A-Class, as well as epitomising its overriding characteristics: dynamism, intelligence and appeal. Restyled headlamps, a bolder radiator grille, powerfully contoured wings and the sweeping lines along the sides combine to reinforce the overall impression of compactness, dynamism and self-assurance. The growth in the body's dimensions and proportions now gives the A Class a more powerful stature: compared to the previous model, the new compact car from Mercedes measures 232 millimetres longer from nose to tail and an extra 45 millimetres widthways.

The new three-door version offers all of the exemplary safety and comfort attributes associated with the A-Class and supplements them with body lines which emphasise this model's youthful and vibrant charm. From late 2004, the three-door version will be offering customers a route into the world of Mercedes-Benz that is as appealing as it is inexpensive.

Intelligent package of safety features for comprehensive occupant safety

The second generation of the A-Class stays true to its reputation for setting the pace in the technology stakes: once again, a series of groundbreaking innovations which enhance driving safety and ride comfort are celebrating their debut in the new model; all in all, over 200 patented designs feature in the new compact car.

Quite apart from the matchless sandwich concept that comes into its own in the event of collisions from the front or the side, the newly developed and highly efficient seat-belt and airbag system fitted aboard the A-Class ensures that occupant safety meets Mercedes' typically

stringent standards. Features include adaptive two-stage front airbags, belt tensioners for the front and outer rear seats, adaptive belt force limiters and newly developed head/thorax side airbags in place of the outgoing model's sidebags. The more extensive use of high-strength and ultra-high-strength steel alloys combines with high-strength bonded joints and additional support sections within the fabric of the bodywork to assist in keeping the vehicle's occupants well protected even in the event of a serious accident.

The sandwich concept has proved its capabilities time and again since its introduction in the A-Class in 1997 and has helped to protect the car's occupants in serious road accidents. Indeed, it has played a central role in reducing the severity of passenger injury in frontal collisions to well below the average values normally seen in this vehicle class.

New rear axle and selective damping system make their debuts

A host of new developments has allowed Mercedes-Benz to make considerable progress in terms of the driving safety and handling stability of the A-Class. The most prominent of the chassis innovations is the parabolic rear axle, whose fortes include precision wheel location as well as excellent roll support when cornering. As a result, the new rear axle plays a pivotal role in achieving the exemplary driving safety, dynamic handling and outstanding levels of ride comfort offered by the new A-Class.

Another ingenious feature included as standard with the chassis of the new compact model is the revolutionary new selective damping system that is making its automotive premiere in the A-Class. The new technology is able to adjust the shock absorber forces as the driving situation changes: under normal conditions, soft shock absorber characteristics translate into tremendous ride comfort, while the full damping force takes effect when cornering at speed in order to stabilise the A-Class as effectively as possible.

Significant boost to power and torque, plus exemplary fuel consumption

More output, more torque, more driving pleasure, reduced fuel consumption – these were the list of development objectives for the engines fitted in the new Mercedes-Benz A-Class. The line-up includes seven four-cylinder powerplants in all, including three newly developed direct-injection CDI diesel units and a new, turbocharged 142 kW/193-hp petrol engine. Compared to the outgoing model series, the output of the petrol and diesel engines for the new A-Class has increased by up to 38 per cent, while torque has improved by as much as 46 per cent. Despite their increased power output, it has been possible to cut the fuel consumption of the petrol engines by up to ten per cent. All the engines meet the tight EU4 emissions limits, and a particulate filter system is available as an option for the diesel units.

The new A 200 TURBO model will see the A-Class enter a new realm in terms of per-formance; the rated output of 142 kW/193 hp makes the four-cylinder unit one of the most powerful in its displacement class. The high maximum torque of 280 Newton metres is constantly on tap over a wide rev band from 1800 rpm up to 4850 rpm, the point at which output peaks. The most powerful model in the new A-Class range sprints from standstill to 100 km/h in a mere 8.0 seconds, and has a top speed of 227 km/h.

The three newly developed CDI diesel engines are built around second-generation common-rail technology, which operates using dual pilot injection and a higher injec-tion pressure (1600 bar). These combine with other measures to produce a significant increase in output and torque, a reduction in exhaust emissions and an audible drop in noise levels.

The diesel models will in future be spearheaded by the A 200 CDI. The direct-injection engine with VNT turbocharger and an ignition pressure of 180 bar has an output of 103 kW/140 hp and develops its peak torque of 300 Newton metres over a wide rev speed band from 1600 up to 3000 rpm. The result is swift acceleration, both from standstill and for slick overtaking: the new A 200 CDI accelerates from standstill to 100 km/h in 9.5 seconds and goes on to reach a top speed of 201 km/h.

With NEDC fuel consumption figures varying between 4.9 and 5.4 litres per 100 kilometres, the new CDI models match the exemplary standards set by the outgoing compact Mercedes-Benz models. The A 160 CDI has a range of around 1100 kilometres with a single tank of fuel (54 litres).

All models in the new A-Class range are available with the brand new AUTOTRONIC continuously variable automatic transmission as an option. This is the first transmission from Mercedes-Benz to operate on this principle, in which the ratios are changed continuously by means of a pulley-wheel variator and a steel thrust belt. As a result, the A-Class is able to accelerate with no interruption of tractive power, and the engine attains its maximum output more quickly than with a conventional automatic transmission. The AUTOTRONIC package is rounded off by high ride comfort and low noise levels.

Setting premium standards for spaciousness, touch & feel and ergonomics

A compact car on the outside, yet a family car with the spaciousness of a mini-MPV under the surface, the unique sandwich concept of the new A-Class succeeds in combining these apparently conflicting characteristics into a single vehicle. The new compact car from Mercedes outperforms both its predecessor model and its competitors as far as its comfort-related interior dimensions are concerned. Shoulder room has increased by as much as 97 millimetres, the passengers' elbow room by up to 95 millimetres and knee room in the rear by 30 millimetres. The space between the front and rear seats now stands at 805 millimetres, putting it on a par with medium-sized saloons.

The selection of materials for the A-Class interior is based on scientific studies conducted in the laboratories of DaimlerChrysler's research department. Here, motorists assessed the touch and feel of a range of different surface materials, switches and controls, and were able to provide valuable pointers for the development of interior components which not only look good but are also pleasant to the touch. The visual qualities of the interior thus provide a harmonious complement to the touch and feel of its component parts. Together, these two areas make a major contribution to the comfort of the car occupants. In addition, experts conducted a series of ergonomics tests and used the results to improve the controls, seating position and angle of vision for the driver.

On the basis of the scientific tests, it was possible to devise the Mercedes "TAF" (touch-and-feel) formula for achieving optimum tactile and ergonomic qualities.

Air conditioning fitted as standard in all models

In addition to the dimensional concept, seat design and improved ergonomics of the new car's interior, climate control also plays a central role in enhancing the safety and comfort of the passengers. To this end, Mercedes-Benz fits the new A-Class as standard with a powerful air conditioning system and also offers its compact car with THERMOTRONIC as an option, which

self-regulates its operation using data from sensors on temperature, sunlight, humidity and pollutant levels in the ambient air.

EASY-VARIO-PLUS increases load capacity to as much as 1995 litres

The boot capacity now totals 435 litres, exceeding that of the current A-Class by as much as 15 per cent, at the same time as setting a new benchmark figure for this segment. The ingenious versatility concept of the predecessor model has undergone systematic redevelopment to revolve around the principle of "rearrangement first". It allows the interior to be adapted to the transportation task at hand in a few simple steps without having to resort to removing the rear seats. The 1/3 : 2/3 split of the rear seating unit, featuring seat cushions and backrests that can both be folded for-wards, makes it possible to produce a completely level loading area, whilst increasing the load capacity of the luggage compartment to as much as 1370 litres (meas-ured using VDA method).

In addition to this, the 2/3-section of the seat cushion can be removed and stowed under the height-adjustable luggage compartment floor in order to create more space for luggage and leisure or sports equipment.

Customers opting for the EASY-VARIO-PLUS system have the added luxury of being able to remove both rear seat cushions and the rear backrests. This system also al-lows the backrest of the front passenger seat to be folded forwards and the front passenger seat to be removed completely. As a result, the load area increases in length to 2.75 metres, while maximum load capacity expands to 1995 litres.

At a glance: The technical highlights of the new A-Class*

Cornering lights: added safety at road junctions and in tight corners.	Standard in conjunction with bi-xenon headlamps
Adaptive front airbags with two-stage gas generators: front airbags deploy depending on the severity of the accident.	Standard
AUTOTRONIC: the newly developed continuously variable automatic transmission from Mercedes.	Optional
Bi-xenon headlamps: powerful gas-discharge bulbs for dipped and main-beam headlamps improve safety when driving at night.	Optional
COMAND APS: this system combines car radio, DVD-based pan-European navigation and telephone controls into a single unit.	Optional
Common-rail direct injection: the diesel engines come with second-generation CDI technology which offers additional gains in terms of fuel consumption, exhaust emissions and noise levels.	Standard on CDI models
Crash-responsive head restraints: in a collision, these newly developed head	Standard for driver and front passenger

restraints offer even greater occupant protection.	
Crash boxes: impact elements in the front end of the car allow for cost-effective replacement following a minor collision.	Standard
EASY-ENTRY system: the front seats can be slid forwards with the backrest folded forwards to afford the rear seat passengers more room for getting in and out.	Standard on three-door model
EASY-VARIO: both rear-seat cushion sections are removable, while the luggage compartment floor is height-adjustable.	Optional for three-door model
EASY-VARIO-PLUS: both rear-seat cushion and backrest sections are removable, the backrest of the front passenger seat can be folded fully forwards and the entire front passenger seat can be removed.	Optional for five-door model
Electromechanical speed-sensitive power steering: the power assistance for the steering is adjusted according to road speed.	Standard
ESP®: this system reduces the risk of skidding.	Standard
Headlamp Assist: a sensor on the windscreen monitors ambient light levels to switch the headlamps on automatically as required.	Standard in conjunction with Light & Sight package
Belt force limiters with adaptive function: this mechanism reduces the force exerted by the belt strap on the seat occupant in the event of a crash	Standard for driver and front passenger
Belt status information: a display in the instrument cluster tells the driver whether the rear seat passengers are buckled in.	Standard
Belt tensioners: any slack in the belt strap is reeled in instantly in the event of a collision.	Standard for driver and front passenger and for the outer seats in the rear
Head/thorax side airbags: these special side airbags protect the head and chest region of front seat occupants.	Standard for driver and front passenger
Child seat recognition: a transponder system automatically detects whether a rearwards-facing child seat is fitted, whereupon it deactivates the front passenger airbag.	Optional for special child seats with transponder
Height-adjustable luggage compartment floor: the luggage compartment floor can be set to one of two different heights.	Standard on five-door model

Multifunction steering wheel: car radio, telephone, navigation system and other units can be operated from the steering wheel.	Standard
Panoramic louvred sliding sunroof: the louvres of the sunroof are made from transparent plastic.	Optional
Parabolic rear axle: the newly developed axle boosts handling stability and ride comfort.	Standard
Particulate filter: the system developed by Mercedes-Benz works without the need for additives and reduces the already low particulate emissions by a further 99 per cent.	Optional for CDI models
Tyre-pressure-loss warning device: the technology of the ESP® system is harnessed to detect any sudden loss of pressure in the tyres.	Optional
Rain sensor: wiper speed is smoothly adjusted depending on the intensity of the rainfall.	Standard in conjunction with Light & Sight package
Sandwich concept: this invention from Mercedes improves occupant safety in serious frontal collisions by allowing the engine and transmission to slide downwards and to the rear. This concept also proves advantageous for collisions from the side.	Standard
Six-speed manual transmission: the newly developed transmission boasts a compact aluminium construction and precision gearshifts.	Standard on A 180 CDI, A 200 CDI and A 200 TURBO
Selective damping system: the shock absorber settings are automatically adapted to the current driving situation.	Standard
Sidebags: these airbags inflate at the side to reduce the risk of injury following a side-on collision.	Optional for the rear
Sound system: a new multi-channel system offers all occupants a surround-sound acoustic experience.	Optional
Tunnel mode: pressing the recirculated air switch closes any windows that are open as well as the sliding sunroof when entering a tunnel or underground garage.	Standard
THERMOTRONIC: automatic climate control system equipped with temperature, solar, humidity and pollutant sensors. Separate	Optional

temperature adjustment for the driver's and front passenger side.	
Windowbags: generously sized airbags which form a curtain extending from the A to the C-pillar in a collision from the side.	Optional
Heater booster system: electrical heater booster system which swiftly warms up the interior following a cold start	Standard on CDI models

Model range and specification: A one-of-a-kind concept offering outstanding benefits

- Progressive one-box design and sandwich concept evolve further
- New product concept with fresh-faced 3-door and versatile 5-door versions
- High-class standard specifications and premium-class high-tech extras

Stuttgart, Jun 29, 2004
Doing it your own way, leading an active lifestyle, exploring new ideas: the Mercedes-Benz A-Class is quite capable of matching up to the individuality, sophistication and supreme self-assurance that characterises modern-day society. A car that mirrors people's attitudes to life; a car that stands out from the crowd; a car whose match-less concept makes it one of the most exciting new developments of recent years.

The A-Class has been showing the way ahead since 1997. Its sense of self-assurance and effortless supremacy set the Mercedes-Benz model apart from other compact cars, elevating it to the status of role model for a new and youthful generation of cars which take a range of qualities and blend them into an irresistible cocktail: innovation and emotion meets intelligence and charm. Armed with these credentials, the A-Class has so far won the hearts of some 1.1 million customers worldwide, over 80 percent of whom were buying their first ever Mercedes. The A-Class: the conqueror.

The second edition of the A-Class is now in the starting blocks. A single glance is enough to confirm that the new model has inherited all of the genes which made its predecessor such a unique breed: the one-box design, with its ultra-short nose and sleek roof lines, continues to be the visual hallmark of the A-Class. The alterations that have been made to this styling are no less striking, however; they underline the powerful, dynamic essence of the car, so that it cuts a new and more mature profile.

A look under the surface of the new A-Class provides further evidence that great ideas are enduring: the intelligent sandwich concept, which successfully solves the dilemma of how to combine compact dimensions with standards of occupant safety that are befitting of a Mercedes as well as making exemplary use of the available space, continues to the one of the compact Mercedes model's trademark virtues that singles it out so distinctly from its rivals.

To put it in a nutshell: the A-Class is, and always will be, different – unconventional, pioneering, one-of-a-kind.

Radiating fresh, youthful appeal: the new A-Class in three-door guise

The fact that the compact car from Mercedes can also cut a sprightly and dashing figure is demonstrated with aplomb by the new three-door variant with its coupé-style silhouette. It offers all of the outstanding safety and comfort attributes boasted by the A-Class, whilst supplementing them with a generous portion of youthful spon-taneity and vitality. It has a magnetic charm which makes it instantly appealing. The balanced blend of emotion and sportiness on the one hand and aesthetic beauty and high-tech on the other, lends emphasis to two of the traits of its inimitable character: its tremendous fun factor and its status as the Mercedes-Benz of the compact class.

This enables the new three-door version of the A-Class to cater to the desires of the young and the young-at-heart, who are keen to use their car to pursue their active and varied lifestyle, yet are unwilling to make any compromises in terms of safety, comfort or high-class appeal. Radiating such youthful and fresh appeal, the three-door A-Class is poised to establish itself from late 2004 as the junior model in the Mercedes-Benz passenger car portfolio which will be offering customers a route into the world of Mercedes-Benz that is as appealing as it is inexpensive.

The trendsetting A-Class: technological debuts for added safety and comfort

Safety	The new **parabolic rear axle**, **disc brakes** all round and the latest generation **ESP**® all help to make motoring safer than ever before; the redeveloped **sandwich concept**, adaptive front airbags, **head/thorax side airbags** and other systems adopted from the executive Mercedes models ensure that occupants are now afforded even greater protection in an accident.
Protection of the environment	All of the engines fitted in the new A-Class comply with the strict **EU4 emissions limits**. CDI models can also be ordered with an optional **particulate filter system**. Furthermore, **fuel consumption** has been cut by as much as ten per cent, despite the increase in engine power. Many components are manufactured using renewable **raw materials** and high-grade **regrinds**.
Spaciousness	The new A-Class outclasses its predecessor and competitors alike as far as all **interior dimensions** which have a bearing on comfort are concerned. Rear passengers in particular can look forward to a new feeling of comfort and space. The **seats** have been redeveloped, and the standard equipment list extended to include **air conditioning** and a **multifunction steering wheel**.
Driving dynamism	Compared to the outgoing model, the **maximum** output of the new range of engines has been upped by as much as 38 per cent, accompanied by a leap in **peak torque** of up to 46 per cent. The new **chassis**, including electromechanical **power steering** and a selective **damping**

AUTO SPIES
More info at www.AutoSpies.com

	system, injects added dynamism into the car's handling, resulting in sheer driving pleasure combined with the greatest possible **ride comfort**.
Versatility	The **boot capacity** outstrips the figures for the previous A-Class by as much as 15 per cent. In just a few easy steps, the brand new **rear seats** can be folded forwards in one of a number of different ways, as the particular transportation task dictates. Together with the height-adjustable **luggage compartment floor** this produces a flat load area.
Looks and feel	Surface materials, trim parts, switches and controls all fit in with both the premium billing of the new A-Class and with the **TAF** (Touch-and-Feel) formula that Mercedes has applied to optimise the car's **tactile** and **ergonomic qualities**.

Variety equals individuality: seven engines, two body styles, thee model lines

Seven by two by three – that is the magic formula for maximising the individuality offered by the new A-Class. The line-up of seven engines can be combined with any of the two body styles and three equipment lines. This produces a grand total of 42 different model versions, which are equipped with either the five-speed or the six-speed manual transmission, depending on the engine. The continuously variable automatic transmission, AUTOTRONIC, can be ordered as an option for all models.

All models are able to boast a comprehensive, high-grade standard specification. Even the entry-level CLASSIC model comes as standard with an array of key safety and comfort features which are by no means taken for granted in this vehicle seg-ment: adaptive front airbags, head/thorax side airbags, adaptive belt force limiters, multifunction steering wheel, speed-sensitive power steering, selective damping sys-tem and air conditioning, to name but a few items on the standard equipment list:

- Heated and electrically adjustable exterior mirrors
- Exterior temperature display
- In-vehicle/trip computer
- Brake Assist
- Cup holder in transmission tunnel trim
- Damping system with selective control
- EASY-ENTRY function (three-door model)
- Belt status display for passengers in the rear
- Belt tensioners for front seats and outer seats in the rear
- Ventilated glove compartment
- Head/thorax side airbags in front
- Rear window wiper with intermittent wipe and one-touch control
- Air conditioning including

- Electronic Stability Program
- Height-adjustable driver's seat
- Power windows in front
- Rear head restraints, height and tilt-adjustable
- Asymmetrically split rear seats, can be folded flat individually
- Front airbags with adaptive control
- Five-speed manual transmission (A 150, A 170, A 200, A160 CDI)
- Tinted glass
- Belt force limiters in the front with adaptive control
- dust filter
- Crash-responsive front head restraints, height and tilt-adjustable
- Height-adjustable luggage compartment floor (five-door model)
- Multifunction steering wheel
- Speed-sensitive power steering
- 185/65 R 15 tyres
- TIREFIT tyre sealant
- Six-speed manual transmission (A 180 CDI, A 200 CDI, A 200 TURBO)
- Central display in instrument cluster
- Remote-control central locking

The ELEGANCE equipment line stands out by virtue of its additional design touches and comfort-enhancing features. Below is a list of some of its extra equipment features compared to the CLASSIC model:

- Front armrest
- Oval tailpipe
- Body-coloured exterior mirrors
- Courtesy and marker lamps in the front doors
- Power windows front and rear with one-touch control
- Windscreen with blue band filter
- Luggage compartment cover
- Leather-trimmed handbrake lever
- Radiator grille with silver louvres and chrome strips
- Leather-trimmed steering wheel
- Light-alloy wheels in nine-hole design
- Front fog lamps
- Leather-trimmed gearshift lever
- Body-coloured protective rub strips all round with chrome inserts
- Body-coloured side skirts
- Body-coloured door handles with chrome inserts
- Ambient and marker lamps in tailgate
- Wooden decorative strips on centre console, transmission tunnel trim and door trim panels

AVANTGARDE models lend extra emphasis to their sporty, progressive character with equipment features such as 16-inch tyres and projector-beam headlamps. Its additional standard equipment compared to the CLASSIC line includes the following:

- Tailpipe made from polished stainless steel
- Body-coloured exterior mirrors
- Courtesy and marker lamps in the front doors
- 195/55 R 16 wide-profile tyres
- Windscreen with blue band filter
- Luggage compartment cover
- Leather-trimmed handbrake lever
- Radiator grille with gleaming black louvres and chrome strips
- Leather-trimmed steering wheel
- Light-alloy wheels in five-hole design (16-inch)
- Front fog lamps
- Projector-beam headlamps
- Bi-chromatic tail lights, dark tinted
- Leather-trimmed gearshift lever
- Body-coloured protective rub strips all round with chrome inserts
- Body-coloured side skirts
- Seats upholstered in fabric/ARTICO combination
- Body-coloured door handles
- Ambient and marker lamps in tailgate
- Decorative strips with textured aluminium finish on centre console, transmission tunnel trim and door trim panels

High-tech specification to order: everything from AUTOTRONIC to windowbags

The new A-Class also distinguishes itself from other compact models with the many extra equipment features which are available to order as an option. It makes maxi-mum use of the technological superiority of Mercedes-Benz to offer state-of-the-art driver assist systems taken directly from the brand's premium models. Here are some examples:

- Audio 50 APS with navigation
- AUTOTRONIC, the continuously variable automatic transmission from Mercedes-Benz
- Bi-xenon headlamps with cornering light
- CD changer fitted in glove compartment
- COMAND APS with large colour screen and DVD-based navigation
- Diesel particulate filter (CDI models)
- EASY-VARIO-PLUS system (five-door models), including removable front passenger seat
- EASY-VARIO system (three-door models) for even greater interior versatility
- Integral child seats in the rear
- THERMOTRONIC automatic climate control
- Light-alloy wheels in 17-inch and 18-inch designs
- Light & Sight package, including rain sensor and Headlamp Assist
- Multicontour front seats

- Panoramic louvred sliding sunroof
- PARKTRONIC
- Tyres with run-flat design
- Tyre-pressure-loss warning device
- Sidebags in rear
- Deluxe seat package, including six-way electrical adjustment and lumbar support for driver and front passenger
- Surround-sound system
- Windowbags
- Electrically adjustable front seats

At a glance: The new A-Class model lines and their specification*

	CLASSIC
Exterior	
Headlamps	H7
Front fog lamps	--
Radiator grille	matt black
Windscreen	--
Bumpers	body-coloured
Rub strips	--
Mirror housing	matt black
Side skirts	black
Door handles	black
Tailgate grab handle	black
Tailpipe	circular
Wheels/tyres	185/65 R 15 with wheel trim
Interior	
Steering wheel	plastic
Dashboard, lower section	black or orient beige
Centre console	plastic trim strips
Gearshift lever	plastic
Handbrake lever	plastic
Transmission tunnel trim	low version
Door trim panels	black or orient beige
Window controls	power windows in front with one-touch opening
Courtesy lamps	--
Ambient/marker lamps	--
Seat upholstery - fabrics	black, orient beige black multicolour
- leather (optional)	--

	ELEGANCE
Exterior	
Headlamps	H7

Front fog lamps	with chrome surround
Radiator grille	silver with chrome strips
Windscreen	with blue band filter
Bumpers	body-coloured with chrome
Rub strips	body-coloured with chrome
Mirror housing	body-coloured
Side skirts	body-coloured
Door handles	body-coloured with chrome
Tailgate grab handle	chrome edging
Tailpipe	oval
Wheels/tyres	185/65 R 15 light-alloy wheels
Interior	
Steering wheel	leather
Dashboard, lower section	black, alpaca grey or orient beige
Centre console	wooden trim strips
Gearshift lever	leather with chrome insert
Handbrake lever	leather
Transmission tunnel trim	raised version with armrest and wooden trim strip
Door trim panels	black, alpaca grey or orient beige with wooden trim strip; speakers with chrome surround
Window controls	power windows front and rear with one-touch control
Courtesy lamps	in the front doors
Ambient/marker lamps	in the tailgate
Seat upholstery - fabrics	black, orient beige alpaca grey
- leather (optional)	black, orient beige alpaca grey

	AVANTGARDE
Exterior	
Headlamps	H7 projector-beam
Front fog lamps	with chrome surround
Radiator grille	gleaming black with chrome strips
Windscreen	with blue band filter
Bumpers	body-coloured with chrome
Rub strips	body-coloured with chrome
Mirror housing	body-coloured
Side skirts	body-coloured
Door handles	body-coloured
Tailgate grab handle	chrome edging
Tailpipe	oval in stainless-steel finish
Wheels/tyres	195/55 R 16 light-alloy wheels
Interior	
Steering wheel	leather

Dashboard, lower section	black
Centre console	aluminium trim strips
Gearshift lever	leather with chrome insert
Handbrake lever	leather
Transmission tunnel trim	low version
Door trim panels	black with aluminium trim strip; speakers with chrome surround
Window controls	power windows in front with one-touch opening
Courtesy lamps	in the front doors
Ambient/marker lamps	in the tailgate
Seat upholstery - fabrics	black (fabric combined with ARTICO)
- leather (optional)	black

Design: Dynamism right down the line

- Exterior: groundbreaking one-box design which highlights renewed vigour
- Three or five doors: two distinct characters with common roots
- Interior: refined ambience full of inspired touches
- Digital design: creating by computer

Stuttgart, Jun 29, 2004
Powerful, self-assured, dynamic – the designers at Mercedes-Benz had their sights firmly set on infusing these attributes as they formulated their initial ideas for the new A-Class. Fired by this goal, the young, inspirational design team succeeded in producing a model whose firm contours and taut lines seem to bristle with forwards drive, even when it is at a standstill. At the same time, the A-Class has done a great deal of growing up. Its appearance is much more solid and wide-set, while every last element of playfulness has been eliminated from the design to boldly reveal a new character, full of power and vigour.

Anyone encountering the new A-Class will find that it immediately stirs up two feelings inside them: on the one hand, its sporty, powerful form provokes a desire to take the wheel, while the striking yet delicately balanced lines coupled with the meticulously sculpted bodywork details fuel the onlooker's appreciation of precision crafts-manship. The dynamic charisma and aura of masterful quality blend into a harmonious symbiosis. The design of the new A-Class has thereby succeeded in combining form and function to strike an ideal balance between allure and rationality, or, to put it in a nutshell, to create a car blessed with both emotion and intelligence.

The unmistakable one-box concept has been carefully honed by the designers. The new A-Class features the same steeply rising nose leading into a domed roof and tail-gate that falls away sharply at the rear that characterised the outgoing model. How-ever, the evolutionary process has triggered a growth spurt, with the new A-Class measuring an extra 232 millimetres from nose to tail and an additional 45 millimetres widthways, giving it a much more powerful poise.

This increase in size benefits both the five-door model and the new three-door version, which share the same roof lines, front end and tail. It is only when they are seen side on that the

difference between the two becomes strikingly apparent. The coupé-style profile of the three-door variant injects it with an even sportier feel and renewed vigour from almost every perspective, without compromising on styling in any way. The designers intended to create such a distinguishing look right from the start, as they sought to appeal to the young and the young-at-heart.

Front: distinctive face is instantly recognisable

The front end of the new A-Class makes a sporty, powerful impression at first glance, whilst skilfully avoiding any sentiment of aggression. The sweeping lines of the head-lamps enhance the impression of width, whilst their gracefully sculptured form fuses seamlessly into the tidy styling of the front end, providing a perfect example of the design refinements which make the new A-Class the car it is.

The characteristic Mercedes radiator grille rises more steeply than previously, giving it a more dominant feel. The bumpers with integral rub strips at the corners (ELE-GANCE and AVANTGARDE) provide a powerful finale to the nose, as well as housing front fog lamps with chrome surrounds on either side of the air intake.

Side profile: striking lines denoting forwards drive

The silhouette of the five-door version's body is moulded by a single continuous line which arches in a dynamic curve from front to rear. It starts with the prominently domed form of the bonnet, which flows back directly into the expansive windscreen before sweeping back over the coupé-style domed roof and concluding with the sharp drop at the rear.

The surfaces at the side are divided up by two main lines which also serve to give the car a lower-set appearance: first, the waistline which originates ahead of the mirror triangle then rises up towards the rear to sweep up sharply into the steeply slanted C-pillar in dramatic fashion. Such audacious styling adds a generous portion of visual forwards drive, whilst radiating a sense of sheer dynamism even when stationary. This impression is heightened by the elongated rear window which sweeps into the rear flanks where it meets in a point with the tail lights.

The fact that the colour scheme incorporates the mirror triangle and the B-pillar into the surfaces of the side windows to produce the optical effect of a self-contained sur-face adds a further element of dynamism along the vehicle's length. The new window styling, featuring much more expansive side windows than was previously the case, creates a superior sense of spaciousness, particularly for passengers in the rear. At the same time, drivers reap the benefits of a clearer view to the rear.

A sharply angled swage line, which also rises steeply towards the rear, traces a prominent lateral contour which runs back into the large tail light unit where it ends neatly. This character line also appears to elongate the length, at the same time as underlining the sportiness of the new compact car from Mercedes. The interplay between soft curves and sharp corners produces an intriguing image that catches the eye from every angle.

The muscular, broad-set styling of the front wings is a further key visual element in this respect. The wheels fill out the whole wheel housings, while the keen edges of the wheel arches both symbolise precision and help to give the new A-Class a lower-slung appearance. CLASSIC models ride on 15-inch wheels with a new wheel trim design, the ELEGANCE equipment line features 15-inch light-alloy wheels in a seven-hole design, while the AVANTGARDE sports 16-

inch, five-spoke light-alloy wheels. The list of vehicle options also includes 17-inch and 18-inch wheels in sporty designs. Both the ELEGANCE and the AVANTGARDE equipment lines include rub strips along the sides too.

Three-door model: sleekness topped with youthful charm

Although the outer silhouette is identical, the styling along the sides of the three-door version clearly sets it apart from the five-door model. As well as restructuring the side view, the longer, coupé-style driver's and front passenger doors also presented the design team at Mercedes-Benz with the scope they needed to remodel the entire rear flank. By positioning the C-pillar at more of a slant, it has been possible to give the windows a more elongated, virtually wedge-like shape, lending visual emphasis to the three-door model's lively temperament.

The designers also sculpted the rear wheel arches on this model variant to be that extra bit more muscular and powerful, adding to the overall impression of length.

These stylistic measures give the three-door model version its distinctive flair and make it appear even sleeker and more dynamic than its five-door counterpart. It ra-diates youthful charm combined with a racy streak, whilst still retaining its genuine Mercedes character.

Rear: elegant styling with broad-set look

When moving round to the rear, both the three-door and five-door version start to speak the same design language again. Of particular note here is the way in which the rear and side sections fuse harmoniously into one another, with the rear window sweeping around into the sporty model's flanks. This lends further emphasis to the impression of width and to the new sense of abundant spaciousness. The large tail light units integrate harmoniously into the design courtesy of an elegant join pattern, and succeed in capturing the sense of supreme handcrafted precision.

Interior: high-grade materials plus streamlined ergonomics

A harmonious synthesis is formed by the exterior on the one hand and the interior on the other speaking a perfectly integrated design language. Both revel in quality and precision, whilst striving to achieve a dynamic, yet mature ambience whose looks and feel are befitting of a Mercedes. In order to achieve this goal in the interior, there has been a conscious move away from the playful character of the outgoing model, as growing up is a question of converting function precisely into form. The unmistak-able character that dominates inside the new A-Class stems from the taut, angular lines, combined with the elaborate integration of interior components. The high-grade materials, as well as the perfect ergonomics and the tremendous precision of the build quality all bear witness to the tremendous attention to detail that has been lav-ished on the new model.

The first impression is one of copious spaciousness that arises both from the expansive windows and from the new form and colour concept, which gives the interior a bright and cheerful feel, as well as a definite element of excitement.

The consistent structuring of the lines clearly demarcates the interior of the new A-Class. The lower edge of the wide, single-section dashboard, for instance, is on a level with the waistline, thereby extending this powerful exterior line into the passenger compartment. The use of homogenous materials produces a smooth transition between the dashboard and the doors,

ensuring a seamless connection that carefully avoids any hint of an abrupt change in appearance or feel.

Centre console: vertical trim positioning

The brand new concept for the centre console is underpinned by the same taut design language. It rises up out of the dashboard, with the prominent edges being emphasised further down by vertical trim strips, which neatly frame the left and right of the console. These are one of the hallmark features of the new Mercedes-Benz A-Class. The edging strips in the CLASSIC version have a high-quality, gleaming black-plastic finish, while fine myrtle wood is used for the ELEGANCE line and sporty aluminium strips distinguish the AVANTGARDE models.

Instrumentation and controls: sporty, with fine chrome elements

Drivers now take hold of a restyled black, three-spoke steering wheel with multifunction buttons. Their gaze will immediately be attracted by the clearly arranged dashboard with its high-grade spray-on polyurethane finish and discreetly integrated control panels and air vents. The sporty yet elegant instrument cluster incorporates four dial-type gauges housed in individual tubes, with the speedometer and rev counter being flanked by smaller gauges for the coolant temperature and fuel level. The wealth of driver information resources is completed by a central display nestled between the speedometer and rev counter which includes in-vehicle and trip computers. The generously sized display gauges come with black faces and white digits which ensure optimum legibility whilst also instilling a certain sense of dignified elegance. The chrome ring surrounds for the four dials are also in keeping with the high-class billing.

Fine chrome elements add a touch of finesse at numerous points around the interior of the new Mercedes-Benz A-Class. Adorning the adjuster controls for the air vents, the shift lever, the handbrake lever as well as the handles for opening the glove compartment and the doors, they clearly demonstrate just how much painstaking attention to detail was paid by the designers when appointing the A-Class.

Functionality: a host of practical touches

The design concept clearly demarks the transmission tunnel trim from the centre console. In its standard specification, the new A-Class comes with a flat transmission tunnel trim with no armrest, with customers also able to opt for a raised version featuring an integral armrest. The add-on tunnel unit includes a practical drawer compartment which can also accommodate a mobile phone.

Carefully coordinated fabric designs were specially developed for the upholstered surfaces of the interior door panels, whose pleasantly simple styling helps to heighten the overall high-quality impression made by the interior. The bottom edge of the doors is lined with top-grade plastic with an attractive matt surface which is extremely resistant to scratching. Door sill panels with aluminium inserts provide a clean, crisp finish along the bottom edges of the interior. The seats were also specially developed for the new A-Class and conform with the same characteristic Mercedes design philosophy that runs throughout the vehicle, resulting in the seats' taut contours and excellent levels of comfort.

Colours: new colour charts

Mercedes-Benz has devised a new individual colour chart to herald the arrival of the new A-Class. It comprises a total of eleven shades, including eight metallic finishes. The new range of colour options also reflects the sense of dynamic maturity that characterises the new A-Class, adding to the high-class looks and feel. Finishes such as atoll blue, dune beige and comet grey correspond to current favourites, but the range also includes a fresh saturn red option. The table below shows a summary:

	Non-metallic		
	jupiter red	night black	glacier white
CLASSIC			
black	X	X	X
orient beige	O	X	O
black/multicolour	X	X	X
ELEGANCE			
black	X	X	X
orient beige	O	X	O
alpaca grey	X	X	X
AVANTGARDE			
black	X	X	X
Optional leather appointments			
black	X	X	X
orient beige	O	X	O
alpaca grey	X	X	X

X recommended;
O possible

	Metallic							
	saturn red	atoll blue	mangrove green	dune beige	comet grey	polar silver	tropical black	spring blue
CLASSIC								
black	X	X	X	X	X	X	X	X
orient beige	X	X	X	X	O		X	
black/ multicolour	X	X	X	X	X	X	X	X
ELEGANCE								
black	X	X	X	X	X	X	X	X
orient beige	X	X	X	X	O		X	

alpaca grey	X	X	X		X	X	X	O
AVANTGARDE								
black	X	X	X	X	X	X	X	X
Optional leather appointments								
black	X	X	X	X	X	X	X	X
orient beige	X	X	X	X	O		X	
alpaca grey	X	X	X		X	X	X	O

X recommended;
O possible

Design evolution: the computer takes centre stage

During the development of the sensational new Mercedes-Benz A-Class, which will soon be brightening up our roads, the Mercedes-Benz design team adopted a state-of-the-art approach, with the computer functioning as a key design tool from start to finish. The only time that the design process followed traditional practices in any way was in its infant phase, when the designers used free-hand sketches to explore the full scope of possibilities presented to them by the task at hand. However, even at this early stage, some stylists did without paper, preferring instead to sketch directly on the monitor using a graphics tablet.

By so doing, they chose the approach which was eventually used for all of the draft designs which were initially selected: their lines and curves were converted into a dataset which enabled the design concept to be illustrated in three-dimensional form. In the CAD Pool, the designers were then able to harness the powers of digital technology to the full: any alterations were transferred to large wall monitors where they were able to make any necessary refinements instantly, using drawing strokes or by taping over.

By adopting this method, it was possible to produce variants which already tallied with the engineering and dimensional specifications to a high degree with tremendous precision and far quicker than ever before. The selection was narrowed down to nine designs which were then all subject to a critical examination on the "Powerwall". High-performance systems with colossal computational power are able to project the models onto the Powerwall, which measures the width and height of one room, ena-bling the designers to scrutinise and analyse them from every conceivable angle.

The intensive work carried out at the Powerwall was finally rewarded by a highly accurate appraisal of the different designs. The team never intended, however, to make final decisions based on computer-generated models alone. After whittling down the number of designs from nine to just six, the modelling specialists took over and turned the computerised versions into a solid clay version with tactile qualities. This meant that the designers were now able to put the final touches to the contours of the wings and to the headlamp transition lines.

From these six models, the design chief together with the Board of Management short listed three which were produced in a life-size 1 : 1 format. Each and every modification which was made at this stage was transferred directly into the dataset by the digitalisation specialists, to both keep the data constantly up to date, and to make the definitive dataset available to other specialist departments, such as body-work design, for comparison purposes. As a result of this method, it was possible to attain both compelling bodystyling as well as an advanced degree of product maturity at a very early stage.

Again and again, the selected draft designs were projected onto the Powerwall where they assumed the lead roles in scenes based closely on everyday life, such as driving in traffic or parking alongside other models of car. After all, the design of the new A-Class should still single it out as being thrilling and full of self-assurance when its owners are going about their day-to-day business.

Body and safety: Typically Mercedes-Benz

- Maximum strength through use of sophisticated materials and joining technology
- Adaptive front airbags and new head/thorax side airbags fitted as standard
- Aerodynamic body with Cd value of 0.29
- Bi-xenon headlamps and cornering light function available as an option

Stuttgart, Jun 29, 2004
In the early 1990s, Mercedes engineers came up with a series of ground-breaking new ideas and enshrined their inventions in official patents. The “motor car with drive unit tilted at an acute angle against the horizontal” (Patent DE 43 26 396 C 2) and the “Firewall construction for a motor car with front-mounted drive unit” (Patent DE 44 00 132 C1), for example, revolutionised automotive construction. With the sandwich concept eventually making the leap from drawing board to production line, customers could enjoy the benefits of a car which had an extremely short front end, yet offered maximum occupant protection.

This new vehicle concept solved the age-old dilemma of how to create a car with compact dimensions and short deformation zones without compromising the levels of occupant protection customers expect of a Mercedes. With the engine and transmission mounted at an angle of up to 59 degrees partly in front of the passenger compartment and partly underneath it, the rigid drive unit does not slide towards the interior in the event of a severe frontal impact, but downwards against the likewise tilted pedal floor panel.

This clever arrangement of engine and transmission allows the front structure of the A-Class to provide a longer effective deformation zone. In other words, without the advent of the sandwich concept, the front section of the A-Class would have to be considerably longer in order to offer the same impressive level of occupant safety in the event of a heavy frontal impact. This ground-breaking feat of construction is thus justifiably seen as a milestone in the development of passenger-car safety systems, solving the problem of how to transfer Mercedes’ stringent safety standards into a compact car design.

The sandwich concept has proved its capabilities time and again since its introduction in the A–Class in 1997 and enhanced the protection of the car’s occupants in a number of serious

accidents. Indeed, it has played a central role in reducing the severity of passenger injury in frontal collisions well below the average values normally seen in this vehicle class.

Body structure: high-strength steel makes up 67 per cent of all sheet metal

The sandwich concept also formed a good basis for an innovative safety concept in the development of the new A-Class. The engineers focussed their attentions on refining the details of the concept in order to achieve an even higher level of safety.

Each individual element of the body construction has been further developed in terms of its geometry, material strength, joining technology and the quality of the materials used. The proportion of high-strength and ultra-high-strength steel alloys has risen to 67 per cent (outgoing model: 54 per cent) – and major safety-related components of the body structure are now made out of this high-tech material. Plus, innovative high-strength glued joints increase the long-term durability of the body-shell structure. In addition to using conventional joining technology such as spot welding and joining, the metal sections are also bonded together. The combined length of the A-Class bodyshell's high-strength bonded seams reaches 86 metres.

Careful selection of materials and sophisticated joining help give the front structure of the new Mercedes compact car impressive crumple resistance, the degree of which rises steeply after a short deformation zone and remains at a high level during the entire crash phase. As a result, the A-Class occupants are involved in the vehicle's braking effect from an earlier stage and over a longer period of time in a frontal impact, allowing the loads exerted to be reduced. The front structure of the new Mercedes compact car is some 60 millimetres longer than the outgoing A-Class.

The most important elements of the front structure are:

- Two straight, ultra-high-strength steel side members with pre-emptive crash boxes made from high-strength steel and a box-shaped cross section in extruded aluminium. The crash boxes have proved their mettle in collisions at low speeds (up to 15 km/h) and allow repair costs to be kept low thanks to their bolted connections. By contrast to the outgoing model, the front-structure side members of the new A-Class are turned to the outside under the floor section, which enables them to form a connection with the lateral side members (door sills).
- Two side member profiles above the wheel arches, which form an additional outlet for the impact forces in an offset frontal collision, in particular.
- The multi-piece frame-type integral support on which the engine, transmission, steering and front axle are mounted and which is fixed to the body at eight different points. In the event of a heavy frontal impact, the centre and rear attachment points are disengaged – depending on the severity of the accident – allowing the drive unit to slide downwards. The front attachment points ensure that it is still firmly secured.
- The front wheels, which constitute another feature of the safety concept for the new A-Class. They anchor themselves against the side members in the event of a collision, providing another dispersion route for the impact forces.

If one side of the front body structure is subjected to a heavy impact, solid cross members ensure that the impact forces are distributed over a wide area. As a result, the deformation zones on the opposite side to where the impact has occurred are also activated and absorb crash energy. These cross members are located above the tilted pedal floor panel and underneath the windscreen, and are anchored to the A-pillars at either side.

Newly developed floor structure acts as a high-strength backbone for the pas-senger compartment

Mercedes engineers have adapted the crash resistance of the passenger compartment to the deformation resistance of the front structure. The floor system in the new A-Class – the passenger compartment's impressively durable foundations – is a new development. Its outstanding features are a transmission tunnel and side mem-bers, which team up with cross member profiles fixed to the underside of the floor system to form a robust structure. The main floor section consists of several metal panels with differing material strengths, which are fixed together by laser welds. In a world first, Mercedes-Benz also uses this beneficial tailored-blank technique for high-strength steel panels, ensuring maximum strength in areas which play a crucial role in providing occupant protection.

High seating position also has advantages in a side impact

The A-Class' patented sandwich concept also displays its strengths in side collisions. The occupants sit around 200 millimetres higher than in a conventional saloon, and, in the event of a side crash with a typical passenger car, the latter's side members impact the body structure of the A-Class in the area where it is strongest – at the level of the support structure. In other words, the on-coming car makes contact with the A-Class' newly developed lateral side members, each of which consist of two continuous rolled-steel sections boasting maximum rigidity.

The inner shells of the side walls are also made up of several different components and feature large, strengthened gusset plates between the roof pillars, roof frame and side members. The slim A-pillars have a two-shell construction and are braced on several levels to robust cross members. The door lock assembly reflects Mercedes' exacting standards and is designed to withstand heavy loads in a side impact. Large-surface plastic honeycomb sections arranged in the lower section of the doors ensure that the support structures are activated at an early stage.

Rear structure with large impact zones

In the event of a rear-end collision, two box-shaped rear side members take over re-sponsibility for energy absorption and force distribution. Like their counterparts in the front structure, these are also turned to the outside in order to form a connection with the side members, which therefore also absorb forces in severe rear-end impacts. The rear-end area of the new A-Class is around 150 millimetres longer than the outgoing model, creating a larger deformation zone. The fuel tank is located in front of the rear axle.

The two rear side members are connected with one another by a newly developed flexible cross profile. This is constructed from heat-moulded, ultra-high-strength steel, making it particularly durable. Like the two crash boxes in front of the side members, this flexible profile also has a bolted connection. The newly developed parabolic-spring rear axle is fixed to an additional side member, which the Mercedes engineers have fitted in the centre of the car.

Top-class restraint systems

When it comes to restraint systems, the new A-Class is fitted with pioneering new developments which have made their series-production debuts over recent years in Mercedes-Benz' executive and luxury-class saloons and top-of-the-range sports cars. These include:

- Adaptive front airbags, with two-stage deployment according to the severity of the accident
- Belt tensioners for the front and outer rear seats
- Belt force limiters with adaptive functioning for driver and front passenger
- Head/thorax side airbags in the front seats.

This wide-ranging package of measures enables the new A-Class to remain at the head of the pack in the compact-car segment in this area of safety technology as well.

The adaptive front airbags have been developed on the back of knowledge gained from the latest crash research. In a collision of moderate severity, the electronic control unit initially activates only one stage of the gas generator, allowing the airbag to inflate more smoothly. If the sensors detect greater impact force, the second stage of the driver and front-passenger airbags is deployed just a few milliseconds later. The airbags' innovative new deployment technology and the lower inflation force through the concealed airbag flap in the instrument panel also help to ensure that the front-passenger airbag is activated with greater smoothness.

Adaptive belt force limiters, whose effect is calculated according to the braking force applied, are fitted as standard in the inertia reels of the front seat belts and are like-wise a new development. The tensioning effect of the belts in the initial impact phase causes them to be pulled tightly against the vehicle occupants. The adaptive force limiters ensure that a high level of restraint force is exerted to combat initial forward displacement. If the occupant is projected further forward into the airbag, which provides additional restraint, the system slackens the belt slightly, thus reducing the force exerted. In this way, the forces absorbed by the occupants' chest area are kept at a constantly low level.

The belt status indicator in the central display of the instrument clusters is another new feature and informs the driver at a glance if the rear passengers have engaged their seat belts.

Newly developed side airbags protect the head and chest area

When it comes to the level of side impact protection for the vehicle occupants, the new A-Class is once again ahead of the game. The sidebags fitted as standard in the outgoing model, which inflate at chest height between the occupants and the doors in the event of a crash and prevent direct contact with the interior door panels, have been succeeded by head/thorax bags in the new car. Located in the front seat back-rests, these newly developed airbags are deployed in a matter of milliseconds in a side impact to form an asymmetric surface, whose upper edge spreads further up-wards when inflated than the sidebags they replace. In so doing, the head/thorax bags reduce the risk of a head impact against the side window or against objects penetrating the interior of the car. At the same time, the lower section of the head/thorax bag inflates between the doors and the vehicle occupants, creating a large-surface protective shield between the door panels and the chest area. This newly developed type of side airbag has a volume of around 16 litres.

The new A-Class' advanced restraint system at a glance:

	Front seats	Rear seats
Inertia-reel seat belts	o Height-adjustable (five-door version)	o Automatic height adjustment

Belt tensioners	o	o On the outer rear seats
Belt force limiters	o	--
Belt status indicator	o Acoustic warning	o Display in the cockpit
Automatic seat occupancy sensor	o In the front passenger seat	--
Automatic child seat recognition*	Optional on the front passenger seat	--
Head restraints, height adjustable	o Height adjustable active head restraints	o Retractable
Front airbags, two-stage	o	--
Head/thorax bags	o	--
Windowbags	Optional	
Rear sidebags	--	Optional
Integrated child seats**	--	Optional
ISOFIX child seat attachment points	--	Optional

o = Standard;

**For special child seats fitted with a transponder;

* Recommended for children between the ages of two and twelve years with a body weight of 12.5 to 36 kilograms

Ease of repair: Construction principles which save money

Energy absorbing bumpers, front and rear modules with bolted connections and crash boxes in the front and rear-end structures are the major components of an ingeniously conceived concept which helps to reduce the cost of accident repairs. These components are designed to absorb a certain amount of energy in low-speed impacts and protect the actual body structure from damage:

- Front section: The plastic bumpers with integrated foamed elements absorb impact energy in accidents at up to around 3 km/h. This deformable material re-gains its shape again automatically after a crash. An extruded aluminium section supports the bumpers and at the same time serves as an impact element. It teams up with the crash boxes, headlamp mounts and radiator console to form a robust front module which absorbs energy in collisions at up to 15 km/h. The crash boxes are bolted to the front side

members and can therefore, like the complete front module, be replaced without the need for extensive welding.

- Protective side moulding: The bumpers and doors of the new A-Class are fitted with plastic rub strips, which protect the body from damage. Scratched or broken rub strips can be replaced easily and quickly.
- Rear end: The rear bumper has the same elastic deformation properties as its counterpart at the front of the car, remaining undamaged in accidents at up to 3 km/h. A robust flexible steel member with crash boxes, which serves as an impact module, is bolted to the body structure and can therefore be easily re-moved. This member absorbs energy generated in crashes at up to around 15 km/h, allowing the body structure behind it to escape unscathed.

Fully galvanised body protects against corrosion

Mercedes-Benz has developed a highly effective package of measures to provide the body with long-term corrosion protection. Underpinning the concept are fully galvanised metal panels, some of which – on the doors and the side members in the front, side and rear sections, for example – are treated to an additional organic coating on both sides which also contains rust-inhibiting zinc pigments. The most vulnerable structural sections of the body, such as the front side members, the upper side member plane of the front-end structure, the door sills and the rear wheel arches, are also protected with a cavity-fill preserving agent.

The Mercedes-Benz experts also weatherseal the welding seams in order to prevent the onset of corrosion. This seam sealing benefits not only the bonnet, doors, tail-gate, rear wheel arches and flap over the fuel filler cap, but also a large proportion of the welded joints in the floor structure of the new A-Class, including the spare wheel and battery recesses.

Using plastic for a large area of the underbody panelling has allowed Mercedes engineers to dispense with conventional PVC underseal. The underbody panelling pro-tects the body from stone chipping, wet and dirt. In keeping with all Mercedes passenger cars, the new A-Class is also protected by a 30-year MobiloLife warranty.

The exterior paintwork of the Mercedes compact car has been modified to enhance its colour, shine, resistance to aging and protection against scratches and stone chipping. A further improved powder-based clearcoat gives the A-Class' paintwork a brilliant and lasting shine and is prepared without the use of solvents. All the other paint materials are also water-soluble and as such largely free of chemical solvents.

Aerodynamics: Cd value drops to 0.29

Mercedes-Benz engineers used state-of-the-art development and testing techniques to hone the aerodynamic talents of the new A-Class. Their detailed work began long before the first prototypes were ready to roll into action and took place in the wind tunnel and on computer screens rather than out on the road.

Based around the most important exterior dimensions and the basic stylistic con-cept, the first 1 : 4 models of the new A-Class completed numerous tests in the wind tunnel, laying the groundwork for the new car's impressive aerodynamics. These trials were backed up by air flow simulations centred around Computational Fluid Dynamics, or CFD for short. This is the term experts use to describe the sophisticated process involved in building up a simulation of air flow characteristics.

The engineers used the latest CFD software to calculate and optimise the aerodynamic conditions.

under the bonnet, around the underbody and over various different areas of the car body. This allowed them to identify potential for further improvements at an early stage.

Working through these calculations is part of a process lasting several hours. In order to simulate the precise course of the air flow over and around individual areas of the car, such as the radiator grille or front spoiler, a powerful computer has to chart a path through highly complicated differential equations with more than 25 million fluid elements. It works for 36 hours at a time in order to calculate a single speed and pressure field, which can then be translated into visual form with the help of colour animations.

With the first prototypes standing by for wind tunnel tests, Mercedes engineers were already hard at work with leading-edge measuring systems, exploring the interplay between the road surface, tyres and car body in real-life conditions. This relationship has a key influence over the vehicle's aerodynamics. The new A-Class completed a series of tests on moving steel belts – which were used to drive the wheels – in the aero-acoustics wind tunnel at the University of Stuttgart. This technology allows the engineers to analyse the air flow patterns experienced by a car driving over both country lanes and at high speeds on the motorway. This type of wind tunnel tests conducted under realistic conditions play a key role in the aerodynamic fine-tuning of the body, as the forces of drag and lift behave differently depending on whether the wheels are moving or stationary. Mercedes experts have used the knowledge gained from these advanced tests to optimise the design of the underbody panelling and coverings for rear axle components, among other areas.

Cd value reduced by three per cent

The dimensions of the new A-Class' larger and therefore more comfortable body cre-ated a fresh challenge for the aerodynamics engineers. However, they still managed to ensure that its drag coefficient (Cd value) was below that of the predecessor model. The most aerodynamically efficient variant is the A 160 CDI, whose Cd value stands at just 0.29, three per cent lower than the figure for the outgoing A-Class.

A range of different measures helped the engineers to achieve this result, for example:

- The aerodynamic design of the front and rear aprons;
- The efficient sealing and air flow around the radiator grille;
- The trim for the side door sills;
- The exterior mirror casing, fine-tuned in the wind tunnel;
- The aerodynamically formed spoiler lip in the upper area of the tailgate;
- The spoilers in front of the front wheels;
- The large area of underbody panelling, which is joined by a full lower cover for the engine compartment in the diesel models;
- The spare wheel recess cover, which acts as an air diffusor;
- The plastic cover for the new parabolic-spring rear axle's Watt linkage.

Clear view through the windows in wet weather

The exterior mirrors and side windows of the new A-Class remain dirt-free in wet weather thanks to a successful aerodynamic development which provides a major boost for the car's active safety.

A series of measures help to keep the new A-Class free of dirt, with the moulding for the A-pillars modified to act as an even more efficient water deflector, for example. Water hitting the windscreen collects in these rails and is channelled from there over the roof towards the back of the car by the air flow. There, it is directed into a drip rail between the tailgate and the roof's rear edge, and is diverted downwards by ducts on either side of the car. The narrow, concealed groove and special spoiler lip in the casing of the exterior mirrors also serve as water deflectors. Both elements ensure that rain water drains away at an extremely flat angle and is carried backwards by the air flow. This allows the side windows to remain dirt-free.

Aero-acoustics help to enhance ride comfort

Precision aerodynamic developments also make their presence felt from an acoustic point of view. The low noise levels on board the new A-Class are the result of sophisticated testing in the noise-free environment of the aero-acoustics tunnel, where Mercedes engineers used special microphones to search for sources of acoustic disturbance and develop an extensive package of measures to combat wind noise. These include all-round door seals up to three layers in thickness and a new attachment point for the exterior mirrors, which have been moved to an acoustically more favourable position on the front door frames.

Illumination technology: AVANTGARDE line with projection-beam headlamps

The A-Class' alluringly designed, width-oriented headlamps blend harmoniously into the surfaces of the front end and help to define the sporty and powerful presence of the new car. State-of-the-art illumination technology is concealed behind the plastic lens with cutting-edge clear-glass styling, and ensures that the road is lit up evenly and across a wide area. This constitutes a significant contribution to active safety when darkness falls.

The CLASSIC and ELEGANCE lines of the new A-Class are fitted as standard with re-flector-type low-beam headlamps (H7 halogen bulbs), whilst the AVANTGARDE boasts eye-catching projection-beam headlamps, whose chrome-edged cylinders add extra emphasis to an already dynamic appearance. Here, a lens system (diameter: 70 millimetres) is responsible for the light distribution and ensures even broader illumination of the road ahead.

In both variants, the reflector-type main-beam headlamps – with H7 halogen bulbs – are housed separately in the headlamp casing. Another distinctive feature are the sidelights, which draw further attention to the new A-Class' striking design in the hours of darkness. The optionally available fog lamps (standard for the ELEGANCE and AVANTGARDE) are fitted in the bumper trim.

Bi-xenon headlamps with cornering light function available as an option

The new Mercedes-Benz compact car can also be ordered with premium-class illumination technology in the form of bi-xenon headlamps with additional cornering light function. The distinctive chrome-edged covers of this optional headlamp system each have two striking bulges, with the sidelight and dynamic range adjustment positioned underneath. The special design developed for the bi-xenon technology draws a visual distinction between these headlamps and the halogen variants.

The bi-xenon concept uses a single bulb for both main and low beam. Whilst the full light beam is exposed on main beam, a shutter slides between the bulb and the lens when the headlamps are

switched to low beam, blocking out part of the light emitted. With bi-xenon headlamps, switching on the main beam also activates the H7 spot-lights, which further extend the range of the light.

As well as enjoying the benefits of dynamic range adjustment and the headlamp cleaning system, customers ordering their new A-Class with bi-xenon headlamps can also call on the services of the cornering light function. This system is activated automatically at speeds of up to 40 km/h when the driver switches on the indicators or turns the steering wheel by a corresponding angle. The cornering light illuminates the area to one side of the vehicle to an angle of up to 65 degrees and a distance of up to 30 metres, thereby lighting up areas of the road which would normally not be visible with conventional headlamp technology. Pedestrians and cyclists alongside the vehicle thus remain clearly visible in darkness as well as in the light. This function also gives drivers a better view of the road through slower corners.

Specially developed electronics do not switch the cornering light on or off abruptly but instead fade it in or out with a dimmer function. This operates more rapidly when fading in than when fading out. The human eye is thus given time to adapt to the change in lighting conditions. In order to accommodate the cornering light function, the fog lamps are fitted with a modified reflector producing broader illumination to either side of the car.

Light and sight package including Headlamp Assist and rain sensor

Headlamp Assist, which switches on the exterior lights automatically when it gets dark or if the car enters a tunnel, is available as an option for the A-Class. The system is one element of a “light and sight” package, which also features a blue windscreen filter band, Headlamp Assist, Night Security Illumination, rain sensing wipers and additional functions such as emergency and fail-safe lighting.

The new A-Class’ large tail light units contain, in descending order, the brake light, reversing light, indicator, tail light and fog lamp. The third brake light is located in a raised position behind the rear window and contains powerful LEDs which light up when the driver depresses the brake pedal and stand out from conventional bulbs with their fast response and long service life.

Windscreen wipers: cutting-edge technology to ensure clear visibility

Mercedes-Benz has developed an extremely efficient wiper system consisting of two wiper arms which work in opposite directions in order to ensure good visibility through the windscreen in wet weather. The wiper blades are 650 / 580 millimetres in length and clean 81 per cent of the total glass area. But that isn’t all that the state-of-the-art “aero” wiper blade technology has to offer. In place of the jointed bracket system of conventional wiper blades, to which rubber wipers are attached, the new A-Class’ aero wipers comprise a one-part rubber profile with integrated spoiler and spring rails positioned on the outside which precisely match the convex curve of the windscreen. The spring rails ensure even distribution of contact pressure over the full length of the wiper blades, which therefore always make contact at optimum pressure. The result is a significantly more efficient wiping effect, even in heavy snowfall. Dispensing with the conventional bracket system has allowed the engineers to reduce the overall height of the wiper blades by almost half, helping to further limit wind noise and improve wiper performance in wintry weather conditions.

The sunroof: louvres produce a panoramic effect

Mercedes-Benz has carried out further modifications to the A-Class' innovative lou-vred sunroof, which is distinguished by its space-saving construction and a roof open-ing which is around 60 per cent larger than that provided by conventional sunroofs. Available as an option for the new A-Class is an electrically operated panoramic sun-roof with transparent louvres. This allows the new development to offer an excep-tional open-air experience, whilst also contributing to the bright and welcoming interior ambience when closed.

The louvres are made of tinted plastic and protected by a scratch-resistant coating which also prevents the sun's UV rays from penetrating the car interior. A manually operated two-blind screen on the inside of the panoramic louvred roof provides a further layer of protection against the sun and can also be used when the roof is open. Here, the screen's air-permeable fabric acts as a draught-stop, reducing draught for the vehicle occupants.

Pushing the button to open the innovative sunroof raises the front louvre, which re-mains in this position to act as a wind deflector. If the button is pressed again, the other four louvres then move backwards and slide together into one tilted unit. Like all the latest sunroofs, the A-Class' new panoramic louvred sunroof can be fixed in any position between fully open and fully closed.

Interior: Opening the door to convenience and comfort

- Top ratings for spaciousness, comfort and ergonomic design
- Careful choice of materials ensures perceived quality you expect from a Mercedes
- Air conditioning fitted as standard in all models
- A-Class premiere for the control and display system COMAND

Stuttgart, Jun 29, 2004
A compact car on the outside, yet a family car with the spaciousness of a minivan under the surface, the new Mercedes-Benz A-Class disproves the theory that these apparently conflicting characteristics can be combined into a single vehicle. With an exterior length of 3838 millimetres and a width of 1764 millimetres, the new model may exceed the dimensions of its predecessor, but the A-Class is still more compact and manoeuvrable than its competitors and still allows a clearer view. Indeed, it takes up only 6.7 square meters of space on the road – that's ten per cent less than other compact cars.

By the same token, the Mercedes-Benz offers significantly more interior space, com-fort and functionality than other models in its class. In this respect, two features of the A-Class play a particularly important role:

- The patented sandwich concept allows the engine and transmission to be arranged partly in front of the passenger compartment and partly below, and other components – such as the battery, activated charcoal filter (for the petrol models), fuses, electronic control units and fuel tank – to be positioned under the passenger compartment, thus saving even more space. This construction con-cept leaves 67 per cent of the body length free for the occupants and their lug-gage, a peerless achievement of space management.
- An intelligent dimensional concept ensures exceptional spaciousness and more freedom of movement for the vehicle occupants. The new A-Class out-performs both its predecessor model and its rivals in terms of all comfort-related interior dimensions, i.e. shoulder room, hip room, elbow room, space between the seats and head room. In

addition, the load capacity of the luggage area is also above the normal level for this vehicle class.

A comparison between the new A-Class and its predecessor model (standard version) confirms that the incoming car has grown up even further in every respect:

	New A-Class (five-door version)	Outgoing model (standard version)	**Difference**
Body Length/width/height	3838/1764/1593	3606/1719/1587	+232/+45/+6
Wheelbase	2568	2423	+145
Interior*			
- Shoulder room, front/rear	1411/1381	1314/1290	+97/+91
- Hip room, front/rear	1362/1330	1323/1254	+39/+76
- Elbow room, front/rear	1422/1444	1327/1361	+95/+83
- Head room, front/rear	989/983	977/932	+12/+51
- Space between seats**	805	775	+30
- Knee room, rear	61	31	+30
Boot capacity***	435 –1370 l	390 -1190 l	+45 to 180 l

Figures in millimetres, measurements when vehicle unladen.
* Five-door version;
** From seat reference point in the front to seat reference point in the rear;
*** In accordance with VDA measuring method

Entering new dimensions: Greater head and knee room and an ergonomically enhanced seat position in the rear. (Figures in millimetres)

The front and rear passengers both benefit from the larger interior dimensions of the new A-Class. Particularly remarkable is the extra width inside the new car, which passengers will notice most clearly in improvements such as the additional 97 millimetres added to the shoulder room of the outgoing model. The credit for this major advance is shared by the wider body (+45 millimetres), but also the redesigned interior door panels and relocation of the seats a further 15 millimetres (rear: 10 millimetres) to the sides of the car. The new length of the A-Class offers the rear passengers the benefits of extra space between the seats which, at 805 millimetres, reaches the level of a mid-range saloon. Knee room in the rear has improved to a similar degree, whilst a remarkable 53 millimetres have been added to the length of the load com-partment floor.

And the Mercedes engineers have made further progress in terms of enhancing visi-bility for the driver. Slimmer A-pillars and the removal of the window guides in the side windows allow the driver's angle of vision to be widened by some ten per cent forwards and to the right and by as much as around 25 per cent forwards and to the left – a major contribution to further improving vision and safety through corners and when turning off.

Seating comfort over long distances for the rear passengers

A significant comfort feature of the new A-Class is the modified seating position in the rear. The floor structure has been lowered in front of the rear seats, with the effect that the rear passengers sit higher, and thus more comfortably, than in the outgoing model. The seats themselves, which

are also new developments, and the improved head and knee room ensure that the rear passengers sit comfortably over long journeys.

Roomy glove compartment and a host of practical stowage compartments

Exemplary functionality and variability have always been among the advantages of the A-Class' innovative body concept. The Sindelfingen-based engineers have continued the development of the compact model's interior according to these criteria and made a number of advances. Indeed, the interior has become even more versatile, thanks to a range of either new or improved stowage compartments. Examples include the following:

- The compartments in the interior panels of the front doors have been designed to accommodate a road atlas and a PET drinks bottle (1 litre). In the rear door pockets, meanwhile, there is enough space for drinks bottles or cans with capacity of up to 0.5 litres.
- The centre console and tunnel trim also offer more stowage options than in the predecessor model. For example, an additional cup holder is located behind the gearshift lever.
- The capacity of the glove compartment, which is cooled by the standard-fitted air conditioning system, has been increased to 8.5 litres, making it more than twice as large as in the outgoing model. In addition to smaller items, this compartment also offers ample room for an A4 atlas and a CD changer for six CDs (optional).
- Both front seats are fitted with an oddments tray which offers room for a tele-scopic umbrella.

Variable rear seat bench and height-adjustable load compartment floor

The 1/3 : 2/3 split rear seat bench allows the A-Class to be adapted quickly and easily according to the transportation job in hand. The basic principle is "rearrangement first". The seat cushions and then the backrests can be folded forwards either individually or as a unit in a single movement, increasing the reach of the load compart-ment from 649 to 1372 millimetres and the boot capacity from 435 to as much as 980 litres. Plus, the 2/3-section of the seat cushion in the five-door version can be completely removed and stowed under the height-adjustable load compartment floor in order to create more space for luggage and leisure or sports equipment. This pushes load capacity up to a maximum 1485 litres – territory normally reserved for minivans. An overview of the vital statistics:

Five-door A-Class

Position of rear seats	**Load capacity**
Basic position without luggage area cover; load compartment floor in lower position.	**435 l**; With load up to roof level: **535 l**
1/3 rear seat folded forward; load compartment floor in upper position.	
a) seat cushion fitted	**635 l**; With load up to roof level: **845 l**
b) seat cushion removed	**690 l**; With load up to roof level: **915 l**

2/3 rear seat folded forward; load compartment floor in upper position.	
a) seat cushion fitted	**760 l**; With load up to roof level: **1050 l**
b) seat cushion removed	**820 l**; With load up to roof level: **1110 l**
Both rear seats folded forwards; load compartment floor in upper position.	
a) seat cushion fitted	**980 l**; With load up to roof level: **1370 l**
b) seat cushion removed	**1100 l**; With load up to roof level: **1485 l**

Figures in accordance with VDA measuring method

With a width of 1010 millimetres and a depth of 723 millimetres, the boot offers sufficient space in which to transport a medium-sized pram – without having to fold for-ward or remove the rear seats.

Mercedes experts used a luggage set to demonstrate the benefits of the new dimensions to a family preparing for a trip away. With the rear seat bench in the standard position and the luggage area to be filled to roof level, passengers in the outgoing A Class could take one suitcase with capacity of 86 litres, another offering 69 litres and a small case with wheels (25 litres) with them on holiday. In the new A-Class, on the other hand, they have significantly greater load capacity at their disposal, with the same seating position leaving enough space in the boot for a second 86-litre suit-case, a sports holdall and a beauty case.

When the rear seat backrest is folded forwards, the load compartment floor – which is height-adjustable through 90 millimetres – allows a level loading surface to be created in the rear of the car. As the new A-Class comes as standard with the innovative TIREFIT tyre sealant kit, the spare wheel well serves as a practical and concealed stowage area. The load compartment floor has a capacity of 67 or 118 litres, depending on its position. A further stowage compartment (4 litres) is located behind a flap in the panelling on the right-hand side of the boot area.

EASY-VARIO-PLUS increases load capacity to as much as 1995 litres

Mercedes-Benz has developed the EASY-VARIO system (optional) for customers who demand that much more in terms of interior variability. In the three-door A-Class, the package includes a height-adjustable load compartment floor and removable rear seat cushions (1/3 and 2/3 sections).

The EASY-VARIO-PLUS system, which is available as an option for the five-door version, transforms the interior of the new A-Class into that of a goods carrier:

- Both rear seats can be completely removed – either individually or as a unit - and the seat cushion bases can be folded neatly away. When the following are removed, load capacity increases accordingly:
- 1/3 rear seat to 710 litres (with load up to roof level: 945 litres)
- 2/3 rear seat to 870 litres (with load up to roof level: 1185 litres)
- both rear seats to 1150 litres (with load up to roof level: 1580 litres)

- The backrest of the front passenger seat folds forwards, extending the load area from tailgate to instrument panel to around 2.34 meters in length.
- The front passenger seat can be completely removed. This allows the A-Class to offer maximum load capacity of up to 1995 litres, whilst the load area – from the tailgate to the front footwells – then measures some 2.75 meters in length.

The seats: two-zone upholstery ensures impressive comfort

Mercedes engineers were not satisfied with merely upping the spaciousness of the interior, improving its ergonomic design and achieving peerless variability in the development of the new A-Class – they also devoted special attention to the seats. And the results of this commitment are impressive indeed. The seats show considerably improvements over the predecessor model's in terms of comfort, side stability, design and perceived quality. Plus, they also offer greater scope for individual adjustment and a more extensive range of optional extras, laying the foundations for exceptional seating comfort.

The seats for the driver and front passenger represent the fruits of new manufacturing technology, which sees the single-piece foamed seat cushions split into separate zones of differing hardness. The foamed material in the raised side bolsters has a stiffer composition in order to ensure good lateral support for the driver and front passenger when cornering and turning off, whilst the softer properties of the seat surfaces allow pressure to be distributed evenly and offer enviable levels of comfort as a result. The depth of the front seat surfaces now measures 512 millimetres, up from the previous 502 mm, whilst 14 millimetres have been added to the width of the cushion, which now spans 513 mm.

The new A-Class sees the frame-type head restraints of the outgoing model replaced by fully padded active variants, which can be adjusted in height and angle. The front seat backrests, meanwhile, are fitted with head/thorax bags – another of the safety systems fitted as standard in the new A-Class. These newly developed airbags further improve occupant protection in the event of a side collision.

The scope of adjustment for the front seats is the same as that in the predecessor model. The reach of the driver's seat can be modified through up to 260 millimetres and its height by 56 millimetres. If the driver alters the height of the seat, the tilt an-gle of the seat cushion is adjusted automatically through up to six degrees. A full range of adjustment for the driver and front passenger backrests means that they can be reclined fully, if desired.

The front seats of the three-door A-Class are fitted with a system which allows the rear passengers to climb in and out of the car comfortably and easily. When the front seat backrests are folded forwards, the EASY-ENTRY function allows the seats to slide all the way forward in a single movement, creating extra room to get in or out of the car.

Customers looking for even greater individualisation in their seat comfort can choose from a selection of enticing options:

- Seat comfort package: height-adjustable front passenger seat, both front seat cushions adjustable for angle, lumbar support for driver and front passenger.
- Electric adjustment for front seats and head restraints.
- Multicontour backrest for the driver: the pneumatic properties of the upholstery allow the contours of the backrest to be adjusted to the occupant's body shape

Other practical extras include stowage compartments under the front seats and the luggage nets on the back of the front-seat backrests.

The seat cushions in the rear of the new A-Class are also made using leading-edge foamed materials, the around 100-millimetre-thick foamed upholstery in the seat surfaces offering significantly greater comfort than the outgoing model.

Instrument panel: exemplary touch and feel and perceived quality

Two of the top priorities in the development of the interior for the new A-Class were its touch and feel and ergonomic design. Surface materials, display instruments, but-tons and control switches were all subjected to thorough testing according to these criteria. Scientists at the DaimlerChrysler research department's Customer Research Center in Berlin used drivers to help them explore the properties of various different material variants and developed methods of objectively assessing the totally subjective perceptions of the participating drivers. The tests produced valuable feedback for the development of the interior design and technology.

The instrument panel has a single-piece construction and the instrument cluster, controls and ventilation outlets blend harmoniously into the overall form. The precise edges and radiuses which define its appearance are the result of a cutting-edge manufacturing process which Mercedes-Benz has further refined. Robots apply a so-called "spray-on skin" to a negative mould. This consists of a soft polyurethane plastic whose top surface is pleasant to the touch and can be shaped as desired – according to the specification for the vehicle – whilst the process is being carried out. The result is an even surface unblemished by parting lines or seams. Concealed on the inside, even the tear seam of the front passenger airbag fails to disturb the consistency of the styling.

A newly developed cross member forms the high-strength basis for the instrument panel and its components. The glove compartment, airbag, centre console and jacket tube are attached to this solid structure, which reduces shaking and vibrations. The cross member is bolted at either end to the A-pillars, helping to provide them with critical transverse support. A firewall, which is bonded and bolted to the bodyshell, seals the openings between the engine compartment and interior.

This new firewall concept offers audible benefits, allowing less obtrusive noise to filter through from the engine compartment to the interior.

Attractively designed cockpit with state-of-the-art control and display concept

The newly designed cockpit without doubt constitutes the most eye-catching element of the A-Class interior. Clearly laid-out circular instruments with chrome surrounds, black dials and white lettering and figures keep the driver informed of the vehicle speed and engine speed, whilst smaller instruments on either side indicate the cool-ant temperature (left) and fuel level (right).

In the centre of the instrument cluster is a striking two-section central display. The top section indicates the daily and overall mileage, with the outside temperature, time, current gear and selector lever position for the AUTOTRONIC continuously variable transmission (optional) stated below.

The control and display concept for the new A-Class also invites drivers to programme in their own settings, in order to tailor various functions to their personal re-quirements. Once stored,

these settings are instantly recalled without the need to so much as lift another finger or press another button. Drivers can amend the settings from the standard-fitted multifunction steering wheel familiar from other Mercedes model series, which is linked up to the central display in the instrument cluster, the radio and the car telephone. All they have to do is touch the lower button on the left-hand side of the steering wheel and the main “Settings” menu will appear on the display. From here, individual functions can be programmed under various different menu options.

Centre console designed using knowledge from research into touch-and-feel characteristics and ergonomics

The centre console is a good example of the flawless interplay between touch-and-feel characteristics and ergonomics in the new A-Class. The visible surfaces of the switches and controls are treated with a special paint, which produces a silky shine and soft finish. This “soft-touch paint” is another component analysed by experts in the DaimlerChrysler research department’s Berlin-based touch-and-feel laboratories. There, they established the thickness of coating necessary to create surfaces which drivers will find pleasant to the touch. The tests revealed that the drivers’ sense of touch allowed them to detect a difference of just a few micrometres.

Another criterion in the development of Mercedes’ hallmark touch and feel properties is the “genuineness” of the materials used. Human senses interact with one another and perception is therefore shaped by their combined responses. Hence, the experts at the Stuttgart-based car maker are keen to avoid disappointing their customers by using anything less than genuine materials. The following claim underlines the standards Mercedes sets itself in this area: “The looks of exquisite wood are combined with the authenticity of real wood.”

Indeed, the new A-Class is a convincing example of this approach. The attractively styled trim elements on the sides of the centre console, tunnel trim and interior door panels consist of either fine myrtle wood (ELEGANCE equipment line), structured aluminium (AVANTGARDE) or black high-gloss plastic (CLASSIC - in the centre console and tunnel trim only).

Controls and displays within easy reach and clearly visible

The buttons and controls are arranged according to the principles of ergonomic design. They are positioned in order of either the importance of their functions, the frequency with which they are used or stylistic considerations. For example, the striking red button for the hazard lights is located in the upper-most position, within equally easy reach of the driver or front passenger. Underneath – depending on which has been specified – is the radio or navigation system, whose colour displays are positioned well within the driver’s field of vision. Next to bottom in the switch order on the centre console is the control unit for either the standard-fitted air conditioning or optional THERMOTRONIC automatic climate control. The latter stands out with its user-friendly and attractive rotary-type switch for manual adjustment of the fan speed (right) and air distribution (left). A switch strip with buttons for optional extras such as seat heating, PARKTRONIC, tow-away protection and interior motion sensor forms the bottom line of the centre console.

Buttons with convenient push-push control

The technology and functional principles behind the development of the buttons were also established on the back of knowledge compiled in touch-and-feel tests conducted by DaimlerChrysler research engineers and involving the input of 120 drivers. The tests involved assessing the force needed to operate the buttons and the force/path values, as well as the

drivers' sensual perception of the buttons when pressing them and when hearing the "click" sound. The results of the tests have helped produce a new generation of buttons based on the so-called "push-push" principle. In other words, a single press of one of these buttons is enough to activate or deactivate the function concerned. The buttons lock into position with a satisfying "click", which doubles up as an audible confirmation that the required function has been successfully engaged.

The centre console leads down to a tunnel trim section, whose level design (standard) allows the integration of further stowage areas and a cup holder. A raised version of the tunnel trim can be ordered as an option, complete with a fore/aft sliding armrest and a stowage compartment drawer function for mobile phones.

High-class combination of materials in the door panels

The interior door panels also reflect the commitment of the Mercedes engineers to bring together attractive design and pleasant touch-and-feel properties. They achieve this aim by combining fabric (top) and scratch-resistant plastic (bottom), which has a new double-gloss grain-effect finish. This eye-catching styling is further enhanced – depending on the equipment line – by a striking trim strip in wood or aluminium. Discreet chrome surrounds adorn the grilles on the door-mounted speakers of the ELEGANCE and AVANTGARDE models.

The wide armrests integrated into the interior door panels are pleasantly soft and, as such, extremely comfortable. The attractively styled controls for the power windows and exterior mirrors are integrated into the door panels within easy reach of the driver/front passenger.

Climate control: top-class comfort comes as standard

In addition to the dimensional concept, seat design and ergonomic properties of a car, interior climate control also contributes to the safety and comfort of its passen-gers. That's why Mercedes-Benz is fitting all new A-Class models as standard with a powerful air conditioning system, whose user-friendly controls are located on the centre console. The driver and front passenger can use the rotary-type switches to adjust the temperature, air distribution and blower speed. The controls for the air conditioning are joined here by other climate-related buttons, such as those for the air recirculation function and heated rear windscreen.

A sensor located in the climate control unit monitors the temperature of the interior and ensures that the level programmed in by the vehicle occupants remains constant. Further sensors measuring the outside temperature and air humidity allow the air conditioning system (with fully adjustable coolant compressor) to be adjusted when required and therefore to economical effect. A solenoid valve enables the system to be regulated continuously in response to the level of humidity in the air, vary-ing the swept volume of the climate control compressor and thus the cooling effect.

Like every Mercedes air conditioning unit, the system in the new A-Class works according to the reheat principle. The system remains constantly active – in low as well as high outside temperatures – in order to first cool the intake air and at the same time remove the moisture from it with the aim of preventing the windows from misting up. The air is then re-heated to the desired temperature. A humidity sensor allows this reheat function to respond to need – the intake air is cooled according to the level of moisture it contains, and then re-heated.

Another special feature is the tunnel function. If the driver presses the air recirculation button down for an extended time (approx. two to three seconds), the air recircu-lation flap in the climate control unit and all the open side windows and sun-roof are closed automatically. When the button is pressed again, they all return to their previous positions.

Mercedes-Benz fits the CDI models as standard with a newly developed PTC (Positive Temperature Coefficient) heating system, which is positioned behind the air conditioning unit's heat exchanger and activated automatically according to the outside temperature. The compact but powerful heating system whirrs into action a short time after the engine has been switched on, warming up the interior.

THERMOTRONIC automatic climate control with sun and pollutant sensor

THERMOTRONIC is a synonym at Mercedes-Benz for unbeatable climatic comfort and now also available for the A-Class. The highly efficient automatic climate control sys-tem is making its debut on the Mercedes compact car's options list.

The THERMOTRONIC control unit differs from the air conditioning system in various ways. Its two striking rotary-type switches, for example, govern the blower speed and air distribution. In between these controls are push buttons, which are used to activate the residual engine heat utilisation function (right) and automatic mode (left). The driver and front passenger can key in their desired temperatures separately at the touch of a button in the centre of the control unit. Separate displays con-firm the values entered.

In the same way as the air conditioning system, THERMOTRONIC also works partly on the basis of data supplied by sensors indicating the interior and outside temperature and the level of humidity of the in-flow air. In addition, a pollutant sensor is also integrated into the system. If the concentration of nitrogen oxide and carbon monox-ide in the outside air exceeds certain values, THERMOTRONIC switches automatically to air recirculation mode. Seven electric motors in the THERMOTRONIC control unit ensure that the air flaps are controlled automatically.

The automatic climate control system also contains a special sun sensor. Positioned on the instrument panel, it supplies the THERMOTRONIC system's electronic control unit with information on the intensity of the sun's rays. In automatic mode, this sensor helps to control the quantity and temperature of the air channelled towards the driver and front passenger according to the angle of the sun's penetration.

The air recirculation function also works automatically. In high outside temperatures, the microcomputer automatically adjusts the proportion of recirculated air in the in-flow air in order to cool the interior more quickly and to limit the energy required. Another standard feature of THERMOTRONIC is a combined filter with active charcoal layer, which collects dust particles and pollen when the air conditioning is set in fresh-air mode.

Four pivoting rectangular vents in the instrument panel, four defroster vents for the windscreen and side windows and four vents in the front and rear-passenger foot-wells ensure that the interior receives efficient ventilation. In conjunction with THERMOTRONC automatic climate control, Mercedes-Benz also equips the new A-Class with a vent which faces upwards from the centre of the instrument panel, distributing air over a large surface area and therefore not creating a draught, as well as two pivoting vents for the rear compartment positioned on the back end of the tunnel trim.

Audio systems: state-of-the-art technology from luxury-class models

In the area of entertainment and communications technology, systems more familiar from Mercedes' leading models are now available for the A-Class. Topping the range is the optionally available control and display system COMAND APS, which combines the services of a radio, navigation system and DVD /CD player. The centrepoint of the system is the large (6.5-inch) TFT colour display boasting flawless clarity and colour presentation. A DVD is available for the navigation system featuring both the European road network and tourist destinations. The route guidance function uses a colour map on the COMAND display, arrow commands in the instrument cluster's central display and audible instructions. Once the route has been calculated, the navigation DVD can be removed and replaced by music CDs. If the driver chooses this option, the navigation system relies on arrow commands only. The system is equipped with an FM-RDS dual tuner for receiving long, medium and short-wave radio stations.

The optional Audio 50 APS is a high-quality system which includes an FM dual tuner receiver, CD drive and arrow-based navigation system with integral RDS-TMC dynamic route guidance. The system's display unit comes in the form of a 4.9-inch TFT colour screen with graphics reproduction capability. The navigation CD contains the road networks of all major European countries, and the CD drive can also be used to play music CDs whilst the route guidance function is in operation.

The Audio 20 CD radio is equipped with an FM /MW and LW receiver. Up to ten stations can be stored for each wave band. The system's four-channel amplifier has output of 4 x 25 watts. The integral CD player can also play privately burned CDs. Automatic station search, the Radio Data System (in conjunction with FM reception) and scan function are further features of this optionally available system, whose integral telephone keypad can also function as a control centre for a mobile phone.

The entry-level system for the new A-Class is the Audio 5 CD (optional) with FM/MW/LW and SW receiver and CD player.

All Mercedes radios are linked up to the standard-fitted multifunction steering wheel to deliver faultless ease of use. A whole host of functions can be operated from here, allowing drivers to keep their hands on the steering wheel when adjusting the volume, for example, or , searching for a different radio station. Another outstanding feature of the audio systems is their speed-sensitive volume control. From approx 20 km/h the volume level is increased in stages in order to adjust to the changing driving situation. Aerial diversity, which selects the strongest signals picked up by the roof-mounted aerial and a pair of FM aerials in the rear window, thus ensuring optimum reception, is another impressive feature of the Audio 20 CD, Audio 50 APS and COMAND APS.

Flawless sound reproduction from the ten-speaker surround sound system

The Mercedes radios are hooked up as standard to six speakers. However, an even higher-quality eight-speaker set can be ordered as an option. Meanwhile, the newly developed surround-sound system (optional) with ten speakers, including active tweeter and woofer system with built-in amplifiers, takes sound reproduction to the next level and adapts precisely to the acoustics of the A-Class interior. A microphone assesses ambient noise conditions, allowing the microcomputer to adjust the volume and sound development of the system sensitively to the situation in hand. The result is a wonderfully consistent audio quality at all times. The sound system can be com-bined with the Audio 20 CD, Audio 50 APS and COMAND APS options. And customers can also specify a CD changer for six CDs as an option for the Audio 20 CD, Audio 50

APS and COMAND APS and this unit slots neatly into the glove compart-ment of the new A-Class.

Universal interface for mobile phones from various manufacturers

Mercedes-Benz offers a universal interface which allows mobile phones from a range of different manufacturers to be integrated into the on-board communication and in-formation data network. This means that the driver can use the telephone easily and comfortably via the buttons on the multifunction steering wheel or the telephone key-pad on the radio (Audio 20 CD, Audio 50 APS and COMAND APS only).

Engines and transmissions: Powerful presence

- Diesel engines: three new power units with up to 140 hp of output
- Petrol engines: highest output rating increased to 142 kW/193 hp
- Transmissions: first ever continuously variable automatic transmission from Mercedes-Benz

Stuttgart, Jun 29, 2004
The A-Class by Mercedes-Benz is a very special automobile in every respect - innovative, intelligent and unique. In short: typically A-Class.

A glance beneath the bonnet confirms this: the four-cylinder engines of this compact car are of a unique construction which is specially configured for the A-Class and of-fers numerous advantages in an automobile of this size. The most important of these is occupant protection: the power unit is installed transversely behind the front axle and inclined forward at an angle of 59 degrees (diesel engines: 56 degrees). This installed position precisely matches the shape of the front bodyshell floor panel. During a severe frontal collision, the engine and transmission are able to slide downwards and to the rear against this panel without damaging the passenger cell.

The second major advantage of the A-Class engines is their compact construction. Their transverse position, partly in front of and partly beneath the passenger compartment, is not only extremely safe but also saves space. It allows a shorter front end design, making a much larger area of the bodyshell available to increase the comfort of the occupants than conventional designs.

And finally, in addition to their unique, angled design and compact dimensions, the four-cylinder engines of the A-Class also have a great deal to offer in engineering terms. This applies more than ever before to the powerplants which Mercedes-Benz will use for the second generation of this successful compact car from autumn 2004.

More output, more torque, more driving pleasure – these development objectives for the new and improved engines have all been achieved, and are accompanied by equally impressive progress in terms of environmental compatibility and comfort, as well as a further reduction in fuel consumption:

- Compared to the preceding model, the increase in output generated by the pet-rol and diesel engines in the new A-Class is as much as 38 per cent. The output spectrum

extends from 60 kW/82 hp for the new A 160 CDI to 142 kW/193 hp for the future flagship model, the A 200 TURBO.

- Compared to the previous A-Class, maximum torque has increased by up to 46 per cent. The new A 200 CDI already develops a whole 300 Newton metres of torque as low down as 1600 rpm.

Versatility is another key virtue of the engine range for the Mercedes-Benz A-Class: instead of six, there is now a choice of seven four-cylinder power units, which are combined with either a five or six-speed manual transmission depending on the torque rating. The newly developed AUTOTRONIC continuously variable transmission is also available for all model variants as an option.

The range of engines and transmissions for the A-Class at a glance:

	A 160 CDI*	A 180 CDI	A 200 CDI	A 150
Displacement cc	1991	1991	1991	1498
Output kW/hp	60/82	80/109	103/140	70/95
Manual transmission	Five-speed	Six-speed	Six-speed	Five-speed

*Available from late 2004; **Available from mid-2005

	A 170	A 200	A 200 TURBO**
Displacement cc	1699	2034	2034
Output kW/hp	85/116	100/136	142/193
Manual transmission	Five-speed	Five-speed	Six-speed

*Available from late 2004; **Available from mid-2005

The diesel engines: high torque for high motoring pleasure

The diesel engines for the new A-Class have been newly developed. Major differences versus the engines in the preceding model include an increase in displacement from 1689 to 1991 cc, higher ignition pressures, improved air ducting and second-generation commonrail fuel injection. These and other measures lead to a significant increase in output and torque, a reduction in exhaust emissions and an audible drop in noise levels. Take the A 160 CDI, for example: the new engine produces around nine per cent more power output (60 kW/82 hp) and develops 12.5 per cent more torque (180 Newton metres) than the previous A 160 CDI. The differences are even more striking for the A 180 CDI: the new 80 kW/109 hp diesel engine has 14 per cent more output than the engine in the A 170 CDI, and makes 250 Newton metres of torque available between 1600 and 2600 rpm, an increase of almost 39 per cent.

The flagship diesel model in the new A-Class is the A 200 CDI, which achieves new standards in terms of agility and driving pleasure. The direct-injection engine has an output of 103 kW/140 hp and develops 300 Newton metres of torque over a wide engine speed range between 1600 and 3000 rpm. The A 200 CDI completes the dash from standstill to 100 km/h in 9.5 seconds and goes on to reach a top speed of 201 km/h.

Key data for the diesel engines for the new A-Class:

	A 160 CDI	A 180 CDI	A 200 CDI
No. of cylinders/ valves per cylinder	4/4	4/4	4/4
Cylinder spacing mm	90	90	90
Output kW/hp	60/82 at 4200 rpm	80/109 at 4200 rpm	103/140 at 4200 rpm
Max. torque Nm	180 at 1400 - 2600 rpm	250 at 1600 - 2600 rpm	300 at 1600 - 3000 rpm
0-100 km/h* s	15.0	10.8	9.5
Top speed* km/h	170	186	201
Fuel consumption**	4.9 l/100 km	5.2 l/100 km	5.4 l/100 km

***Provisional figures; **NEDC combined fuel consumption, provisional figures**

Variable high-pressure pump cuts fuel consumption

With fuel consumption figures for the NEDC cycle varying between 4.9 and 5.4 litres per 100 kilometres, the engines are capable of matching the exemplary standards set by the outgoing compact Mercedes-Benz models, at the same time as cutting exhaust emissions and producing higher pulling power.

This result is largely thanks to the second-generation common-rail injection system, which allows the solenoid valves on the injectors to be controlled even more precisely and the high-pressure pump to be regulated to match current demands. In the first-generation CDI engines, this pump always operated at maximum output, which required a high energy input at the expense of fuel consumption and also drove up the fuel temperature. This conflict of aims has now been resolved with a newly developed high-pressure pump, which is regulated in accordance with demand by means of a suction throttle. Depending on the fuel pressure calculated by the engine management system, the delivery chambers of the pump are only partly filled and enable the delivery volume to be demand-linked. This technology considerably reduces the energy input required by the pump, and therefore the fuel consumption.

Three-phase fuel injection at up to 1600 bar

Another important feature of this second-generation common-rail technology is the newly developed seven-hole injection nozzle, which replaces the previous six-hole nozzle. The new injector makes it possible to reduce the hole diameter by around 20 per cent, thereby reducing the flow rate. This means that the fuel is distributed more evenly in the cylinders, ignites more rapidly and burns more completely than before. The progress achieved thanks to this improved mixture formation is particularly noticeable when measuring the exhaust emissions.

The greater throttling effect of the smaller nozzle holes increases the injection time, however, which is particularly unfavourable when more performance is required. To compensate for this effect, the engineers at Mercedes have increased the injection pressure from the previous 1350 bar to 1600 bar, thereby shortening the injection time. As in all common-rail engines, this high injection pressure is available at all times, i.e. even at low engine speeds.

The pilot-injection system has always been a characteristic feature of common-rail engines from Mercedes-Benz. This ensures quieter combustion: a few milliseconds before the main injection process, a small quantity of diesel fuel flows into the cylinders, ignites and thereby pre-heats the combustion chambers. This creates a more favourable environment for the subsequent main injection: the fuel ignites more easily in the pre-heated cylinders, which means that the pressure and temperature no longer increase as suddenly as in an engine without pilot injection. This has an attenuating effect on combustion noise.

In these second-generation CDI engines, the engineers at Mercedes have perfected this principle by means of dual pilot injection. The high-performance solenoid valves in the new 1600-bar injectors permit even shorter time delays between pilot and main injection, so that now small pilot quantities flow into the combustion chambers twice in succession within less than a millisecond, ensuring even better pre-heating. The result is audible, as combustion noise levels are once again significantly reduced.

New electronic engine management system with a wide range of functions

The injection timing, volume and pressure are regulated by a newly developed electronic control unit, which is integrated into the databus network of the A-Class. The other tasks this unit performs in connection with the fuel injection process include idling and individual cylinder torque control, engine speed limitation, deceleration fuel cut-off and control of the fuel pump. The micro-computer is also responsible for controlling the charge pressure of the turbocharger, exhaust gas recirculation and for shutting off the intake ducts in diesel engines in line with demands. All the system components and their functions are monitored by an efficient diagnostic system.

The quick-start glow-plug system is yet another first, and enables the diesel engines to be started almost as quickly as their petrol counterparts.

New A 200 CDI with 180-bar ignition pressure and a VNT turbocharger

The impressive increase in output and torque which clearly distinguishes the CDI engines of the new A-Class from those in the preceding model is not just the result of increasing the engine displacement by almost 18 per cent. At the same time, the Mercedes engineers improved the gas cycle in the cylinders and increased the ignition pressure from the previous 145 to 180 bar. As a result, the new engines develop even more tractive power in the lower engine speed range. Specifically, this means that in the A 180 CDI, 198 Newton metres no less than 79 per cent of the maximum torque – is already available from 1300 rpm.

Even more impressive torque characteristics are displayed by the new A 200 CDI, whose engine operates at an ignition pressure that has been increased to 180 bar and which distinguishes itself from the other diesel units in the new A-Class range by utilising a VNT (Variable Nozzle Turbine) turbocharger. In a VNT turbocharger, the angle of the guide vanes can be varied according to the engine operating parameters, enabling the greatest possible volume of exhaust gas to be used to compress the intake air and build up the charge pressure. At low engine speeds, the vanes reduce the flow area and the charge pressure increases, while the flow area is increased again at

higher engine speeds to reduce the rotational speed of the turbocharger. The prime benefits of this variable turbocharger control include better cylinder charging and therefore more torque.

In all the diesel engines for the A-Class, the air compressed by the turbocharger flows through an intercooler which has now been tripled in size, from where it enters a mixing chamber and meets the recirculated exhaust gases. The exhaust gases are fed directly from the exhaust manifold and flow through a water-cooled exhaust heat exchanger. They mix with the compressed fresh air, with an automatic intake air throttle control ensuring the optimum ratio of charge air to recirculated exhaust gases. In the A 200 CDI, the VNT turbocharger assumes the task of setting the optimal pressure conditions for exhaust gas recirculation.

The mixing chamber is part of a complex air distribution module. From here, each cylinder is supplied with the air/exhaust gas mixture via two ducts. One of the two intake ducts can be shut off depending on the engine speed and engine load, thereby increasing the swirl rate of the mixture. At low engine speeds, a system of continuously variable swirl flaps is also in action. These further increase the air speed in the four spiral ducts of the cylinder head, leading to an improvement in power and torque delivery at partial throttle.

Trusted technology for the crankcase and cylinder head

A crankcase of grey cast iron provides the solid basis for the new-generation diesel engines of the A-Class. In view of the compact engine dimensions, increased displacement and higher ignition pressure, this well-proven material has the best credentials. While leaving the spacing between the cylinders unchanged, Mercedes engineers have increased the bore from 80 to 83 millimetres and the stroke from 84 to 92 millimetres. The forged connecting rods have been lengthened to 147.85 millimetres. The crankshaft is likewise of forged steel and features five bearings, eight counterweights and a vibration damper. The pistons, whose crowns have a special, dished profile, are equipped with cooling ducts into which oil is sprayed by pressure-controlled nozzles.

The cylinder head in the new diesel engines has two overhead camshafts, each of which controls two intake and two exhaust ports via roller-type rocker arms. The steel camshafts are produced using an internal high-pressure forming process developed by Mercedes-Benz, which ensures a very high level of precision: the cavities in the blanks are filled with a liquid and subsequently formed for a precise fit at a pressure of up to 2000 bar. A chain drives the camshaft on the intake side, which meshes with its counterpart on the exhaust side.

Exhaust emissions below the EU4 limits, optional diesel particulate filter

The diesel models of the new A-Class have also made great strides where exhaust emissions are concerned. The newly developed diesel engines are so clean that they are able to meet the stringent emissions limits laid out in the EU4 directive without a particulate filter system. Compared to the previous CDI units, gaseous emissions have been reduced by up to 56 per cent while particulate emissions are now down to 0.025 grams per kilometre.

Sophisticated engine improvements and use of the latest common-rail technology are in large measure responsible for this. The new A-Class is also equipped with two oxidation-type catalytic converters, whose task is to reduce gaseous pollutants by combining them with oxygen (oxidation). In this way unburned hydrocarbons (HC) and carbon monoxide (CO) are converted to water (H2O) and carbon dioxide (CO2). One of these catalytic converters (volume 2.1 litres) is located immediately downstream of the turbocharger turbine, while the second with a volume of

two litres is positioned in the underbody area. An oxygen sensor upstream of the catalytic converter closest to the engine monitors the exhaust gas constituents.

Mercedes-Benz also offers an optional, maintenance-free particulate filter system, which further reduces particulate emissions. The particulate filter (volume 2.5 litres) replaces the underbody catalytic converter and is connected to the upstream catalytic converter close to the engine by means of an air-gap-insulated exhaust duct. The particles retained on the walls of the filter ducts are burned off at an exhaust temperature above 600 degrees Celsius.

The particulate filter system developed by Mercedes-Benz regenerates itself without the use of additives, allowing it to remain effective over a very high mileage, something which distinguishes it from previously available processes of this kind. Dispensing with fuel additives, whose purpose is to help burn the soot particles trapped in the filter at low temperatures, has a positive effect on fuel consumption, durability and engine output. Studies have shown that the fuel additives used by other manufacturers to clean the filter remain in the filter ducts as non-recoverable ash, and can eventually block these after a high mileage has been covered. This increases the exhaust counter-pressure and therefore the fuel consumption, while reducing the output of the diesel engines accordingly.

With this filter system, high mileages can be achieved by the new A-Class diesel models without any additional servicing. The exhaust temperature required for particulate regeneration is reached either at high engine speeds or by appropriate adap-tation of certain engine functions. These are controlled as a function of the exhaust pressure and temperature at the particulate filter. Variable, second-generation common-rail technology makes a major contribution in this respect, as it allows a brief post-injection of fuel depending on the operating status and the condition of the filter. This specifically increases the exhaust temperature, burning off the particles trapped in the filter in a controlled manner.

The petrol engines: outputs of up to 193 hp with turbocharging

Mercedes-Benz has improved the proven four-cylinder petrol engines for the A-Class in key areas, achieving remarkable progress in numerous criteria. Output has been increased by up to 38 per cent compared to the preceding models, with torque improving by more than 36 per cent, while the fuel consumption, exhaust emissions and noise are significantly reduced.

As before, there is a choice of four petrol engines. The extra output and torque stems mainly from a displacement increase of around 100 cc and the use of a variable in-take manifold in the A 150, A 170 and A 200 models. This means that without having to resort to complex four-valve technology, these engines have a power-to-swept-volume ratio of 47 to 50 kilowatts per litre, a remarkable figure for this vehicle segment, and develop high pulling power even at low engine speeds. Take the A 200 for example: this lively 100 kW/136 hp engine has 156 Newton metres – 84 per cent of its maximum torque – on tap at just 1500 rpm. The figures for the engine in the new A 200 TURBO are even more impressive. This 142 kW/193 hp unit achieves a power-to-swept-volume ratio of approx. 70 kilowatts per litre, and from 1800 rpm the driver can call upon the maximum torque of 280 Newton metres which then remains constant over a wide rev speed band. This gives the engine the ideal credentials for returning dynamic on-road per-formance. On paper, the A 200 TURBO stops the clock at just 8.0 seconds for the 0 - 100 km/h sprint, and is capable of attaining a top speed of 227 km/h.

Key data for the petrol engines for the new A-Class at a glance:

	A 150	A 170	A 200	A 200 TURBO
No. of cylinders/ valves per cylinder	4/2	4/2	4/2	4/2
Displacement cc	1498	1699	2034	2034
Output kW/hp	70/95 at 5200 rpm	85/116 at 5500 rpm	100/136 at 5750 rpm	142/193 at 5000 rpm
Max. torque Nm	140 at 3500 - 4000 rpm	155 at 3500 - 4000 rpm	185 at 3500 - 4000 rpm	280 at 1800 - 4850 rpm
0-100 km/h* s	12.6	10.9	9.8	8.0
Top speed* km/h	175	188	200	227
Fuel consumption**	6.2 l/ 100 km	6.6 l/ 100 km	7.2 l/ 100 km	7.9 l/ 100 km

*Provisional figures; **NEDC combined fuel consumption, provisional figures

Fuel consumption cut by up to ten per cent

The specific fuel consumption of the spark-ignition engines has been reduced courtesy both of the low friction losses in the piston, connecting rod and valve control systems, as well as of the further improvements which have been made to the mixture distribution in the combustion chambers. In practical terms this means that in the NEDC test, the petrol models in the new A-Class consume up to ten per cent less fuel than the equivalent models they replace, despite their higher output.

The state-of-the-art, lightweight power unit consists of an aluminium crankcase with grey cast iron cylinder liners. The pistons, sump, oil pump, rocker arms, engine mounting, timing case and other engine components are also of aluminium, while the intake manifold, air filter and cylinder head cover are made from plastic. Thanks to this lightweight design, the petrol engines tip the scales at between only 92 (A 150) and 117 kilograms (A 200 TURBO) and are therefore significantly lighter than other four-cylinder units in this displacement class. The power-to-weight ratio of the turbocharged engine is a remarkable 0.82 kilograms per kilowatt.

The compact cylinder head features a swirl duct which creates high turbulence in the fuel/air mixture, thereby ensuring an optimal combustion process. Positioning the spark plugs so that they are virtually centralised serves the same purpose. Valve timing is taken care of by a hollow camshaft made of induction-hardened forged steel and low-friction roller-type rocker arms. A timing chain with a hydraulic tensioner and rubber-coated sprockets drives the camshaft. A hydraulic system automatically compensates for valve clearance.

Mercedes engineers have also achieved the high thermal efficiency of the spark-ignition engines with a high compression ratio of 11.0 : 1. This made it necessary to divide the water jacket into two sections: the lower section has a high flow speed in order to cool the very hot combustion chamber areas – especially the webs between the intake valves – and make such a high compression ratio possible in the first place. The upper section cools the engine's valve guides. In addition, the exhaust valves of the A 170, A 200 and A 200 TURBO are sodium-cooled.

Higher torque stemming from newly developed variable intake manifold

Mercedes engineers have considerably improved the air supply to the engine by means of a variable intake manifold with long intake ducts. This consists of three plastic shells and features an electro-pneumatically actuated controller barrel which opens or closes according to engine load and speed. At low engine speeds, the in-take air flows to the cylinders via four long intake ducts to obtain a high torque yield. This creates pressure waves in the intake ducts which assist the intake process. At high engine speeds, the barrel closes these intake ducts, so that the air takes a di-rect path to the combustion chambers through a short intake duct. The engine computer decides whether and when the controller barrel opens or closes the ducts on the basis of stored characteristic maps which ensure optimal engine operation.

In the case of the turbocharged engine which has been newly developed for the A-Class, the intake air flows from the air filter to the turbocharger, which is located in the exhaust manifold to save space. The flow of exhaust gases required to drive the turbine is adjusted to match the current engine operating point by a pneumatically controlled wastegate valve. The compressed intake air flows from the turbocharger through an intercooler, which is in turn linked to the throttle valve actuator.

The outstanding torque characteristics of the 142 kW/193 hp engine confirm the high efficiency of the turbocharger, which was developed by Mercedes engineers together with their colleagues from the DaimlerChrysler research department. A special turbine geometry ensures excellent responsiveness even at low engine speeds, and produces an extremely wide peak torque band that extends from 1800 up to 4850 rpm.

Emission control with two catalytic converters

The petrol engines for the new A-Class meet the requirements of the EU4 standard. These low emission levels are firstly the result of complete fuel combustion, which in turn ensures low levels of untreated emissions. Secondly, the efficient emission control system is also a major contributory factor: from the exhaust manifold, whose sheet-steel construction heats up rapidly after a cold start, the exhaust gases flow through four stainless-steel ducts to a catalytic converter (volume 0.7 litres) which is located close to the engine and which features a control probe and a diagnostic probe. This catalytic converter is complemented by a second catalytic converter (volume 1.3 litres) positioned downstream on the underbody.

In the A 200 TURBO the exhaust manifold is air-gap-insulated, and is welded directly to the turbocharger housing.

Transmissions: AUTOTRONIC for eminently smooth driving pleasure

From autumn 2004, Mercedes-Benz will be ushering in a new era in the field of transmission technology with the new A-Class. For the first time in its history, the Stuttgart car maker is offering a continuously variable automatic transmission – a technology which holds particular advantages for compact cars and can therefore expect a highly promising future. AUTOTRONIC, as it was christened by the Mercedes-Benz development team, is available for all engine variants of the new A-Class as an optional extra. In addition, Mercedes-Benz has developed a new six-speed manual transmission which is standard equipment in the A 180 CDI, A 200 CDI and A 200 TURBO. The trusted five-speed manual transmission features as standard in the A 150, A 170, A 200 and A 160 CDI.

AUTOTRONIC operates as a continuously variable transmission (CVT), in which the ratios are varied continuously with the help of a pulley wheel variator. Accordingly, it does not employ the paired gear wheels normally used in automatic transmissions.

The main advantages of the newly developed AUTOTRONIC compared to a conventional automatic transmission are improved ride comfort, extra flexibility and quicker acceleration:

Ride comfort	Jolt-free ratio changes. The engine speed is lower when cruising at a constant speed. The most suitable ratio is always selected in hilly terrain. There is a variable engine braking effect on downhill gradients.
Acceleration	The ratios are changed without interrupting tractive power The engine reaches its rated output more rapidly.
Flexibility	The engine always performs at its optimum operating point.

These benefits give both driving pleasure and dynamic performance a considerable boost.

Choice of three shift programs

The new AUTOTRONIC is just as easy to operate as a conventional Mercedes automatic transmission. The selector lever positions "P", "R", "N" and "D" correspond to the familiar shift gate. Pressing a button enables the driver to choose between two shift programs: "C" for Comfort and "S" for Standard.

In Comfort mode, the transmission keeps the engine speed as low as possible, so that the A-Class accelerates more gently and uses less fuel, for instance. In the Standard program, AUTOTRONIC becomes adaptive: it automatically recognises the individual style of driving and adapts the gearshift strategy accordingly. If the driver adopts a more sporty driving style, for example, the transmission makes higher power reserves available by raising the engine speed, while in the case of a more relaxed, comfort-oriented style the engine speed is reduced.

In manual mode, which is activated by briefly nudging the shift lever sideways, AUTOTRONIC divides its complete ratio range into seven virtual stages. The gears are then shifted up or down by nudging the selector lever to the left or right, again without any interruption in tractive power. A display in the instrument cluster shows the shift range currently selected.

Variator for continuously variable ratios

The centrepiece of the AUTOTRONIC transmission is the so-called variator, which basically consists of two pairs of pulley wheels. These are referred to technically as the primary and secondary disc sets. Both sets are made up of a fixed disc and a sliding disc, the latter being able to slide axially with the help of a hydraulic pump operating at a pressure of up to 67 bar. Varying the pressures applied at the two sliding discs both adjusts the contact pressure on the steel thrust belt and changes the radii of the belt on the primary and secondary sides.

In this way, the most suitable ratio is selected for any driving situation – instantly, seamlessly and always very smoothly, so that the occupants of the A-Class hardly notice the AUTOTRONIC transmission in operation. The largest ratio is 6.41 times greater than the smallest ratio, meaning that the ratio spread is significantly wider than in a conventional five-speed automatic transmission. During brisk acceleration, for example, AUTOTRONIC moves the sliding discs so that the steel thrust belt is tensioned to the maximum and moves inwards between the secondary discs to select the highest ratio (2.72). The position of the variator is exactly the opposite for the lowest ratio (0.424), which makes for particularly economical driving.

The steel thrust belt which moves between the discs has a width of 30 millimetres and consists of 400 individual links. The complete AUTOTRONIC unit measures only 345 millimetres in length and is therefore the world's most compact continuously variable automatic transmission. It contains only 334 components, the only gear wheels in the compact transmission housing belonging to the reversal unit, which reverses the movement of the discs and thereby enables the vehicle to drive backwards.

A further special feature typical of Mercedes is the torque converter between the engine and the AUTOTRONIC transmission. This helps the A-Class to move off particularly smoothly, yet very briskly. As in all automatic transmissions from Mercedes-Benz, the torque converter locks up in many operating situations to compensate for the slip that occurs between the pump and turbine wheels and prevent power losses. The lockup clutch can be activated in all ratios with a rate of slip that matches current requirements, thereby preventing drive train vibrations from being transmitted.

Transmission control as a sophisticated mathematical process

In order to control the AUTOTRONIC functions Mercedes-Benz has developed a powerful microprocessor which is integrated into the transmission. It is linked to the electronic network in the new A-Class via a databus and also processes the signals from various transmission sensors. These include:

- speed sensors for the primary and secondary discs, as well as the output shaft
- temperature sensor for the transmission oil
- pressure sensor for the secondary discs
- sensor for the selector lever position

The electronic control unit uses the wealth of sensor data to calculate the current vehicle speed, the actual torque at the transmission's input shaft, the flow rates re-quired for the electrohydraulic transmission control system as well as the most appropriate gearshift strategy, i.e. selection of the most suitable ratio and deployment of the torque converter lockup clutch. Other parameters relevant to the shift strategy are also incorporated into the calculation process. This allows the transmission control system to take account of factors such as the vehicle load, uphill or downhill gradients, the longitudinal and lateral acceleration of the A-Class, as well as the individual style of driving. In this way, AUTOTRONIC is always able to select the transmission ratio which best suits current operating conditions and driver requirements.

New six-speed manual transmission for high-torque engines

Like AUTOTRONIC, the six-speed manual transmission included as standard in the A 180 CDI, A 200 CDI and A 200 TURBO models is a new development. Taking the three-shaft concept as a basis, the engineers in Stuttgart have succeeded in incorporating six forwards gears into an

aluminium housing which is no less compact than that of the well-proven five-speed A-Class transmission. Moreover, the new manual transmission now transmits a much higher engine torque of as much as 300 Newton metres in the A 200 CDI.

The three shafts – one drive shaft and two output shafts – are constantly engaged. Gears 1 to 4 are shifted on the output shaft located outside the oil sump, which means that the six-speed transmission offers a high level of shift smoothness even at low ambient temperatures. The sophisticated synchromesh system for gears 1 to 4 has the same purpose: a triple cone in first and second gear, and a dual cone for third and fourth gear.

Gears 5 and 6, as well as reverse gear, are located on the lower output shaft. As for third and fourth gears, Mercedes-Benz uses a dual-cone synchromesh here. Shift smoothness was also a primary concern in other areas of this transmission's development. For example, the rods which control the selector forks on two levels are mounted on roller bearings to give them a particularly light action. A module is bolted onto the transmission which accommodates all of the gearshift functions. These include the supports for control cable attachment, the levers for shift gate and gear selection, and the shifter shaft with the drivers for the selector forks.

The shift lever is linked to the shift module by a control cable which allows the individual gears to be selected and engaged. A hydraulic central release bearing ensures smooth, maintenance-free operation of the clutch, whose operating forces remain constant throughout the service life of the A-Class. In the A 180 CDI, A 200 CDI, A 200 and A 200 TURBO, the inclusion of a two-mass flywheel takes standards of comfort to even greater heights. In order to tailor the new six-speed transmission as closely as possible to the different operating ranges of the petrol and diesel engines, Mercedes-Benz has developed two variants which differ in terms of their ratio spread and torque rating.

Proven five-speed manual transmission with precision refinements

The proven five-speed manual transmission remains standard equipment in the A 150, A 170, A 200 and A 160 CDI models of the new A-Class. Mercedes engineers have fine-tuned this transmission to harmonise it with the new engines. Modifications include new ratios for first and second gears, as well as new final-drive ratios for both the petrol engines and the A 160 CDI. The precise, light operation and short shift travel have been retained. The compact and extremely lightweight five-speed manual transmission is able to transmit a maximum torque of 185 Newton metres, and is fitted in one of three different variants depending on engine model.

The chassis: Driving pleasure comes as standard

- Electromechanical speed-sensitive power steering fitted as standard
- Innovative new spherical parabolic-spring rear axle ensures flawless dynamics and impressive comfort
- Automatic adjustment of shock absorber force according to situation in hand
- Latest generation of ESP® with tyre pressure loss warning as an option

Stuttgart, Jun 29, 2004

A look at the chassis technology under the skin of the new A-Class provides further evidence that the new model differs fundamentally from its predecessor. Added to the mix are a series of new developments which play a major part in four outstanding characteristics of the new Mercedes compact car: active safety, driving dynamics, ride comfort and driving pleasure.

From the steering to the shock absorbers, the brakes to the rear axle, the Electronic Stability Program to the tyres, Mercedes engineers have taken a thorough look at all the chassis components, developed and incorporated innovative new systems and made telling improvements to already proven technology.

The result of this in-depth development and testing work can be seen and felt after just a few kilometres out on the road. The new A-Class takes the combination of dynamic handling and hallmark Mercedes comfort to a level above that offered by its predecessor, with both features enjoying equal importance.

In addition to these technological innovations, basic features of the outgoing model's chassis have also been modified, some of them fundamentally. The Mercedes engineers have thus succeeded in laying the perfect foundations for further advances in terms of driving dynamics. Indeed, new dimensions for the car's wheelbase, front and rear track width, wheels and tyres make a significant contribution to the sporty yet comfortable driving characteristics of the new A-Class.

The most important chassis data at a glance:

	New A-Class*	**Outgoing model** (standard version)	**Difference**
Wheelbase	2568	2423	+145
Track width**			
- front	1556	1503	+53
- rear	1551	1452	+99

Figures in millimetres; *Three and five-door versions; **For the A 150 / A 140 entry-level model

Front axle: further modifications to McPherson technology

A McPherson front axle offers substantial advantages for front-wheel-drive vehicles and Mercedes-Benz has taken the development of this design to a new level. Where the wheel is normally located by the suspension strut, track rod and a camber arm with anti-roll bar, the front axle of the new A-Class can call on the additional benefits of rigid wishbones. These assume wheel location duties from the anti-roll bar, which is linked to the strut suspension by a torsion bar linkage and newly developed rubber mounts. This solution widens the scope of possible chassis settings – especially when it comes to enhancing elasto-kinematics and reducing road roar and tyre vibration - and at the same time facilitates the precise adjustment of the caster angle and camber. The wishbones each consist of two welded sheet steel shells and are attached to the frame-type integral support using large rubber mounts. Optimised sup-port heads have also been developed for the McPherson axle's twin-tube shock absorbers.

Steering: power assistance graded according to the speed of travel

Mercedes-Benz is introducing electromechanic speed-sensitive power steering for the first time in the new A-Class. Here, the power assistance is generated using an electric motor, which

transfers it directly to the gearing of the rack-and-pinion steering mechanically rather than hydraulically. This newly developed technology impresses with a host of plus points: lower weight, more compact dimensions, in-creased effectiveness and a reduced energy requirement. However, the most important benefits are without doubt provided by the additional functions offered by this state-of-the-art steering system:

- The electric motor is equipped with a micro computer which is integrated into the databus network of the new A-Class and regularly calls up the latest data on the travelling speed, engine speed, steering angle and torque at the torsion bar. This information is used to grade - or “parameterise”, as the experts would say – the level of power assistance according to the vehicle speed. This has the advan-tage of providing the driver with greater power assistance at lower speeds, making parking and manoeuvring far more comfortable than with a conventional power steering system. The speed-sensitive function is adjusted and programmed precisely for each body and engine variant of the new A-Class. The direct steering ratio and impressive dynamics of the newly developed system ensure precise steering feel. Active response characteristics aid the centring of the steering.
- As the electric motor is only activated when the steering is in use, the system’s energy requirement is lower that of hydraulic steering – and that is reflected in reduced fuel consumption.
- The electromechanic steering works without hydraulic oil, allowing for easier as-sembly and repairs. This technology also scores highly in terms of environ-mental protection, as oil disposal is not an issue.

The A-Class’ safety-enhancing and space-saving sandwich concept allows the steering gear to be positioned in front of the wheel centre. This helps to further improve the responsiveness of the steering, making the Mercedes compact car safe and easy to handle. Light and smooth handling characteristics and a pro-safety tendency to understeer combine to ensure enviable driving pleasure.

The steering column consists of an upper steering shaft mounted in the jacket tube and a lower two-piece steering shaft, whose constituent components slide against each other in a frontal collision in order to prevent the steering structure from pene-trating the interior. A universal joint connects the two steering shafts. The driver has various options when it comes to adjusting the attractively designed three-spoke steering wheel (diameter: 380 millimetres). A handle positioned underneath the steering column pulls out to allow full height adjustment (by +/- 20 millimetres), whilst the steering wheel is also available with additional reach adjustment (by +/- 30 millimetres) as an option.

As in other Mercedes model series, the steering wheel for the new A-Class is a central element in the state-of-the-art control and display concept. Thanks to the easy-reach multifunction buttons, the driver no longer has to take his or her hands away from the steering wheel in order to operate the radio, navigation system and car telephone or to access important information on the display in the instrument cluster. The standard-fitted multifunction steering wheel is made out of die-cast magnesium and is designed to deform as required in the event of a crash.

Rear axle: new development allows exemplary directional stability

The rear axle of the A-Class is a new development whose description alone is enough to arouse the curiosity. The “spherical parabolic-spring rear axle” is the result of sev-eral years of complex development and testing work by Mercedes engineers and makes a key contribution to the exceptional driving dynamics and impressive ride comfort of the new A-Class.

The centrepiece of this intelligent construction is the forwards-arched axle housing, which takes the place of conventional control arms and serves to secure the wheels. The axle housing is fixed to the car body by separately arranged springs and shock absorbers, the anti-roll bar and a centrally located elastomer central bearing. A special linkage named after the brilliant British inventor James Watt is responsible for wheel location and support against lateral force. The two struts of the Watt linkage are attached to the rear section of the axle housing and connected by a rotating coupling in the centre to the car body.

The axle housing consists of two sheet steel shells, whilst the Watt struts are manu-factured using internal high-pressure forming processes and thus display outstanding rigidity. The axle components are protected from stone chipping by additional plastic coverings, which also offer aerodynamic benefits. The Watt coupling is a robust forged part.

Precise wheel location and outstanding active safety at the critical limit

Precise wheel location and extremely effective anti-roll control are the major advantages of the newly developed rear axle. These two attributes make their presence felt even more strongly in an innovative vehicle concept such as the A-Class, whose particular centre of gravity would normally require a fairly stiff chassis setting. However, this special axle technology allows a more comfortable setting for the springs and damping – without detracting from the outstanding road-holding characteristics of the new Mercedes compact car. The camber angle of the wheels remains constant regardless of the driving situation, allowing higher lateral forces to be transferred be-tween the tyres and the road surface – particularly through corners – than is possible with a conventional link axle. This effect also influences the car's tendency to under-steer, an important factor in the A-Class' high level of active safety. Thanks to the innovative axle technology, the new model's handling remains stable, sporty and pre-cise even when the car is carrying a load or operating at the limit.

A key attribute of the spherical parabolic- spring rear axle is the raised momentary centre of rotation – i.e. the pivot point around which the body leans to the side through corners. The distance between the momentary centre of rotation and the vehicle's centre of gravity above it results in the lever arm, which influences the extent of the rolling motion. With the Mercedes rear axle, the momentary centre of rotation lies 280 millimetres above the road and therefore closer to the vehicle's centre of gravity. The short lever arm prevents the rolling motion caused by vehicle lean.

The momentary centre of rotation remains constant in any situation out on the road. Even when the A-Class is fully loaded, this pivot point is only lowered by some 48 mil-limetres.

Due to the high momentary centre of rotation of the car's rear axle and the low posi-tioning of the front axle, the roll axis of the new A-Class rises to the rear. This results in reduced body movement – a positive development which really comes into its own if the driver switches to a more dynamic driving style.

This innovative axle technology allows comfortable spring and damper ratios. The rear axle of the new A-Class features coil springs, single-tube shock absorbers and an anti-roll bar. The springs and dampers are positioned separately. The large elastomer central bearing, which links the axle housing with the car body, also ensures good structure-borne soundproofing and minimises vibrations.

Shock absorbers: world premiere of the selective damping system

Another special feature of the A-Class chassis is an innovative selective damping system. Celebrating its world premiere in automotive construction, this new technology provides a straightforward yet extremely clever answer to a dilemma which has teased engineers for many a year. Should they favour a stiff shock absorber set-up in the interests of active safety and driving dynamics or is a softer, more comfortable setting the better all-round solution?

With the selective damping system in the new A-Class, Mercedes-Benz has killed these two birds with one stone. Working according to hydromechanical principles, this system achieves its aims without the need for complex sensors or electronics.

A brief insight into the workings of a modern shock absorber helps to clarify the func-tioning of this new development. After all, this is where the desired damping effect is generated, with wheel movements causing a valve system on the damper piston to compress oil. In so doing, flexible valve plates initiate the pre-defined resistance characteristics of the shock absorber.

With the new selective damping system, part of the oil flows through an additional valve body positioned above the damper piston itself. Inside is the control piston, which splits the valve body into two areas.

If the shock absorber experiences only minor vertical movement – consistent with a normal driving style – the control piston sits in a central position, keeping a bypass channel open, which clears the way for part of the oil to flow through the piston pin (see diagram). This oil moves past the damping valve, reducing the overall hydraulic resistance of the shock absorber. The effect is “softer” shock absorber characteristics, ensuring less road roar and tyre vibration.

If the shock absorbers are more active - during dynamic cornering or evasive manoeuvres, for example - the oil pushes the control piston in the valve body down-wards or upwards, automatically closing the bypass channel. The driver can thus rely on the full damping effect and the A-Class is stabilised to maximum effect.

Brakes: reliable, strong and durable

In a further contribution to active safety and accident avoidance, Mercedes-Benz if fitting the new A-Class with disc brakes on the front and rear axles. The Mercedes engineers have adapted the diameter and thickness of the brake discs precisely to the improved performance credentials of the new car. For example, the front disc brakes of the A 150 and A 160 CDI measure 276 x 12 millimetres, giving them a diameter 16 millimetres greater than in the current A-Class. The powerful A 170, A 180 CDI, A 200 and A 200 CDI models are fitted with internally ventilated disc brakes (276 x 22 millimetres) at the front. The A 200 TURBO, meanwhile, comes equipped with 288 x 25-millimetre ventilated brake discs. A sensor on the right-hand calliper monitors brake pad wear, sending signals which are constantly analysed and assessed. If the thickness of the pads is reduced to a critical point, an indicator lamp lights up in the instrument cluster. The brake booster is another component to show a performance advantage over the outgoing model. The master brake cylinder of the 9-inch unit has a diameter of 23.8 millimetres (predecessor model: 22.2 millimetres).

Solid disc brakes with integrated duo servo brake for the parking brake function re-place the rear drum brakes of the outgoing model in all engine variants of the new Mercedes compact car.

An overview of the brake data for the new A-Class:

	A 150 A 160 CDI	A 170 A 200 A 180 CDI	A 200 TURBO A 200 CDI
Front axle			
- Brake discs	Solid	Internally	Internally
- Piston diameter	57	ventilated	ventilated
- Disc diameter	276	57	57
- Disc thickness	12	276	288
		22	25
Rear axle			
- Brake discs		Solid	
- Piston diameter		30	
- Disc diameter		258	
- Disc thickness		8	

The latest generation of ESP®: even greater precision, even more effective

The latest generation of the Electronic Stability Program ESP® makes a convincing impression with its even more precise and finely controlled interventions. This technology is fitted as standard in the new A-Class and is underpinned by a control unit which also contains the functions of the anti-lock braking system, acceleration skid control and Brake Assist. ESP® improves a car's directional stability and reduces the danger of skidding under braking or acceleration or when coasting freely, by braking each wheel individually and/or adjusting the engine torque. The system also helps to shorten the ABS braking distance through corners and on roads where one side is slippery.

The hydraulic unit and electronic control module of the new generation of ESP® form a single compact unit. This means that the latest ESP® technology takes up around a third less space than its predecessor and also stands out with its lower weight. An-other new feature is the active wheel speed sensors, which are each equipped with a separate voltage supply and feed the ESP® computer even more precise data. A cen-tral point of this innovative system is the micromechanical rotational speed sensor, which records the movement of the vehicle around its vertical axis and thus recog-nises skidding movements. This sensor is located in the tunnel trim next to the park-ing brake lever and transmits its data via a separate databus system to the ESP® control unit.

For the new A-Class, Mercedes-Benz has dispensed with the button on the dashboard which allowed the driver to deactivate the acceleration skid control system. The new, intelligent control logic of the Stability Program uses data from sensors to recognise situations on the road where this function is required and automatically adapts the skid control function accordingly.

As before, the A-Class comes with the hydraulic Brake Assist system, which offers particularly notable advantages for compact cars with front-wheel drive. Where Brake Assist was previously linked up to a brake booster, the system now uses the ESP® infrastructure, making it more compact, lighter and more effective. The Brake Assist function is controlled by the high-pressure pump in the ESP® hydraulic unit. In emergency braking situations, this pump assists the driver by generating maximum pressure of 200 bar and thus helping to reduce the stopping distance. The necessary information is supplied by the wheel speed sensors, the stop lamp switch and two pressure sensors in the hydraulic unit.

Tyre pressure loss warning based on ESP® technology

The highly efficient ESP® technology has the potential to incorporate additional functions, such as the warning system for the driver in the event of significant pressure loss in one of the tyres. Here, ESP® uses information from sensors monitoring wheel speed, which is largely dictated by the travelling speed of the car and the load and air pressure in the tyres. As the Stability Program permanently monitors the speed of the wheels and compares the values with each other, it also detects noticeable deviations.

In addition, the control unit automatically checks other road-holding variables such as lateral acceleration, yaw rate and wheel torque in order to reliably diagnose the loss of air pressure in a tyre. However, this system does not measure the actual air pressure in each tyre. If an insufficient level of pressure is detected, the warning “Tyre pressure, check tyres” appears in the central display of the instrument cluster. The automatic tyre pressure loss warning system comes as standard on A-Class variants fitted with 17 and 18-inch wheels and/or sports suspension, but is also available as an option for all other models.

The environment: In the green over the full lifecycle

- Overall energy consumption drops by nine per cent
- Significant rise in use of high-quality recycled and natural materials

Stuttgart, Jun 29, 2004
Low pollutant emissions and fuel consumption, reduced noise emissions, increased recycling and wider use of natural materials together make up the template for an environmentally compatible vehicle – and the new Mercedes-Benz A-Class fits this description. The new car’s eco friendly concept is based on two pillars: the present and the future.

- The present: A combination of technological innovations in the body, chassis and engine design for the A-Class and advances in manufacturing processes allow Mercedes-Benz to reduce the emissions generated through the production and use of the new car. Examples of these successful developments include the solvent-free powder clearcoat, which protects the body, and the new or modified petrol engines. Despite their higher output, these power units consume up to ten per cent less fuel and meet the stringent EU 4 exhaust emissions limits.
- The future: With its far-sighted selection of materials, Mercedes-Benz is making a crucial contribution to preserving resources and lowering the levels of emissions which can be produced through the material recycling process for cars after they have reached the end of a long service life.

Carbon dioxide emissions cut by around nine per cent

This is all part of an integrated concept, which covers the A-Class’ entire lifecycle. Experts in the Environment-friendly Product Development department at the Mercedes-Benz Technology Centre (MTC) have compiled an impressive pool of knowl-edge as part of an environment-oriented assessment programme carried out over the full course of the A-Class’ service life. Emissions of the greenhouse gas carbon dioxide produced in the manufacture of the new A-Class and by its use over a full lifecycle will be around nine per cent below the levels of the outgoing model.

Primary energy consumption has been reduced by roughly the same degree, falling from 522 gigajoules for the first-generation A-Class to a total of 479 gj in the new car. This equates to the energy stored in some 1300 litres of petrol.

With the new A-Class, Mercedes-Benz has also made remarkable progress in reducing the emissions levels of the outgoing car in terms of other pollutants, such as:

Nitrogen oxides: down 17 per cent
Sulphur dioxide: down 6 per cent
Volatile hydrocarbons: down 8 per cent
Special waste materials: down 10 per cent

The Mercedes experts have looked at over 40,000 individual processes as part of its integrated environment analysis for the new A-Class. The overall assessment covers a total of more than 200 “input” factors (resources) and some 300 “output” parameters (emissions).

Recycling quota stands at 85 per cent

Mercedes’ “Design for Environment” philosophy begins with the selection of materials. Only materials boasting low resources consumption, outstanding recycling properties, a minimal energy requirement and low emissions in their manufacturing, processing and use are permitted in the construction of the Stuttgart-based brand’s passenger cars. On this basis, the new A-Class already satisfies the recycling quota of 85 per cent stipulated Europe-wide from 2006 and is also set to meet the recycling target of 95 per cent – with a maximum of ten per cent of the car parts being allowed to be utilised for incineration to produce energy - planned for implementation in 2015.

The new Mercedes compact car consists largely of materials for which recycling processes have already been developed and tested:

- Steel and iron-based materials: 65.7 per cent
- Plastics: 17.7 per cent
- Non-ferrous metals and light alloys: 7.8 per cent

54 components approved for recycling

When it comes to preserving resources, Mercedes-Benz gives high-quality secondary raw materials priority wherever possible. MTC experts have had some positive experiences with the use of recycled plastics and are committed to channelling plastics from end-of-life vehicles and scrapped car parts back into the production of new vehicles. A total of 54 components in the new A-Class with a combined weight of 34 kilograms are made from high-quality recycled plastics – equating to 21 per cent of all the plastic parts used. The number of approved recycled components for the new car is therefore more than three times higher than was the case for the outgoing model.

Proportion of components (by weight) made from natural materials rises by 98 per cent

The development and production of car parts made from renewable raw materials is another important part of preserving resources and of Mercedes’ “Design for Environment” philosophy. Mercedes-Benz sees the use of natural materials as an important contribution to reducing carbon dioxide emissions. After all, using renewable raw materials helps to put the brakes on the consumption of traditional energy resources such as coal, natural gas and petroleum.

In the A-Class, 26 components with a combined weight of 23 kilograms were manu-factured using natural materials. The total weight of components made from renew-able raw materials has

therefore risen by around 98 per cent from the levels in the outgoing model. One example of the use of natural materials in automotive construc-tion are the covers for the front seat backrests in the new A-Class, which consist of a combination of plastic and flax fibres.

And Mercedes engineers have also opted for a natural raw material to ensure fuel tank ventilation, with olive wood used in the production of an activated charcoal filter. This microporous material absorbs the hydrocarbon emissions and is self-regenerating.

The latest tests carried out as part of DaimlerChrysler's materials research show that natural fibres are also extremely effective in material composites. Indeed, they could even replace glass fibre as a strengthening agent in plastic parts for car bodies thanks to their exceptional bending and tensile strength. Natural fibres also stand out from glass fibres with their lower weight, ease of use and suitability for recycling. Another source of natural materials is the abaca plant, which grows in the Philippines. Its fibres, which are extremely elastic and boast impressive tensile strength, are currently being tested for use in the manufacture of part of the underfloor panelling of the new A-Class. Abaca fibres are considered to be the strongest and longest natural fibres on the planet.

Technical data

Mercedes-Benz A160 CDI*

Engine

No. of cylinders/ arrangement		4/in-line, 4 valves per cylinder
Displacement	cc	1991
Bore x stroke	mm	83.0 x 92.0
Rated output	kW/hp	60/82 at 4200 rpm
Rated torque	Nm	180 at 1400-2600 rpm
Maximum engine speed	1/ min	4800
Compression ratio		18.0 : 1
Mixture formation		Common-rail direct injection, turbocharger, EDC

Power transfer

Transmission		Five-speed manual transmission
Clutch		Single-plate dry clutch
Ratios	Final drive 1st gear 2nd gear 3rd gear	3.31 3.64 2.04 1.26

	4th gear 5th gear Reverse	0.88 0.70 3.29

Chassis

Front axle	McPherson struts, three-link suspension, two-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Rear axle	Parabolic rear axle, coil springs, one-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Braking system	Hydraulic dual-circuit braking system with vacuum servo, ABS anti-lock braking system and brake assistant, disc brakes front and rear, hand brake, ESP® (Electronic Stability Program)
Steering	Electromechanical parameter steering
Wheels	6 J x 15
Tyres	185/65 R 15

Dimensions and weights

Wheelbase	mm	2568
Track front/rear	mm	1556/1551
Overall – length	mm	3838
Overall – width	mm	1764
Overall – height	mm	1593
Turning circle	m	10.95
Luggage capacity**	l	435-1995 (three-door: 435-1485)
Kerb weight acc. to EC	kg	1325 (three-door: 1300)
Payload	kg	435
Gross vehicle weight	kg	1760 (three-door: 1735)
Tank capacity/reserve	l	54/6

Performance and fuel consumption***

Acceleration 0-100 km/h	s	15.0

Maximum speed	km/h	170
Fuel cons. NEDC combined	l/100 km	4.9

*available from end of 2004; **acc. to VDA measuring method; ***provisional figures

Mercedes-Benz A180 CDI

Engine

No. of cylinders/ arrangement		4/in-line, 4 valves per cylinder
Displacement	cc	1991
Bore x stroke	mm	83.0 x 92.0
Rated output	kW/hp	80/109 at 4200 rpm
Rated torque	Nm	250 at 1600-2600 rpm
Maximum engine speed	1/ min	4800
Compression ratio		18.0 : 1
Mixture formation		Common-rail direct injection, turbocharger, EDC

Power transfer

Transmission		Six-speed manual transmission
Clutch		Single-plate dry clutch
Ratios	Final drive 1st gear 2nd gear 3rd gear 4th gear 5th gear 6th gear Reverse	3.240 (gears 1-4) / 2.700 (gears 5,6,R) 3.933 2.222 1.389 0.975 0.925 0.814 4.681

Chassis

Front axle	McPherson struts, three-link suspension, two-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Rear axle	Parabolic rear axle, coil springs, one-cylinder gas-pressure shock absorbers with selective damping

	system and coil springs, torsion-bar stabiliser
Braking system	Hydraulic dual-circuit braking system with vacuum servo, ABS anti-lock braking system and brake assistant, disc brakes front and rear, hand brake, ESP® (Electronic Stability Program)
Steering	Electromechanical parameter steering
Wheels	6 J x 15
Tyres	185/65 R 15

Dimensions and weights

Wheelbase	mm	2568
Track front/rear	mm	1556/1551
Overall – length	mm	3838
Overall – width	mm	1764
Overall – height	mm	1593
Turning circle	m	10.95
Luggage capacity*	l	435-1995 (three-door: 435-1485)
Kerb weight acc. to EC	kg	1345 (three-door: 1320)
Payload	kg	425
Gross vehicle weight	kg	1770 (three-door: 1745)
Tank capacity/reserve	l	54/6

Performance and fuel consumption**

Acceleration 0-100 km/h	s	10,8
Maximum speed	km/h	186
Fuel cons. NEDC combined	l/100 km	5.2

*acc. to VDA measuring method; **provisional figures

Mercedes-Benz A 200 CDI

Engine

No. of cylinders/ arrangement		4/in-line, 4 valves per cylinder
Displacement	cc	1991

Bore x stroke	mm	83.0 x 92.0
Rated output	kW/hp	103/140 at 4200 rpm
Rated torque	Nm	300 at 1600-2600 rpm
Maximum engine speed	1/ min	4800
Compression ratio		18.0 : 1
Mixture formation		Common-rail direct injection, turbocharger, EDC

Power transfer

Transmission		Six-speed manual transmission
Clutch		Single-plate dry clutch
Ratios	Final drive 1st gear 2nd gear 3rd gear 4th gear 5th gear 6th gear Reverse	3.240 (gears 1-4) / 2.700 (gears 5,6,R) 3.933 2.222 1.389 0.975 0.925 0.814 4.681

Chassis

Front axle	McPherson struts, three-link suspension, two-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Rear axle	Parabolic rear axle, coil springs, one-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Braking system	Hydraulic dual-circuit braking system with vacuum servo, ABS anti-lock braking system and brake assistant, disc brakes front and rear, hand brake, ESP® (Electronic Stability Program)
Steering	Electromechanical parameter steering
Wheels	6 J x 16
Tyres	195/55 R 16

Dimensions and weights

AUTO SPIES
More info at www.AutoSpies.com

Wheelbase	mm	2568
Track front/rear	mm	1552/1547
Overall – length	mm	3838
Overall – width	mm	1764
Overall – height	mm	1595
Turning circle	m	10.95
Luggage capacity*	l	435-1995 (three-door: 435-1485)
Kerb weight acc. to EC	kg	1365 (three-door: 1340)
Payload	kg	415
Gross vehicle weight	kg	1780 (three-door: 1755)
Tank capacity/reserve	l	54/6

Performance and fuel consumption**

Acceleration 0-100 km/h	s	9.5
Maximum speed	km/h	201
Fuel cons. NEDC combined	l/100 km	5.4

*acc. to VDA measuring method; **provisional figures

Mercedes-Benz A150

Engine

No. of cylinders/ arrangement		4/in-line, 2 valves per cylinder
Displacement	cc	1498
Bore x stroke	mm	83.0 x 69.2
Rated output	kW/hp	70/95 at 5200 rpm
Rated torque	Nm	140 at 3500-4000 rpm
Maximum engine speed	1/ min	6300
Compression ratio		11.0 : 1
Mixture formation		Microprocessor-controlled petrol injection with hot film air mass measurement (HFM)

Power transfer

Transmission		Five-speed manual transmission
Clutch		Single-plate dry clutch
Ratios	Final drive 1st gear 2nd gear 3rd gear 4th gear 5th gear Reverse	3.88 3.64 2.04 1.33 1.03 0.82 3.29

Chassis

Front axle	McPherson struts, three-link suspension, two-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Rear axle	Parabolic rear axle, coil springs, one-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Braking system	Hydraulic dual-circuit braking system with vacuum servo, ABS anti-lock braking system and brake assistant, disc brakes front and rear, hand brake, ESP® (Electronic Stability Program)
Steering	Electromechanical parameter steering
Wheels	6 J x 15
Tires	185/65 R 15

Dimensions and weights

Wheelbase	mm	2568
Track front/rear	mm	1556/1551
Overall – length	mm	3838
Overall – width	mm	1764
Overall – height	mm	1593
Turning circle	m	10.95
Luggage capacity*	l	435-1995 (three-door: 435-1485)
Kerb weight acc. to EC	kg	1225 (three-door: 1195)
Payload	kg	465
Gross vehicle weight	kg	1690 (three-door: 1660)

AUTO SPIES
More info at www.AutoSpies.com

Tank capacity/reserve	l	54/6

Performance and fuel consumption**

Acceleration 0-100 km/h	s	12.6
Maximum speed	km/h	175
Fuel cons. NEDC combined	l/100 km	6.2

*acc. to VDA measuring method; **provisional figures

Mercedes-Benz A170

Engine

No. of cylinders/ arrangement		4/in-line, 2 valves per cylinder
Displacement	cc	1699
Bore x stroke	mm	83.0 x 78.5
Rated output	kW/hp	85/116 at 5500 rpm
Rated torque	Nm	155 at 3500-4000 rpm
Maximum engine speed	1/ min	6300
Compression ratio		11.0 : 1
Mixture formation		Microprocessor-controlled petrol injection with hot film air mass measurement (HFM)

Power transfer

Transmission		Five-speed manual transmission
Clutch		Single-plate dry clutch
Ratios	Final drive 1st gear 2nd gear 3rd gear 4th gear 5th gear Reverse	3.88 3.64 2.04 1.33 1.03 0.82 3.29

Chassis

Front axle	McPherson struts, three-link suspension, two-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Rear axle	Parabolic rear axle, coil springs, one-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Braking system	Hydraulic dual-circuit braking system with vacuum servo, ABS anti-lock braking system and brake assistant, disc brakes front and rear, hand brake, ESP® (Electronic Stability Program)
Steering	Electromechanical parameter steering
Wheels	6 J x 15
Tyres	185/65 R 15

Dimensions and weights

Wheelbase	mm	2568
Track front/rear	mm	1556/1551
Overall – length	mm	3838
Overall – width	mm	1764
Overall – height	mm	1593
Turning circle	m	10.95
Luggage capacity*	l	435-1995 (three-door: 435-1485)
Kerb weight acc. to EC	kg	1240 (three-door: 1210)
Payload	kg	465
Gross vehicle weight	kg	1705 (three-door: 1675)
Tank capacity/reserve	l	54/6

Performance and fuel consumption**

Acceleration 0-100 km/h	s	10.9
Maximum speed	km/h	188
Fuel cons. NEDC combined	l/100 km	6.6

acc. to VDA measuring method;*provisional figures

Mercedes-Benz A 200

Engine

No. of cylinders/ arrangement		4/in-line, 2 valves per cylinder
Displacement	cc	2034
Bore x stroke	mm	83.0 x 94.0
Rated output	kW/hp	100/136 at 5750 rpm
Rated torque	Nm	185 at 3500-4000 rpm
Maximum engine speed	1/ min	6300
Compression ratio		11.0 : 1
Mixture formation		Microprocessor-controlled petrol injection with hot film air mass measurement (HFM)

Power transfer

Transmission		Five-speed manual transmission
Clutch		Single-plate dry clutch
Ratios	Final drive 1st gear 2nd gear 3rd gear 4th. gear 5th gear Reverse	3.72 3.64 2.04 1.33 1.03 0.82 3.29

Chassis

Front axle	McPherson struts, three-link suspension, two-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Rear axle	Parabolic rear axle, coil springs, one-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Braking system	Hydraulic dual-circuit braking system with vacuum servo, ABS anti-lock braking system and brake assistant, disc brakes internally ventilated at the front and solid at the rear, hand brake, ESP® (Electronic Stability Program)
Steering	Electromechanical parameter steering

Wheels	6 J x 16
Tyres	195/55 R 16

Dimensions and weights

Wheelbase	mm	2568
Track front/rear	mm	1552/1547
Overall – length	mm	3838
Overall – width	mm	1764
Overall – height	mm	1595
Turning circle	m	10.95
Luggage capacity*	l	435-1995 (three-door: 435-1485)
Kerb weight acc. to EC	kg	1270 (three-door: 1240)
Payload	kg	425
Gross vehicle weight	kg	1695 (three-door: 1665)
Tank capacity/reserve	l	54/6

Performance and fuel consumption**

Acceleration 0-100 km/h	s	9.8
Maximum speed	km/h	200
Fuel cons. NEDC combined	l/100 km	7.2

*acc. to VDA measuring method; **provisional figures

Mercedes-Benz A 200 TURBO*

Engine

No. of cylinders/ arrangement		4/in-line, 2 valves per cylinder
Displacement	cc	2034
Bore x stroke	mm	83.0 x 94.0
Rated output	kW/hp	142/193 at 5000 rpm
Rated torque	Nm	280 at 1800-4850 rpm
Maximum engine speed	1/ min	6000
Compression ratio		9.0 : 1

Mixture formation		Microprocessor-controlled petrol injection with hot film air mass measurement (HFM), turbocharger

Power transfer

Transmission		Six-speed manual transmission
Clutch		Single-plate dry clutch
Ratios	Final drive 1st gear 2nd gear 3rd gear 4th gear 5th gear 6th gear Reverse	3.240 (gears 1-4) / 2.700 (gears 5,6,R) 4.214 2.542 1.710 1.263 1.184 0.953 5.015

Chassis

Front axle	McPherson struts, three-link suspension, two-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Rear axle	Parabolic rear axle, coil springs, one-cylinder gas-pressure shock absorbers with selective damping system and coil springs, torsion-bar stabiliser
Braking system	Hydraulic dual-circuit braking system with vacuum servo, ABS anti-lock braking system and brake assistant, disc brakes internally ventilated at the front and solid at the rear, hand brake, ESP® (Electronic Stability Program)
Steering	Electromechanical parameter steering
Wheels	6 J x 16
Tyres	195/55 R 16

Dimensions and weights

Wheelbase	mm	2568
Track front/rear	mm	1552/1547

AUTO SPIES
More info at www.AutoSpies.com

Overall – length	mm	3838
Overall – width	mm	1764
Overall – height	mm	1595
Turning circle	m	10.95
Luggage capacity**	l	435-1995 (three-door: 435-1485)
Kerb weight acc. to EC	kg	1305 (three-door: 1275)
Payload	kg	425
Gross vehicle weight	kg	1730 (three-door: 1700)
Tank capacity/reserve	l	54/6

Performance and fuel consumption***

Acceleration 0-100 km/h	s	8.0
Maximum speed	km/h	227
Fuel cons. NEDC combined	l/100 km	7.9

*available from mid-2005; **acc. to VDA measuring method; ***provisional figures