6. Body: Bigger, Stiffer, Safer.

- **Lightweight bodyshell with multi-bar concept.**
- **Designed for optimum results in the EuroNCAP crash test.**
- **Best marks in the US standard side and rear crash test.**
- **Enhanced restraint system for optimum occupant safety.**
- **More precise activation of airbags and belt tensioners.**

The new BMW 3 Series offers even greater presence and comes with an even more powerful look than its predecessor. This is attributable, first, to the greater emphasis of the car's "muscles" and, second, to the larger dimensions. And indeed, BMW's new Sports Saloon has grown in every respect:
Length is up by 49 millimetres or 1.92″, width by 78 millimetres or 3.07″, and height by 10 millimetres or 0.39″.

These larger dimensions benefit both passenger comfort and driving dynamics, with the car's longer wheelbase reducing any vibration of the vehicle. The most important point, however, is the enhancement of passive safety, with BMW's new model being the safest 3 Series of all times. And at the same
time the new 3 Series is lighter than before or at least not heavier despite the car's larger dimensions and higher level of equipment: Taking the higher level of equipment into account, the body-in-white is 30 kilos or 66 lb lighter than on the former model.

The benefits provided by this achievement in engineering are quite dramatic in terms of both driving dynamics and fuel economy: A change in weight by 10 per cent speeds up or slows down acceleration from 0–100 km/h by no less than 7 per cent. And when it comes to fuel consumption, 10 per cent more or less weight adds up to 1 per cent cost of fuel at the filling pump.

All-round safety strategy.
BMW's engineers have pursued their quest for concept harmony also in developing the car's safety system: Applying an all-round safety strategy, their objective in designing the body structure was to ensure maximum safety for the driver and his passengers through optimum interaction of the

suspension, drivetrain and equipment, without impairing the car's dynamics and comfort in any way.

Taking a thoroughly new approach.
The new BMW 3 Series offers noticeably more space, comfort and safety with even better performance and greater fuel economy. To reach all these objectives at the same time, it was not sufficient to merely "lean down" the body-in-white or replace steel by aluminium. Rather, the only solution was to take a thoroughly new approach.

Capitalising consistently on progress in steel technology.
In this process BMW's engineers benefitted from innovative breakthroughs achieved in the meantime in steel and steel moulding technology.
The steel grades available today, for example, offer enormous strength and stability on relatively small cross-sections. Multi-phase steel, for example, is able to withstand far higher loads and forces than conventional steel and is therefore simply perfect for body components relevant to safety. Other types of modern steel are more pliable than before, appropriate drawing processes thus serving to make even very intricate and complex parts and components.

Support bar concept for extra body stiffness.
Looking back at old traditions and beyond the usual horizon in automobile production, BMW's engineers focusing on the new 3 Series also had another idea: Taking up the concept of building trusses and girders going back centuries, the engineers created a support bar concept for the load-bearing structure of the new 3 Series. This provides for reinforcement bars between points subject to a particular load such as the engine mounts at the front as well as the points connecting the engine to the longitudinal arms, and the connection points on both the B-pillars and at the rear.

At the same time the engineers enhanced the conventional reinforcements on the car's body by switching over to high-strength and multi-phase steel, innovations not available before.

As a result of these improvements, body stiffness over the former model is up by 25 per cent. In a collision the forces generated are absorbed by the structure of the car and are taken up or passed on in a defined process via so-called load paths. This, in turn, reduces the degree of deformation and, in conjunction with improved passive safety features, gives the car's occupants maximum safety on the road.

Top results in crash tests.
Through its innovative and trendsetting safety concept, the new BMW 3 Series consistently capitalises on new materials technologies. The safety concept is therefore a major factor in giving the new car truly outstanding results in various crash tests, the new BMW 3 Series offering a standard of passive safety never seen before in this class.

The best-known crash tests today are the NCAPs in Europe, the USA, and Japan. In the toughest of all these tests, the EuroNCAP Frontal Offset Crash, the car is driven against a deformable barrier head on at a speed of 64 km/h and with 40 per cent offset. A side crash is simulated, in turn, by an impact against a deformable barrier at 50 km/h on the side of the car being tested. Then there is also the side pillar test with the car impacting a rigid pillar from the side at 29 km/h in order to simulate an accident involving a post or a tree.

The BMW 3 Series is designed and built to provide optimum results in these currently most demanding crash tests in the world. This makes the 3 Series one of the safest passenger cars in all classes the world over.

Also in a collision from the side: the safest 3 Series of all times.
New side and rear-end crash requirements in the USA also call for passive safety of the highest standard – and the BMW 3 Series is one of the first production cars to meet these tests: The US IIHS side-on crash defined only a few months ago provides for a mass of 1.3 tonnes impacting the car directly into the side – that is at its most sensitive point – at a speed of 50 km/h
or 31 mph. In particular, the crash simulates an offroader or SUV, that is a relatively high vehicle hitting the front door of the car at an angle of 90° above the side-sill with its protective effect. Again, the BMW 3 Series meets this extreme test with flying colours.

Hit from behind at 80 km/h.
Performance of the new BMW 3 Series is equally good in the new FMVSS 301 US high-speed rear-end impact test simulating a crash from behind against the stationary vehicle. Under the strict test conditions, a rigid barrier hits the rear end of the car at 80 km/h or 50 mph, in an impact with 70 per cent overlap. One of the requirements is that the fuel system does not start to
leak or lose any fuel – and again, the new 3 Series also meets this enormous challenge.

Low cost of repair reducing insurance premiums.
Apart from these simulated accident scenarios, everyday, “regular” accidents were taken into account as a significant factor in developing the new BMW 3 Series. Tests of the kind conducted by the Allianz Zentrum für Technik (Allianz Centre of Technology/AZT) in Munich, for example, are crucial to factors such as the car’s insurance rating. One of the tests requires an
impact at 40 km/h (25 mph) and with 40 per cent overlap against a solid barrier. Another test is a collision from behind, with a rigid one-tonne barrier hitting the car from behind at a speed of 15 km/h and again with 40 per cent overlap.

The results show that the cost of repairing the new 3 Series after such an accident is relatively low, the structure of the body remaining free of damage in a frontal and, respectively, rear-end collision at up to 15 km/h with 40 per cent overlap at the side. The big advantage for the customer is a low insurance rating with correspondingly cheap premiums or, respectively, low cost of repair.

Occupant safety of the highest calibre.
The new BMW 3 Series raises occupant safety in this class of vehicle to a new, unprecedented level of excellence, offering all occupants greater safety than ever before. So once again, BMW is moving up the benchmark also in this respect.

Efficient, easy-to-wear seat belts.
The seat belts have always been the fundamental feature of a car’s restraint systems. But while the seat belts used to be the only safety feature inside a car, they are now part of a complex occupant safety system incorporating special electronic controls coordinating additional vehicle functions.

Within the new BMW 3 Series, the all-round system of seat belts features belt latch tensioners and belt force limiters at the front. The belt latch is now fitted directly in the seat frame, giving the belt even better geometry and bringing it to rest even more efficiently on the occupant’s body. This also gives the customer the advantage of extra comfort, with the belt, thanks to its optimised pivot points, running even more smoothly and free of friction. And in the
event of an accident the belt latch fitted firmly to the seat, together with the belt latch tensioner, ensures better restraint travel and, as a result, reduces the risk of injury.

Conducting comprehensive ergonomic studies, BMW's engineers have determined the optimum belt pivot point for occupants of all sizes and all seating positions. This avoids the need to adjust bolt height and rules out the
risk of unwanted misadjustments. The two occupants on the outer rear seats also benefit from optimised belts with latch tensioners, while the centre seat comes with a conventional three-point belt and a folding headrest.

Front passenger airbag remaining out of sight.
The front passenger airbag now activated in two stages in the 3 Series as a function of accident severity is housed beneath a cover in the instrument panel and is therefore kept out of sight when not in use. The driver airbag also operating in two stages is housed in the steering wheel, new low-pollutant
gas generators reducing the development of smoke in pyrotechnical ignition of the airbags.

Both the driver and front passenger also benefit from seat-integrated hip/thorax airbags for even better protection in an accident. Placed in the seat and not in the inner door padding, these airbags follow the position of the occupants with every adjustment of the seat, thus maintaining their optimum position at all times. And compared with the airbag integrated in the door panel on the former model, airbag volume has been reduced by 50 per cent while providing an even better safety function than before.

Window curtain from the A- all the way to the C-pillar.
Head airbags protect both the front and the rear occupants. Inflating within just 22/1000ths of a second, these head airbags form a window curtain extending along the windows from the A- all the way to the C-pillar. Here again, the focus was on providing optimum safety and protection regardless of the passengers' seating position.

The 3 Series for three: three Isofix child seat fastenings.
Using the Isofix safety system standardised the world over, the driver of the BMW 3 Series is able to fit special child seats quickly and safely on firm points within the car, offering young passengers optimum safety in an accident.
For the first time in this class, the new BMW 3 Series offers Isofix child seat fastenings on no less than three seats, and not "just" on one or two seats, as before. The seats prepared for this purpose are the front passenger's seat as well a the outer seats at the rear. Whenever a child seat is fitted at

the front, the frontal airbag on the seat involved must be deactivated by means a key switch on the seat itself.

Central safety electronics coordinating the car's protection systems.
Apart from the availability and ideal arrangement of the various safety features, their reliability and operating safety are crucial to optimum occupant protection. And given the need to minimise the cost of an accident, only the components really required should be activated if the worst comes to the worst. Precisely this function and specific control is ensured by the central safety electronic concept featured in the 3 Series.

Sensors operating with a high degree of accuracy ensure that only the pyrotechnical components really required to protect the occupants are activated in a specific situation. These sensors are housed both in the car's control centre as well as in the B-pillars and the doors. They also serve to detect an impact at the earliest possible point, thus offering decisive fractions of a second in inflating the safety components without the slightest delay.

Even after a crash the danger is not over.
After a crash and the functions triggered immediately to protect the occupants, the electronic safety system activates the so-called post-crash functions enhancing safety and rescue options following the event itself. One example is the function automatically opening the car's central locking, another is automatic operation of the hazard warning flashers and activation of the interior lights. As of a predetermined impact force, the system also switches off the fuel pump and the safety battery terminal intervenes in the on-board power network to avoid a possible short circuit. A separate power connection serves at the same time to maintain important functions such as the car's lights, hazard warning flashers, or automatic telephone emergency system.

7. Assistance Systems: Reliable Friends Just in Case.

- **Adaptive Headlights.**
- **Two-stage brake lights (Brake Force Display).**
- **Wide range of telematic functions.**
- **iDrive control concept.**
- **Multi-function steering wheel with additional buttons for individual use.**

Looking in particular at a car's assistance systems, we see that traditional "class differences" in the world of motoring are a thing of the past. For premium cars these days have to offer everything available in technical terms, regardless of the individual class or segment. To be specific, this means that the 3 Series features assistance systems previously to be found only in the luxury performance class. So that now, proceeding from a wide range of standard equipment, the customer is able to configure his or her BMW 3 Series according to individual, personal preferences.

Three headlight systems for optimum visibility.
The headlights are a good example: In this area of technology becoming increasingly significant in terms of safety, comfort and use of the car's dynamic potential, the purchaser of a 3 Series can choose from no less than three different systems. The standard technology is dual halogen headlights in progressive free-form configuration featuring high-intensity H7 low-beam and high-beam bulbs consistently and homogeneously lighting up the road ahead. This offers the customer very effective low- and high-beam illumination characterising BMW cars together with the striking dual headlights.

Static bi-xenon dual headlights with maximum low- and high-beam illumination are available as an option. Parking illumination is provided exclusively by two light conductor rings so far to be found only in BMW's luxury performance class. So now this characteristic feature is provided for the first time also in the 3 Series.

Adaptive Headlights, the absolute climax in headlight technology.
Bi-xenon headlights with an adaptive light function are the absolute climax in headlight technology. And the BMW 3 Series is the only car in its class to offer this advanced adaptive headlight system.

Adaptive Headlights significantly enhance driving safety in the dark, ongoing, dynamic adjustment of the headlights to the car's current direction of travel ensuring optimum illumination of the road ahead and giving the driver much better visibility. This is a particular advantage in bends, where the driver restricted by static headlights always looks into a kind of "black hole". Now Adaptive Headlights dynamically following the road ahead literally guide the driver along winding roads like a magic wand.

In technical terms, this "magic wand" is a closely networked safety system consistently adjusting the headlights to the current steering angle. Controlled in their movements by the angle of the steering wheel, the yaw rate of the car, and road speed, the bi-xenon headlights light up the road ahead
like eyes automatically moving in the right direction. To avoid the risk of dazzling oncoming traffic, in turn, the Adaptive Headlights feature dynamic headlight range control and incorporate a headlight cleaning system.

Two-stage brake lights to prevent collisions from behind.
Two-stage brake lights, a BMW innovation officially called the Brake Force Display, ensure an enormous improvement of traffic safety. These two-stage lights are based on the recognition that accidents from behind can be reduced dramatically if motorists following the car are informed clearly and in good time about how hard the driver is applying the brakes. And precisely this information is provided by the Brake Force Display: As long as the driver is applying the brakes with "normal" force, the brake lights at the rear and the third brake light in the middle come on the usual way. Whenever the driver applies the brakes hard, on the other hand, or with ABS intervening, the brake lights coming on at the rear cover a larger area. Motorists following from behind will intuitively interpret this larger surface as indicative of an emergency braking manoeuvre, applying the brakes harder themselves and gaining important stopping distance in the process.

BMW Assist – the ideal electronic helper for many purposes.
BMW Assist, another important innovation, features an emergency call function, BMW Breakdown Assistance, the BMW Info customer information system, the V-Info traffic information service, as well as BMW's mobility-based enquiry service. Offering this range of features as well as a data

return function in response to enquiries, BMW Assist is currently quite unique in the market.

These services offer the customer a wide range of benefits in terms of both comfort and safety – extending from practical assistance in looking for a specific restaurant or film at the cinema all the way to the announcement of the driver's next service at the dealership, the car transmitting data on possible defects to the BMW Service Partner in advance. Certain telematic services are fully automatic, such as the emergency call function whenever an airbag is activated.

Rarely used, but indispensable: the emergency call function.
A BMW Assist feature fortunately required only on rare occasions is the emergency call function: Whenever an emergency call is placed automatically (by the airbag being activated) or manually (by somebody pressing an emergency call button), the car establishes a voice link to the local service provider. Once that link has been set up, the service provider receives a text message with the GPS satellite navigation coordinates of the car specifying its current location as well as the customer's number. As long as this voice connection is in place, the user is able to cancel the alarm if it has been set off by mistake. And if the emergency is serious, the service provider will immediately inform the local police and rescue services, ensuring that they are guided to the scene of the accident precisely and without the slightest delay.

BMW Breakdown Assistance helping to avoid problems.
Another BMW Assist function required only rarely but nevertheless of importance when needed is BMW Breakdown Assistance with both automatic and manual teleservice. This function places an automatic service call with the dealer as soon as the car's electronic "brain" recognises that the car will
require maintenance in the near future. The dealer then contacts the customer to arrange an appointment, for example to change the oil. In many countries (but not yet in Germany) the driver is also able to send a service call manually by text message to his dealer and then automatically receives the telephone connection required.

Should the customer contact BMW Breakdown Assistance via the BMW Hotline, additional information on the car and the data on a possible defect is transmitted by text message to the BMW Mobile Service or the Customer Hotline in the respective country, the system then establishing a telephone connection with the BMW Service Partner. This gives the dealer

advance information on any defects and allows him to prepare the remedy required. The advantage for the customer is personal planning of convenient service dates and shorter service periods.

All the car's data saved in the key.
The Key Reader function also serves to optimise service procedures and cut back service periods to a minimum: As soon as the customer gives his BMW Service Partner the key to the car, the dealer is holding everything he needs to know about the car in his hands, since the key comprises all relevant data on the car in the interest of efficient and speedy service. A reader then reads this data into the dealer's computer, such automatic acquisition and transfer of data ruling out mistakes and misunderstandings. This also helps the customer to save time, since it is no longer necessary to record all data and possible defects in the usual manual process.

"My Info" going from the internet straight into the car's on-board system.
The "My Info" service offers a convenient internet application for the first time transmitting navigation destinations and telephone numbers directly from the http//www.bmw-assist.de website into the car in geo-coded form. This saves the driver the trouble of entering such data manually into the navigation system or the telephone on board his BMW.

V-Info plus: Immediate processing of traffic information by the navigation system.
V-Info plus traffic information is another very convenient and practical tool making life a lot easier for the driver. Using this function, the car regularly calls up the latest traffic information on the driver's planned route or around the current location via text message from a service provider. This data then goes straight into the navigation system, which is able to determine and calculate alternative routes, for example to avoid traffic congestion on the motorway.

BMW Online: Checking out the stock exchange and listening to the radio.
Using BMW Online, the driver is able to access an internet service selected in advance from a wide range of internet-based service options. Typical examples are the news, reception and transmission of e-mails, hotel reservations, and a ticket ordering service. Other on-board infotainment functions are available at the same time, allowing the customer, say, to listen to the radio and simultaneously check out the stock exchange.

To keep the websites available clear and readily accessible for the customer, the various offers are pre-selected. The customer is also able to configure or change his personal starting page at home or in the office, with separate starting pages being set up for other users. And incorporating a firewall, filter functions and access codes, BMW's safety concept prevents unauthorised access and protects the system from viruses.

When it comes to telematics, BMW is two years ahead.
Although telematics already offer a wide range of functions, the potential of this sophisticated service is still far from exhausted. Indeed, BMW Online and other telematic services just mark the starting point for further, far more comprehensive multi-media functions and offers. Wireless communication between the on-board computer, the car's telephone and the mobile phone, for example, is already reality – and there are already visions extending all the way to dynamic parking space navigation with an automatic parking
fee function as well as exclusive BMW Online Shops. BMW customers are the first to benefit from these achievements, since their brand is the leader in telematics, experts claiming that BMW's leadership in technology over the competition is equal to a period of at least two years.

Assistance as an offer, not an obligation.
Offering appropriate assistance systems, BMW's philosophy is that the customer should decide himself whether to use the support provided by a specific system or not. Clearly, a philosophy of this kind accepts back-up systems intervening on their own accord only where such systems are absolutely essential to the driver and his passengers, as is the case with many suspension assistance systems or with the automatic emergency call function following the activation of an airbag. Given the complexity of many assistance systems, on the other hand, system control and operation must be intuitive or at least easy to learn, ergonomic and with a rapid response in due respect of the driver's self-responsibility.

iDrive combining high information density with easy control.
BMW iDrive is certainly the perfect and most feasible concept in achieving this goal. No other system offers the same density of information combined with excellent intuitive operation via the Controller. A further advantage is that iDrive enables the front passenger to control and use nearly all functions, while the passengers at the rear are able to follow up visual and text information via the Display in the middle of the instrument panel.

Taking up BMW's iDrive philosophy, the 3 Series is now pioneering the concept of on-board information and ergonomics in the midrange segment. Most functions crucial to motoring are arranged on or directly around the steering wheel, that is within optimum reach for the driver. The basic comfort functions, in turn, are located in the centre console for simple control by both the driver and front passenger. And all other settings and services are at the disposal of both the driver and front passenger via the Controller as well as the Display.

Display with transflective surface.
The Display housed conveniently within a binnacle in the middle of the instrument panel serves as the control and operation surface for nearly all assistance and communication systems. The Stage I version of the Colour Display measures 6.5 inches, Stage II 8.8 inches. The transflective surface is easy to read from all seats even in bright sunshine, transflective technology passively reflecting the incoming daylight to make the Display clear, brilliant and easy-to-read. In bad weather or in the dark transmissive background illumination again ensures optimum readability, a further advantage being individual control of Display brightness. There is even a special feature incorporating this individual setting in the Car & Key Memory function, Display brightness adjusting automatically to the setting chosen by the customer in advance.

One Controller for all purposes.
The main menu presented on the Display is split up into four areas – Communication, Navigation, Entertainment, and Climate. Depending on the car's level of equipment, the sub-functions within these individual areas may be controlled on various levels by the Controller. Moving this central control element in the four directions of the compass, the driver chooses the function area desired and then navigates within the various sub-functions. To confirm the menu item currently marked by the cursor, all he has to do is press the Controller.

Voice entry for a wide range of functions.
Apart from manual control by the Controller, voice entry is also available as the second option for operating and controlling the telephone, BMW Assist,
BMW Online, the navigation system, the telephone directory, the radio, the CD, DVD, and MP3 audio services, as well as automatic air conditioning.
A new feature seen for the first time in this class is the text-to-speech engine

enabling the user to read out texts. This significantly enhances the level of motoring comfort and safety especially in receiving the names of radio stations and similar information. The language dialogue is also enhanced and there are a number of new functions.

A navigation system with ears.

Particularly the navigation system benefits from these modifications, thus maintaining its leading role versus the competition. An additional feature is the presentation of points of interest, the navigation system telling the driver, for example, which local sights might be worth visiting or the address of the nearest BMW Service Station.

Multifunction steering wheel with additional buttons for further purposes.

The optional multifunction steering wheel is an independent assistance system in its own right. Apart from its main function, the steering wheel incorporates several ergonomically arranged buttons for controlling major functions frequently required. So to operate these functions, the driver need not take his hands off the steering wheel nor move his eyes from the road. The functions controlled in this way are “louder” and “quieter”, the telephone, audio operation and source, station search, traffic messages off, and voice entry.

The optional high-end multifunction steering wheel comes furthermore with two additional buttons for individual programming by the user – a feature never seen before in the midrange segment.