

Twenty Years of the BMW M3.

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1. Twenty Years of the BMW M3 – a Legend in Sports. (Short Version)



It is one of the most successful chapters in the history of the automobile and in international motorsport alike: the story of the BMW M3 – and to this day, the end of this unique success story is not even in sight.

In 2006 BMW and BMW M GmbH celebrated the 20th birthday of the most successful touring car of all times. Within two decades, three generations of the BMW M3 have successfully entered and conquered both the market and the race track, each of these models quite unique and legendary in its own right. Dominating the racing scene and paving the way on the road for a new species of particularly sporting, but nevertheless highly practical series-production cars fully suited for everyday use, the BMW M3 to this day thrills a loyal and constantly growing group of enthusiasts and aficionados the world over.

This unique story of success started back in 1986 with the launch of the first BMW M3 based on the E30 version of the BMW 3 Series. From the start, this thoroughbred sports car thrilled not only the motorsport enthusiast and the racing expert, but also car fans the world over. Boasting powerful-looking spoilers and strikingly flared wheel arches all round, the very first BMW M3 was a sensation to behold even at a standstill. And although the road-going version offered all the everyday driving qualities required of a modern car, the real home of the BMW M3 was the race track. Powered by a four-cylinder featuring avantgarde four-valve technology, the BMW M3 brought home one victory after the other.

Originally conceived for just 5,000 units for the purpose of homologation, this very first BMW M3 gained growing popularity right from the start. And apart from the car's convincing concept, an ongoing increase in engine power from 195 hp all the way to 238 hp added to the car's fascinating thrill.

Total production up to the end of the car's production cycle in 1991 amounted to almost 18,000 units including the BMW M3 Convertible. Subsequently, the two following generations significantly exceeded even this remarkable sales figure, the second generation of the BMW M3 based on the E36 model series accounting for a sales volume of almost 72,000 units, and the third generation based on the E46 model series achieving an even more impressive production run of over 85,000 units.

Precisely this success confirms the strategy of BMW M GmbH to convey the qualities of superior motorsport machines right through to series production. After three generations and more than 174,000 units sold, production of the E46-based BMW M3 ended in 2006 – only to be continued in 2007 with the fourth generation carrying on this exceptional story of success.

The successor to a legend.

Based on the coupé version of the E36 model series, the second generation of the BMW M3 made its appearance in 1992. At first sight this model looked quite “normal”, without any large spoilers or striking wheel arches – but just one glimpse into the engine bay told another story, with this being the first BMW M3 to feature a six-cylinder power unit.

Developing maximum torque of 320 Newton-metres or 236 lb-ft all the way from 3,600 to 6,000 rpm, together with maximum output of 286 hp, this outstanding sports car offered the driver superior acceleration at all times and in every situation. Indeed, BMW's engineers were able to achieve these performance figures quite unusual at the time through painstaking attention to detail and with a number of innovative solutions: Apart from VANOS variable camshaft management and the upgraded single throttle butterfly control unit, newly developed engine electronics able to process more than 20 million instructions per second helped to give the engine its enormous power and performance.

Catering for growing demand for a four-door model, the second generation of the BMW M3 was also built in saloon guise, in addition to the coupé and convertible versions. And the success of all three models was overwhelming, almost 72,000 units of all three body variants leaving BMW's Regensburg Plant throughout seven years of production. These were joined by another 700 units built as completely knocked down (CKD) kits at BMW's Rosslyn Plant in South Africa.

The BMW M3 saga goes on.

Towards the end of the year 2000, the latest and still current version of the BMW M3 entered the market as the next generation. Based on the E46 model series coupé, this version of the BMW M3 again combines supreme performance, exceptional driving qualities and unique design, clearly distinguishing the car from other models in the BMW 3 Series.

Particularly the front section of the current BMW M3 supporting the engine compartment lid made of aluminium looks flatter and more aggressive than on every other regular production BMW 3 Series. And beneath the engine compartment lid with its striking powerdome lurks one of the most significant

innovations introduced in this model – the new, even more powerful six-cylinder engine developing maximum output of 252 kW/343 hp and applying the high-speed engine concept carried over from Formula 1 and now so characteristic of all cars built by BMW M GmbH: When revving at a speed of 8,000 rpm, the pistons in the new M3 power unit move up and down at a velocity of more than 20 metres or 66 feet a second, thus reaching a new dimension for a car of this class.

The BMW M3 CSL was also based on this model. Boasting an even more powerful engine, developing 265 kW/360 hp and featuring radical lightweight technology using the most advanced materials such as carbonfibre-reinforced plastics and carbon, the BMW M3 CSL has a power-to-weight ratio of 3.85 kg/hp – a truly outstanding figure which raises this BMW M3 to an entirely new dimension of dynamic performance.

Still, the fact remains that yet another model stands out as the fastest and most expensive of all BMW M3s built so far – the BMW M3 GTR presented to the public in 2001 for the American Le Mans Series (ALMS). Indeed, this truly unique car was a genuine eye-catcher from the start not only through its muscular look, but also and in particular through its 4.0-litre V8 high-performance power unit developing 330 kW/460 hp in racing trim and, respectively, 258 kW/350 hp in the road-going version.

This supreme sports car set the standard also in another respect, its price of approximately Euro 250,000 making it a truly exclusive offer.

2. The Birth of a Sports Legend.



The BMW M3 made experts and car buffs wax lyrical right from the very beginning, before the car even made its official appearance. For it was back in summer that 1985 car magazines all over Germany published their first reports on an “over-the-top 3 Series” based on the E30 model series and boasting exceptional performance data: 200 horsepower, a top speed in excess of 230 km/h or 143 mph, and acceleration to 100 km/h in 6.7 seconds.

Obviously, the connoisseur immediately realised that the fastest BMW 3 Series the world had ever seen was about to make its appearance. In reality, however, well over a year was still to pass before the first car testers and customers were able to take their seat in a BMW M3.

The BMW M3 project had started a few months before at BMW Motorsport GmbH. The legend has it that Eberhard von Kuenheim, at the time the Chairman of the Board of Management, gave the go-ahead for a particularly sporting and dynamic engine in the BMW 3 Series in a talk with the Technical Director of BMW M GmbH, Paul Rosche. So the order to develop such an exceptional power unit quite literally came right from the top.

A high-performance power unit after just two weeks of development.

Rosche and his team were however well-prepared when they received the green light to build this exceptional power unit. For Rosche, incidentally also the “father” of the turbocharged engine which helped Nelson Piquet bring home the Formula 1 World Championship in 1983 in his BMW Brabham, had already checked out the “bits and pieces” he needed for the engine: The new power unit was based on the crankcase of the four-cylinder already featured as a highly refined and dynamic two-litre in large-scale production, with its engine block already rendering an invaluable service in the World Championship engine.

The decision in favour of a four-cylinder and against the six-cylinder introduced in the BMW 3 Series in the meantime was taken not only to save weight, but also and above all for technical reasons: The longer crankshaft on the large engine started to vibrate much earlier at increasing engine speeds than the crankshaft in the four-cylinder. Hence, the responsible designers made the crankdrive on the BMW M3 so stiff that it was able to run even at speeds of 10,000 rpm and more – an increase in engine speed by approximately

60 per cent over the four-cylinder built in regular series production. And at 6,750 rpm, maximum engine speed of the road-going BMW M3 was significantly below the critical limit, offering adequate margin for ongoing development.

The cylinder head also came from series production, as it were, with the engine specialists opting for the four-valve cylinder head of the six-cylinder and then simply “cutting off” two combustion chambers. This was possible without any major complications due to the same distance between cylinders in both versions, which obviously made things easier. The last step then required was to increase engine capacity to 2.3 litres.

After an incredibly short development period of just 14 days, the first prototype engine was ready to go, proudly bearing the abbreviation “S14” in a slightly modified version and destined to write history in both motorsport and series production.

The only bad news for Paul Rosche in this development process is that he was not able to integrate a turbocharger in the engine for reasons of homologation, since the “fathers” of the BMW M3 had planned the car from the start also as a Group A racing car, which required production of at least 5,000 units in 12 successive months. And that made it quite clear that the BMW M3 had to be a road-going car suitable for everyday use, making it impossible to give the car a technically very demanding and sophisticated turbocharged power unit.

Powerful and clean all in one.

While focusing particularly on the power and performance of the new engine, the responsible engineers also had other important developments in mind. One point was that the four-cylinder in the BMW M3 was to pave the way into the future also in terms of emission management, forming a perfect team with a fully controlled catalytic converter – a combination quite unusual back then in the mid-80s, when the catalyst still tended to increase fuel consumption and reduce engine output.

A further potential drawback was that unleaded gasoline, obviously a must for an engine with a catalytic converter, did not have the reputation of being particularly good for a high-performance power unit. And last but certainly not least, the quality of fuel in Europe varied significantly from one region to another – again not good news for the reliable operation of such an engine.

But again, Paul Rosche and his team found the solution: They modified the engine and reduced its compression ratio from 10.5 : 1 to 9.6 : 1. As a result, the power unit featured in the BMW M3 did not develop any destructive knocking effect even in response to fuel with a varying octane rating.

And a truly sensational factor at the time was that even this reduction of engine compression and the integration of a catalyst meant a reduction in engine power by only 5 hp down from the regular 200 horsepower.

Proving its merits at Nürburgring.

Wherever there is light, there is also shade – an experience the development specialists creating the BMW M3 soon made on their first test drives.

For while the engine ran smoothly without any undue incidents, the exhaust system was obviously unable to handle the power the engine forced into the manifolds. So as a result, the exhaust pipes burst and required the development specialists to put in some extra overtime.

Ultimately the reason for this problem was determined to be the very high temperature of the exhaust gas when driving under full load: during test drives on the Nordschleife of Nürburgring putting all the car's materials to an incredible test, the high-performance exhaust gas system became so hot that it expanded by up to 25 millimetres or 1 inch, then being bent against the suspension units.

Only a short while later, however, the engineers found a very straightforward and basically simple solution to this problem by using different rubber units on the suspension and thus creating more play and flexibility.

This made the car ready to go, as the testers of BMW Motorsport GmbH soon proved impressively on the high-speed test track in the Italian town of Nardo: Driving the M3 full throttle around the circuit, they covered a distance of no less than 150,000 kilometres or 93,000 miles, even under such gruelling conditions. And the exhaust system passed the test successfully, just like all other components in the car.

Making its first public appearance.

Just a few months after the go-ahead for the BMW M3 project, the car itself was presented to the public at large for the first time at the Frankfurt Motor Show in autumn 1985. Even without the special paintwork otherwise featured on cars of this kind making their public debut, visitors had no problem to distinguish the BMW M3 from the other models in the 3 Series, the large front spoiler as well as a wing extending from one side to the other at the rear speaking a clear language. Air dams all round the car also bore testimony to the aerodynamic refinement of the entire body.

One example of such refinement was also the C-pillar somewhat wider and lower than on the regular production model in order to ensure a smooth flow of air along the edge of the roof and to direct the air rushing by even better to the

rear wing. Mighty wheel arches all round ending in a striking contour line along the car, finally, gave the BMW M3 a unique look of speed and dynamism right from the start, even at a standstill.

A lightweight athlete with thoroughbred racing technology.

Without ballast, the BMW M3 weighed a mere 1,200 kilos or 2,646 lb, thus also standing out as a genuine lightweight athlete. At 6.15 kg per hp, the car's power-to-weight ratio was very good even by today's standards, benefiting in particular from the use of plastic components.

While the body of the car including its wide wheel arches was made out of traditional metal plate, the front and rear bumpers as well as the side-sills, the luggage compartment lid and spoilers were all made of plastic. But still, car testers and customers had to wait until spring 1986 before they were able to experience these sensational figures themselves.

To live up to the concept of the car, the active press driving launch of the BMW M3 was held on the Mugello Race Track in Italy. And although the cars presented on the occasion were still pre-series models, the testers able to enjoy the experience immediately confirmed that the specifications claimed for the BMW M3 were more of an understatement and certainly no exaggeration.

This was indeed not surprising, considering that the BMW M3 from the start offered the highest calibre of racing technology within its striking and muscular body: The axle kinematics, springs and dampers, for example, were all modified. The brakes featuring ABS as standard came with inner-vented brake discs at the front and a high-pressure pump driven by the engine.

This servo pump also supplied power assistance to the steering, thus making both systems independent of the vacuum currently prevailing within the power unit.

This aerodynamic refinement also had a significant effect on the car's handling and driving characteristics, providing an excellent drag coefficient of 0.33. Compared with the other two-door models in the BMW 3 Series, front axle lift was down by approximately one-half and rear axle lift was even about two-thirds lower thanks to the large wing.

The windscreen and rear window bonded on to the body helped to enhance body stiffness, again with a positive impact on the car's handling and driving behaviour. The obvious benefit the driver was able to feel right away was a significant improvement in driving stability and even more precise steering also at very high speeds. And this precision was indeed necessary, since the

BMW M3 in standard trim boasted a top speed of 230 km/h or 143 mph with a catalytic converter and an even more impressive 235 km/h or 146 mph without a catalyst – both figures previously only to be found with the fastest thoroughbred sports cars.

Despite this very high speed, the BMW M3 was relatively fuel-efficient in its consumption of premium grade gasoline: In the one-third composite test cycle applied at the time, at a speed of 90 km/h, 120 km/h and in city traffic, the BMW M3 consumed far less than 9 litres per 100 kilometres, equal to 31.4 mpg Imp.

Such exclusive technology and outstanding performance nevertheless had a price, the BMW M3 entering the German market in 1986 with a price tag of DM 58,000. By comparison, this made the BMW M3 DM 14,700 more expensive than the next model in the BMW 3 Series, the BMW 325i Convertible.

Despite this relatively high price, BMW had no problem selling the 5,000 units required for homologation. On the contrary – purchasing contracts for the BMW M3 soon appeared in the advertising sections of virtually all car magazines, with customers lucky enough to have a contract in their hands only willing to pass on the car in return for a considerable premium.

The first BMW M3s were only actually handed over to their proud owners in 1987 when, following a “family photograph” of all 5,000 cars at BMW’s car park in Munich-Freimann, the BMW M3 was finally delivered to customers.

Up to 300 horsepower for the race track.

While the BMW M3 was also conceived as a road-going car suitable for everyday use, it remained first and foremost a racing car. So now it had to prove that its creators had given the M3 the right DNA from the start.

With a World Touring Car Championship being held for the first time in 1987, the BMW M3 was simply perfect for this new challenge, the 2.3-litre power unit being boosted to a maximum of 300 hp at 8,200 rpm compared with the 200 hp of the 2.3-litre road-going version and thus offering the same power as the BMW 635 CSi.

Instead of entering a works team, BMW’s decision in this first season was to support a number of renowned private teams such as Linder, Schnitzer and Zakspeed. And the famous drivers to be admired at the wheel of the BMW M3 included the likes of Christian Danner, Markus Oestreich, Roberto Ravaglia, and Emanuele Pirro. Featuring Anette Meeuvissen and Mercedes Stermitz at the wheel, there was also a ladies’ team driving the new sports car from Munich in the World Touring Car Championship.

The first race in the new series was in Monza, Italy, on 22 March 1987 – but it did not come under a good star for BMW, with all M3s being excluded from the final scoreboard after the cars had been scrutinised under partly chaotic conditions and disqualified because of allegedly illegal panel thickness. And although BMW naturally appealed the decision, the Company's complaint was rejected by the sports officials on the grounds that it had been submitted "too late".

Subsequently, however, there were no further claims that the cars were "illegal" in any way and the first race did not even have any effect on the result of the championship, with Roberto Ravaglia ending the season as the first World Touring Car Champion.

Even that was not all, with other BMW M3 drivers also ranking right at the top, among them Winfried Vogt who clinched the title of European Champion, and Altfried Heger, who finished as the runner-up.

Winning the Corsica Rally – and thus scoring BMW's first win in a race for the World Rally Championship in 14 years – the BMW M3 impressively proved that its success was not limited to circuit racing or the race track alone.

"Most Sporting Saloon of the Year."

Clearly, the unique story of success written by the BMW M3 right from the start soon aroused the attention of both the public and the motoring press. Not surprisingly, therefore, the readers of the German car magazine "sport auto" immediately chose the new model as the "Most Sporting Saloon of the Year".

At the same time the BMW M3 gained growing appeal also in its "civilian" version, becoming the first BMW in 1987 to be equipped with electrically adjustable dampers: Turning a knob next to the handbrake lever, the driver was able to choose among the Sports, Normal and Comfort settings, telltales in the dashboard presenting the set-up chosen.

Two very special offers for the private enthusiast followed in 1988: Bearing the additional letters "Evo" for evolution, BMW introduced a small special series of even more powerful M3s. Standing out clearly through its opulent spoilers, this very special BMW M3 was powered by a 220 hp engine again also available in catalyst trim with maximum output of 215 hp.

The second new model was addressed to the aficionado of open-air motoring – the BMW M3 Convertible based on the "regular" BMW 3 Series Convertible. Developing maximum output of 215 hp and offering a top speed of 239 km/h or 148 mph, this was by far the most powerful and fastest open four-seater available in a small production series.

24-hour races: the BMW M3 scores a one-two victory on Nürburgring.

By this time the BMW M3 had really got going on race tracks almost everywhere, this outstanding two-door model clinching not only the German Touring Car Championship (DTM), but also six other national titles including the championships in France, Britain, and Italy.

A year later BMW's racing machine remained virtually unbeatable, engine output of 300 horsepower enabling the BMW M3 to easily outperform its touring car competitors in Germany, Belgium, the Netherlands, France, Italy, Finland, Spain, Sweden, and Yugoslavia. Belgian driver Marc Duez entered the Monte Carlo Rally in the same year in his BMW M3, finishing 8th as the fastest driver in a car without all-wheel drive. And the driver teams Emanuele Pirro/Roberto Ravaglia/Fabien Giroix as well as Alfrid Heger/Harald Grohs/Olaf Manthey added the final touch in this series of success, scoring a one-two victory in the 24 Hours of Nürburgring.

Special model series: Evo 2 and 320is.

The BMW M3 led the way in international touring car racing in supreme style for no less than five years. Bringing home the European Touring Car Championship several times, winning the German Touring Car Championship (DTM) twice, and scoring a number of victories and championships on an international level, the BMW M3 soon became the most successful touring car of all times.

Depending on current racing rules and regulations, the four-valve power unit had to be modified for the various national events: In Britain, for example, engine capacity was limited to two litres, while starting in 1999 it was increased to 2.5 litres in both Germany and France, giving the four-cylinder maximum output of up to 360 hp.

The engine and fuel management systems also varied from one version and type of race to another, with the engine featuring not only single throttle butterflies, but in some cases also valve slides on the intake side.

Introducing the largest version of the M3's power unit, the engineers at BMW M GmbH went all the way to the absolute limit: To obtain maximum engine size of 2.5 litres, they not only increased the stroke of the 2.3-litre power unit from 84 to 87 millimetres (3.31 to 3.43 "), but also enlarged the four cylinder bores from 93.4 to 95.5 millimetres (3.68 to 3.76 "), reducing the topland gap between the cylinders to just 4.5 millimetres or 0.18 inches.

But supreme success on the race track once again proved that the engineers were right, the engines smoothly taking in all the strain of the toughest touring car events even when pushed to maximum power and performance.

Discerning customers had the option to buy a civilian version of this then most dynamic BMW M3, the Sports Evolution model developing maximum output of 238 hp. Limited to a small production series of just 600 units, this special model was recognisable by its adjustable front air dams and rear wings.

There was also a special version of the 2.0-litre power unit raced in Italy developed specifically for everyday use: This was the BMW 320is with stroke extended to 72.6 millimetres or 2.86", and with a further increase of the compression ratio to 10.8 : 1. Maximum output of the 2.0-litre power unit with these specifications was 192 hp, making the car very popular in Italy and Portugal, where it remained below the engine displacement limits for luxury cars subject to significantly higher taxation.

By the end of 1991 no less than 17,970 units of the first-generation BMW M3 left the Plant, among them 786 Convertibles.

3. The Successor: Six Cylinders for Ongoing Success.



The second generation of the BMW M3 entered the market in 1992 as a brand-new and completely different car.

The new model was based on the highly successful E36 model series coupé, differing from outside only through a number of refinements such as the side-sills completely painted all round and a newly designed front spoiler. The designers had consciously decided against widely flared wheel arches or a wide and extra-large rear spoiler like on the former model, thus clearly stating that the new car was taking on a new position in the market: Instead of an uncompromising sports machine focusing consistently on competition and racing qualities, BMW M GmbH had now created an elegant and discreet coupé featuring an ultra-powerful engine. So the "only" sign of distinction at first sight was the aerodynamic design of the exterior mirrors immediately setting the second generation of the BMW M3 aside from its regular production counterparts.

The "heart" of the new BMW M3: the six-cylinder power unit.

The launch of the new model also marked the beginning of the six-cylinder age with the BMW M3. To generate even more power and torque, the responsible engineers had followed the proven motto that there is "no replacement for displacement", except of course even more displacement. And so the capacity of the new engine was almost one-third greater than on the former model (2,990 cc instead of 2,302 cc).

The new engine was however a truly outstanding performer not only because of its extra capacity, but also and in particular on account of its VANOS (variable camshaft spread) technology, a revolutionary new development by BMW's engine specialists.

VANOS is able to adjust the opening times of the intake valves to engine speed and load, optimising torque, output and fuel consumption in ongoing, steady and consistent process.

Hence, the power and performance data of BMW's new four-valve power unit told a clear story, with the new M3 offering 46 per cent more power than its predecessor, that is with engine output now amounting to 210 kW/286 hp. Maximum torque of 320 Newton-metres or 236 lb-ft at 3,600 rpm, in turn, likewise placed the new power unit of the M3 right at the top in the normal

aspiration segment. Indeed, the six-cylinder offered as much torque just above idle speed – 230 Newton-metres or 169 lb-ft – as the former M3 engine at its highest point.

At the time no other normal-aspiration engine in the world offered the same kind of specific power – 70.2 kW/95.2 hp per litre – and the same specific torque – 107 Newton-metres/79 lb-ft per litre.

As a result of this supreme power, the new coupé accelerated to 100 km/h in just 6.0 seconds and offered a top speed of 250 km/h or 155 mph.

And even this top speed was limited electronically – and not on account of “inadequate” engine power – since BMW had decided voluntarily to apply this limit to all of the Company’s road cars.

The low fuel consumption of BMW’s new supersports was also quite remarkable, remaining at the same level as a “normal” midrange model at the time: 9.1 litres of premium fuel (equal to 31.0 mpg Imp) in the one-third cycle. And this was of course unleaded fuel, since the catalyst had become state-of-the-art technology by the early ’90s.

BMW’s engineers had indeed upgraded the existing catalyst technology specifically for the new engine, developing so-called stereo lambda control in the process, with the fuel/air mixture formation for three cylinders being controlled separately by separate exhaust gas pipes, each with its own lambda probe or oxygen sensor. As a result, the new six-cylinder not only complied with the emission standards required, but even outperformed the emission limits by more than 50 per cent.

Chassis and brakes: adjusted to the engine’s performance data.

Obviously, the far greater engine power of the new model called for an upgraded chassis and suitably enhanced brakes: purist and dynamic, but nevertheless suitable for everyday use, and naturally tailored to the specific requirements of 17-inch series-40 tyres. For despite the extremely wide tyres and low tyre profile, the driver of a BMW M3 nevertheless expected an acceptable standard of driving comfort as well as good directional stability.

Once again, the chassis and suspension featured a single-joint spring strut front axle with reinforced spring plates and stub axles. The central-arm rear axle featured for the first time on the BMW Z1, in turn, served to reduce body squat and dive when accelerating and applying the brakes to a minimum, and was therefore also featured on the new BMW M3. The only modification was on the longitudinal control arms, which had to be reinforced accordingly to match the extra power of the engine.

The dampers and anti-roll bars were likewise significantly firmer, again reflecting on the height of the body, with the BMW M3 being precisely 31 millimetres or 1.22" lower than the BMW 3 Series Coupé.

Superior lateral acceleration clearly showed the supreme interaction of all chassis and suspension components: Under normal circumstances the maximum lateral acceleration possible on a car of this kind was 0.8 g, that is 0.8 times the acceleration of the earth. But the new chassis and suspension of the BMW M3 put through its paces in thorough tests on Nürburgring, just like the former model, was able to withstand lateral forces of up to 1 g, a truly impressive figure.

Where there is a lot of power, that power has to be kept under control. Precisely this is why the new model was equipped from the start with extra-powerful brakes featuring large swing-calliper disc brakes inner-vented both front and rear. ABS anti-lock brake technology already a standard feature at the time in every BMW, had been specifically modified for the outstanding performance of this high-powered sports coupé, enabling the new BMW M3 to decelerate even faster and more smoothly from high speeds than its predecessors, which had already set the standard in this respect: The new model took only 2.8 seconds or 35 metres/115 feet to come to a standstill from a speed of 100 km/h. And it was able to complete the same exercise from 200 km/h or 124 mph in less than 6.0 seconds.

An athlete in everyday clothing: the sports coupé for the road.

Although BMW had developed the new model as the starting point for successful participation in touring car racing, the Company also wished to appeal to the driver attaching great significance in everyday traffic to sporting performance, superior dynamism and, as a result, sheer driving pleasure. And indeed, from the start the new BMW M3 pampered this target group with a standard of everyday driving quality never experienced before, going far beyond the car's straightforward and uncomplicated handling, which as such is one of the basic requirements made of every BMW M3.

One example was the ample space on the rear seats, which was far greater than in the former model. And the driver was even able to take along bulky objects within the interior thanks to through loading from the luggage compartment to the interior of the car.

Given these qualities, it is no surprise that the new BMW M3 immediately won over customers and the media everywhere, filling up BMW's order books and bringing home numerous honours and titles.

As an example, the readers of the German car magazine "sport auto" soon lauded the most agile BMW 3 Series no less than twice in a row as their "Car of the Year", "Auto Plus" in France even praising the BMW M3 as the "Car of the Century". And immediately after the new M3 was introduced in the USA, the editors of "Automobile Magazine" likewise awarded the title "Car of the Year" to the new star in the market, making the BMW M3 the first imported car in the United States ever to receive this award.

Open temptation: the BMW M3 Convertible.

As elegant and beautiful as the BMW M3 Coupé was, demand for a re-make of the BMW M3 Convertible consistently became greater in the course of time. But BMW's Motorsport Subsidiary in the meantime re-named BMW M GmbH had expected this right from the start, thus providing for an open-air version from the beginning during the planning period. Precisely this is why the new open-air BMW M3 based on the four-seater BMW 3 Series Convertible was able to make its debut as early as in 1994, fitted as standard with a power roof and innovative safety technology.

The rollover system introduced by BMW at the time offered all occupants a standard of safety and protection never seen before in an open-air car. In conjunction with the extremely stiff windscreen frame, two rollbars fitted out of sight behind the rear-seat headrests ensured optimum occupant protection in the event of a rollover, sensors monitoring the position of the car and activating the rollbars upon reaching a certain limit, the rollbars then moving up instantaneously under spring pressure, without requiring any pyrotechnical activation.

When production ended in 1999, precisely 12,114 of these extra-safe and extra-fast BMW M3 Convertibles had left the Plant.

A further highlight came in 1994, when the BMW M3 made its debut as a four-door saloon. Indeed, introducing this car BMW fulfilled the wish of many customers for a compact and luxurious saloon with all the DNA of a high-performance sports car. Quite simply, the four-door model was the most successful combination of sporting performance and everyday driving qualities ever to be seen up to that time in the guise of the BMW M3.

This model appealed particularly to customers who regarded the Convertible or Coupé as too purist or, respectively, too sporting. Apart from its performance identical to that of the Coupé, the Saloon excelled in particular through a superior range of interior features with wood trim and nappa leather seats. And production figures spoke for themselves, with no less than 12,435 Saloons being sold up to 1999.

In spring 1995 BMW M GmbH introduced something very special – a small, limited-edition series of the M3, the BMW M3 GT Coupé built for homologation purposes.

On the race track this car was destined to make its appearance in, say, the IMSA GT Series in the USA. But at the same time this special model appealed above all to the enthusiast seeking even more power and performance in his – or her – BMW M3, with the superior output of the engine being increased to an even higher level: In this special version available only in British Racing Green, the upgraded 3.0-litre six-cylinder now developed maximum output of 217 kW/295 hp, accelerating the BMW M3 GT to 100 km/h in 5.9 seconds.

The car was also upgraded in aerodynamic terms, now featuring striking spoilers both front and rear. A special feature was that the driver was able to adjust the front spoiler for angle in the interest of even better aerodynamics.

The BMW M3 GT Coupé also set the benchmark in terms of equipment, two airbags naturally coming as standard, together with sports seats finished in nappa leather and carbonfibre trim within the interior.

Built in small run of just 350 units, this special model retailed in the market at a price of DM 91,000 (German market price).

Entering the scene with double-VANOS: new 3.2-litre engine developing 321 horsepower.

It is a well-known fact of life that even the very best is open to improvement. And so, on 20 July 1995, BMW AG announced that the BMW M3 was becoming even more sporting and dynamic with a new six-cylinder power unit now displacing 3.2 litres and developing maximum output of 236 kW/321 hp at 7,400 rpm. As in the past, the new adjustable intake camshaft served to improve not only engine power and torque, but also idling smoothness and emission management.

Another new feature added for the first time was synchronous management of the exhaust camshaft allowing internal recirculation of exhaust gas within the engine to significantly reduce the emission of nitric oxides – a technology appropriately referred to by BMW as double-VANOS.

Catering for the wish expressed by many BMW M3 customers looking for an additional driving gear, BMW introduced the new model from the start with a new six-speed gearbox. A further highlight was the introduction of compound brakes on the front axle, the combination of an aluminium brake disc carrier and a grey-cast-iron friction ring allowing the brake disc to expand appropriately upon application of the brakes, without any distortion or undue tension.

Shifting gears even faster: the Sequential M Gearbox.

In 1997 BMW M GmbH introduced the Sequential M Gearbox in the BMW M3, making this the first large-scale production car in the world to feature this trendsetting technology. SMG enables the driver to shift gears on one level from front to rear, with electrohydraulic operation of the clutch. The result, first, is an extremely fast gearshift, while, second, it is virtually impossible for the driver to confuse gears and make a mistake in the process of shifting.

While some people were a bit sceptical to begin with, the Sequential M Gearbox soon proved to be a great success – by the end of its production life, nearly every other car in the second generation of the BMW M3 was fitted with a Sequential M Gearbox (SMG).

Entering the 1997 model year, all BMW 3 Series were facelifted, including the various M3 models. Now the BMW kidney grille was even rounder and gave the headlight units even greater significance, while the direction indicators were now housed behind white glass covers.

The BMW M3 again became a sales hit over the years until its end of production in 1999, exceeding sales of the first generation by far: In all, BMW built and sold exactly 71,242 units of the second-generation M3 in the guise of the Coupé, Convertible, and Saloon.

4. Continuing the Success Story: The Third-Generation BMW M3.



The third generation of the BMW M3, this time based on the E46 model series coupé, made its debut in the year 2000. And once again, the third edition of this world-famous sports car from Munich excelled from the start through even more performance, more dynamism and even more unique design, clearly setting this special model apart from the other versions of the BMW 3 Series.

From the very beginning, the first tests published by motor journals clearly proved that the BMW M3 is a particularly powerful sports coupé of the highest calibre, with truly unparalleled performance.

Athletically built, elegant to behold.

In its design, the third-generation BMW M3 again follows in the footsteps of the first generation, albeit without spoilers and striking, extra-wide wheel arches. But thanks to the new front air dam with its integrated foglamps in elliptical design as well as large air intakes, the current M3 clearly stands out from all other versions of the BMW 3 Series.

Made of aluminium, the engine compartment lid is approximately 40 per cent lighter than a comparable lid made of steel plate. And a particular feature is that despite this lower weight, the engine compartment lid offers the same stiffness and crash safety as the steel plate lid on the "basic" Coupé.

A further sign of distinction clearly visible on the engine compartment lid of the BMW M3 again sets the car aside from other models in the BMW 3 Series – the so-called Powerdome. Precisely this is where the new power unit of the BMW M3 offers all its superior features, beneath this slight bulge in the middle of the bonnet.

A feature characteristic of the entire car in its appearance is that no single design element is for show purposes alone. Rather, all modifications versus the series model apply the strict principle of "form follows function", at the same time offering the very best in aesthetic design and cultivated style.

From the side, the body of the BMW M3 including the wheel arches is much wider than that of the "regular" Coupé (up by 20 millimetres or 0.79"). Further highlights to be admired from the side are the intake "gills" and the M3 logo in the front side panels. This wider bodyshell is not just cosmetic, but is rather essential to accommodate the wider track as well as appropriately wide tyres and wheels.

The powerful look created in this way is further underscored by new M exterior mirrors in aspheric design and folding in electrically when required as an option, side-sill covers and, at the rear end of the car, an aerodynamically optimised rear dam complete with a rear spoiler. A double-chamber exhaust system with four tailpipes, finally, clearly reveals the power and performance of this exceptional car.

Engine with even more power thanks to the high-speed concept.

The power unit of the new BMW M3 gives the definition of "turbine-like performance and running smoothness", which for a long time has been the hallmark of BMW's six-cylinders, a completely new meaning. Displacing 3,246 cc, the newly developed engine has carried over the high-speed engine concept already well-known in Formula 1 to series production in the BMW M3. Now, with the engine revving at 8,000 rpm, the pistons run at a speed of more than 20 metres or 66 feet a second, almost as fast as the pistons on a Formula 1 power unit.

Indeed, no other engine in the market – and no other car – is able to offer this kind of power and performance: Maximum output of 252 kW/343 hp accelerates this 1,570 kg/3,462 lb sports car from a standstill to 100 km/h in just 5.2 seconds. Supreme efficiency at all engine speeds and under all loads, in turn, guarantees efficient fuel consumption under all practical driving conditions as well as a low level of emissions.

Ongoing development of the high-speed concept was however only one reason for developing this new engine, since the engineers at BMW M GmbH were required to fulfil a whole list of demands in creating the new engine: Lower weight, more torque and extra power as well as a wide range of useful engine speeds were just as important as an engine suitable for reliable use the world over. Particularly this final point was indeed a great challenge to BMW's engineers, since the engine was required from the start to comply with all legal requirements in terms of emission and noise control either currently in force or coming into force in the many countries in which the BMW M3 is sold.

With this high-performance engine boasting the most outstanding features and data, the development team was hardly able to use any of the regular series production parts as was still possible with the first generation of the BMW M3 back in 1985. So the only components they were able to carry over to the new M3 without modification were the oil sump gasket, the tightening cylinder for the ancillary unit belt drive, the rear crankshaft cover together with its seal, as well as the oil pressure and water temperature sensors. And the only features the new engine shares in common with the former power unit are its dimensions and the quasi-dry sump system.

Thanks to the skills of BMW's engineers, the new power unit meets all these – and other – requirements. Compared with the – already light – former engine, BMW's engine specialists have indeed succeeded in reducing the weight of the engine by another 6 per cent. And at the same time they have moved the engine's centre of gravity down even further in the interest of enhanced driving dynamics.

On account of the higher engine speed and more complex function data, the engineers at BMW M GmbH also had to develop a new engine control system: MSS 54. As on the previous engine, this multi-processor system masterminds two 32-bit micro-controllers and two timing co-processors, now however operating at an even higher cycle frequency.

In all, the computer power of the new control unit is now 25 million instructions per second (MIPS). And just how important and complex the functions of this new unit are for the entire operation of the engine as such is clearly borne out by the various processes covered by the multi-processor system, which supervises the angle spread on the intake and exhaust camshafts (double-VANOS) as well as the oil level, masterminds the electronic immobiliser, and controls the electronic throttle butterflies. Working individually for each cylinder, the control unit furthermore calculates the ignition timing, the volume of fuel injected and the injection time individually for each operating cycle as a function of engine load and speed. And last but not least, the control unit provides information for service and maintenance via an elaborate and sophisticated diagnostic system.

Perfect engine management based on an in-house development.

Cylinder-specific, adaptive knock control receives the knock signal via three body sound sensors, with each sensor monitoring two cylinders. The signal is adapted for each cylinder by a standardisation process geared to the respective operating point, allowing the system to program the best and most appropriate ignition timing throughout the entire ignition angle control map. Operating a switch on the dashboard, the driver of the BMW M3 is then able to activate a more sporting, that is a more progressive control line modifying accelerator travel and the throttle butterfly opening.

Electronic throttle butterfly control is now based on instant commands, with the driver's request for power being measured via the potentiometer on the gas pedal and converted into a desired signal and power level. This wish for power is then corrected by the power manager taking the power requirements of the ancillary drive units into account as well as the maximum and minimum power required for Dynamic Stability Control (DSC) and Engine Drag Force Control (EDFC).

The target power level calculated in this way is then set within the system, taking the current ignition angle into account. In practice, what this means for the driver is that the engine virtually “reads” his style of motoring from the position of his foot on the accelerator, providing the power required quickly and efficiently.

Optimum gas charge cycle ensured by variable camshaft spread.

Variable camshaft spread on the intake and outlet camshafts (double-VANOS), which made its world premiere in its first version in the 1992 BMW M3, ensures an optimum gas charge cycle also in the engine of the current BMW M3. On the road, this means more power, greater fuel economy, and low exhaust emissions.

Through its principle alone, VANOS technology allows appropriate management of the engine at all times. The sprocket wheel connected with the crankshaft by a duplex chain is linked to the camshaft by a spirally-toothed shaft adjustable along its axis. Such an axial shift on the shaft, on account of the spiral gearing, generates a radial, relative movement between the camshaft and the sprocket, with the spread angle on the intake camshaft being varied as a result by 60° and the angle on the outlet camshaft by 46°.

Axial adjustment of the toothed shaft is provided by an adjuster piston.

Engine oil is pre-compressed up to an operating pressure of 115 bar by a radial piston pump integrated in the VANOS housing. Map-controlled high-pressure adjustment, in turn, guarantees short adjustment times and therefore provides the optimum spread angle for each operating point depending on load and engine speed and synchronised to the ignition timing and injection volume.

One engine for all countries.

The newly developed straight-six displacing 3,246 cc is the first power unit suitable for all countries and national specifications. However, as opposed to the 252 kW/343 hp ECE version, the power unit is throttled on the US version of the BMW M3 to reduced output of 333 SAE-hp (249 kW/338 DIN-hp).

This means that with an increase in engine capacity by only 1.4 per cent over the former model, maximum output is up by 6.9 and maximum torque by 4.3 per cent.

This increase in power and torque is a direct result of the high-speed engine concept, consistent control of the charge cycle and minimisation of friction effects increasing the engine's specific output from 100 to almost 106 hp per litre.

Despite its high maximum running speeds, the engine offers a large useful speed range, developing 80 per cent of its maximum torque at just 2,000 rpm. No surprise, therefore, that this power unit thrilled specialists and car journalists right from the start, winning the coveted “Engine of the Year” trophy, a really outstanding award, six times in a row from 2001–2006.

Exceptional technology for an exceptional car.

On account of the high standard of performance the current BMW M3 offers whenever required, numerous systems within the car had to be configured more elaborately and with greater attention to detail than in a “regular” road car. One of these special features is the supply of lubricant to the engine by quasi-dry sump lubrication: Due to the specific arrangement of the sump and the engine tilted to the right at an angle of 30°, the engine oil would be unable to flow back to a “normal” sump under high lateral acceleration in a left-hand bend and when applying the brakes all-out. Hence, the engineers working on the power unit connected the compressed oil pump with a reflow pump extracting oil on the right side from the small oil sump at the front and delivering the oil to the large oil sump at the rear. For all practical purposes, this completely closes the rear oil sump, with the reflow openings and compressed oil pump extraction point being precisely tailored to the acceleration forces prevailing in a car of this calibre.

Even faster than the engine: the chassis and suspension.

The engineers responsible for developing the current BMW M3 gave particular attention from the start to the chassis and suspension. Following the philosophy that “the chassis must always be faster than the engine”, they demanded the utmost of the chassis and suspension technology, a task obviously giving the suspension engineers a significant challenge considering the high-speed concept and outstanding performance of the M3 power unit.

However, they were able to set out from an excellent foundation right from the beginning, with the chassis and suspension of the third-generation BMW M3 being a consistent development of the former chassis. And the chassis on the second-generation is still acknowledged to this day as the benchmark in the sports car segment, being lauded by the experts of US magazine “Car and Driver”, for example, as the “Best Handling Car”.

The extra-stiff bodyshell of the BMW 3 Series Coupé, the large share of lightweight aluminium axle components, and well-balanced front-to-rear weight distribution of almost 50 : 50 were indeed ideal prerequisites for ensuring unfiltered driving pleasure with BMW standard drive feeding power to the rear wheels. And despite the somewhat larger dimensions of the new model, the chassis and suspension engineers succeeded in even outperforming the predecessor’s handling qualities while at the same time maintaining a high standard of everyday practical use.

DSC and the M Differential Lock for extra traction.

Introducing the third generation of the BMW M3, BMW M GmbH also made DSC Dynamic Stability Control a standard feature of the car. Hence, wheels spinning on a wet road or in snow are now a thing of the past once and for all.

The engineers responsible for the new BMW M3 were however not able to simply take over the DSC system incorporated in the “regular” 3 Series, but rather had to modify the system on account of the enormous power and performance offered by the BMW M3. Particularly the immediate response of the BMW M3 power unit and the short final drive ratio call for numerous changes in the system.

From the beginning, differential locks on the rear wheels have been a standard feature on all BMW M Cars. And now, introducing the third generation of the M3, the engineers replaced the former torque-sensing self-locking differential with 25 per cent locking action by an all-new development providing a variable locking effect between 0 and 100 per cent.

Bearing the name Variable M Differential Lock, this new system is able to offer a decisive improvement of traction even in the most demanding situations, with the drive wheels running on a surface with different frictional coefficients. So in combination with DSC Dynamic Stability Control, the BMW M3 now offers driving qualities also in winter previously regarded as quite impossible on a sports car with rear-wheel drive.

High-performance brakes and M Power.

Wherever there is a lot of power from the engine, you also need a lot of brake power. Precisely with this in mind the BMW M3 was equipped from the start with an extra-large high-performance brake system featuring compound brakes in floating arrangement. In this case the inner-vented friction ring on the brake disc is connected in floating configuration with the aluminium brake cage by way of stainless-steel pins cast into the brake unit.

The result is a considerable reduction of thermal forces acting on the brake disc, with an appropriate increase in service life. Perforation of the friction ring serves to additionally reduce the weight of the brake discs by 0.7 kilos on each front wheel and 0.8 kilos on each rear wheel in comparison with conventional, single-piece brake discs.

Thanks to large, cross-drilled grey cast iron brake discs (diameter/thickness at the front: 325/28 millimetres (12.80/1.10‘‘), at the rear: 326/20 millimetres (12.83/0.79‘‘), stopping forces are really remarkable: Assisted by a 9-/10-inch tandem booster, the BMW M3 achieves deceleration of approximately

11 metres/sec², with a stopping distance of just 35 metres or 115 feet from a speed of 100 km/h. So when it comes to brake performance, the BMW M3 once again compares very favourably with even the most thoroughbred sports cars.

More than “just” one BMW M3 in the range.

A year after introducing the BMW M3 Coupé, BMW M GmbH proudly presented the Convertible version of the M3 based on the E46 model series in 2001. While identical with the fixed-roof coupé all the way back to the A-pillar, the Convertible is nevertheless a very unique car, the striking waistline and the special character of an open-air sports car giving the Convertible an even wider and more powerful look. In all, therefore, the BMW M3 Convertible looks even more muscular and lower than its fixed-roof counterpart with which it naturally shares all technical highlights and refinements.

In autumn 2001 BMW nevertheless proved that even this exclusive standard can be enhanced to an even higher level: Presenting the BMW M3 GTR, the Company proudly launched an upgraded road-going version of the BMW M3 destined to proceed from one victory to the next in the American Le Mans Series (ALMS). So as of February 2002, the road-going version of this very special model, with engine power cut back from 330 kW/460 hp to 258 kW/350 hp, was available at a price of approximately Euro 250,000.

In technical terms the road model was related very closely to the racing version, a V8-high performance power unit with dry sump lubrication generating supreme power within the engine compartment featuring additional cooling slits. Other special features were the six-speed manual gearbox as well as a double-plate clutch again typical of a racing car.

The body was also similar to the racing version, with the roof, the rear wing as well as the front and rear air dams being made of carbonfibre-reinforced plastic in the interest of minimum weight.

The 110 per cent car.

In 2003 BMW introduced the series version of the Concept Car which had already hit the headlines at the 2001 Frankfurt Motor Show – the BMW M3 CSL, an abbreviation standing for “Coupé, Sports, Lightweight”.

Indeed, this BMW tradition goes all the way back to the '30s of the former century, when the legendary 328 Mille Miglia Touring Coupé first saw the light of day. This time, however, BMW's engineers interpreted the old theme in a new way, focusing not on the radical reduction of weight simply by removing individual components, but rather on intelligent lightweight engineering, that

is the reduction of weight by using the best and most appropriate materials at the right point. Accordingly, BMW's experts succeeded in reducing the weight of the BMW M3 by more than 110 kilos or 243 lb, with the CSL version weighing in at just 1,385 kg or 3,054 lb.

The power unit was also upgraded, now developing maximum output in this specific model of 265 kW or 360 hp. The result was a power-to-weight ratio of just 3.85 kg per horsepower, a truly sensational figure making the BMW M3 CSL even more agile and dynamic than the "regular" BMW M3. As a result, the M3 CSL accelerates to 100 km/h in just 4.9 seconds and reaches 200 km/h in an equally astounding 16.8 seconds. Top speed, in turn, is limited electronically to 250 km/h or 155 mph.

The – lucky – driver of the BMW M3 CSL benefits from further technical assistance and enhancement systems featured as standard on this unique car: BMW's Sequential M Gearbox complete with Drivelogic and the M Track Mode. This special transmission ensures a very fast gearshift within just 0.08 seconds, like in a Formula 1 racing car, by means of paddles on the steering wheel. And like on the BMW M3 equipped with SMG, Launch Control integrated in the system enables the BMW M3 CSL to accelerate from a standstill all the way to top speed, without the driver having to shift gears or watch out for engine speed limits.

Introducing the M Track Mode, BMW M GmbH added a special DSC mode carried over from motorsport as yet another highlight in the BMW M3 CSL: Now, optical indicators in the dashboard enable the driver on the race track to make maximum use of the car's longitudinal and lateral acceleration within its physical limits, with DSC intervening only when the driver reaches the absolute extreme.

Further improvement of the "basic" model.

Entering the year 2005, BMW introduced a very special feature for the M3: the Competition Package. At a price of Euro 5,300, the really discerning costumer ordering a new car was now able to choose this special feature giving the BMW M3 even more direct and sporting handling. The Package includes 19-inch wheels in the same styling as the rims on the BMW M3 CSL and fitted complete with Sports Cup tyres. In conjunction with the chassis and suspension optimised all round and the even more direct steering (with a transmission ratio of 14.5 : 1 instead of 15.4 : 1), this gives the car an even higher standard of all-round agility and performance on the road.

Benefiting from this special package, the driver of the “basic” BMW M3 was also able to enjoy the advantages of the M Track Mode carried over from the BMW M3 CSL. Brakes likewise coming from the BMW M3 CSL are naturally also included in the Package, to ensure appropriate stopping power with very short stopping distances at all times.

Given all these qualities, the third generation BMW M3 is just as popular among customers the world over as its predecessors. This explains why no less than 85,139 units were delivered to customers by summer 2006, among them no less than 29,633 Convertibles.

5. The BMW M3 – a Spearhead in Innovation.



Clearly, an exceptional car deserves exceptional technology – which is precisely why new technologies and innovations have been developed time and again for the BMW M3 over a period of 20 years, enabling this unique car at all times to maintain its leadership in the area of driving dynamics.

In this process of development the BMW M3 has served consistently as both a pioneer and pacemaker. Indeed, many of the innovations featured for the first time in the BMW M3 now help to improve driving dynamics and motoring comfort also in regular production cars. And so the history of the BMW M3 is full of milestones and benchmarks in technology.

The Sequential M Gearbox: shifting gears like in Formula 1.

The conventional shift lever has been a thing of the past for a long time now in the highest realms of motorsport – instead, today's Formula 1 driver shifts gears by means of paddles on the steering wheel, keeping his foot fully on the gas pedal in the process. To make this possible, the most advanced engine electronics interrupt the flow of power from the engine for milliseconds, and the control unit shifts gears electrohydraulically, opening and closing the clutch at the same time. As a result, there is no need for a clutch pedal any more, which has therefore become superfluous.

BMW introduced the first version of this system now featured as state-of-the-art technology in Formula 1, in its successful touring cars for the race track as far back as in 1996, becoming the first manufacturer worldwide to use this technology. At the time still incorporating a stickshift in the middle, the initial system served to shift gears on one level in a sequential process like on a motorcycle. To shift up, the driver simply pulled the shift lever back without operating a clutch, to shift down he pressed the lever to the front.

The advantage offered by the system was an extremely fast gearshift and absolute reliability in use, without the risk of shifting to the wrong gear.

Gaining more and more experience in motorsport, BMW then carried over this technology to its road-going cars, introducing the Sequential M Gearbox on the BMW M3 in 1997. The second generation of SMG now significantly enhanced over the first version is identical in technical terms with the regular manual gearbox on the BMW M3, six forward gears giving the driver absolute freedom in choosing the type of gearshift he prefers. Particularly the process of shifting gears by means of paddles contributes to the driver's active safety on the road, enabling him to keep his hands on the steering wheel at all times.

Benefiting from M Drivelogic, the driver of the BMW M3 is also able to adjust gearshift dynamics in the manual mode to his personal style of motoring by means of six different programs ranging from smooth but dynamic (Driving Program S1) all the way to ultra-powerful and sporting (Driving Program S5). And then there is also Driving Program S6 activated whenever DSC Dynamic Stability Control featured as standard in the BMW M3 is switched off, SMG then shifting gears just as fast as in a racing car.

The new Sequential M Gearbox also offers significant benefits in terms of safety: In a critical driving situation, for example when shifting back on a slippery surface, SMG immediately opens up the clutch within fractions of a second, preventing the car from swerving out of control as a result of excessive engine forces acting on the drive wheels. A further point is that the driver is no longer able to make a mistake when shifting gears. Hence, SMG contributes not only to extra sportiness on the road, but also to greater safety in everyday traffic.

The Variable M Differential Lock: taking bends in sporting and safe style.

Originally, BMW M Cars were fitted with a torque-sensing self-locking differential for locking action of up to 25 per cent and a consistent basic setting. Their purpose was to limit the effect of the final drive differential in the interest of optimum traction at all times. With the two drive wheels of a car covering different distances in a bend – the inner wheel obviously not travelling as far as the outer wheel – the final drive serves to compensate and set off this fundamental difference.

A differential lock, in turn, builds up locking action whenever required, for example when one of the two drive wheels threatens to spin, for example on a slippery surface. This advantage is appreciated particularly by the sporting and dynamic driver, since it helps to enhance the positive qualities of rear-wheel drive particularly when the driver prefers a sporting style of motoring and on surfaces with an above-average frictional coefficient.

A torque-sensing differential lock sets the overall torque the wheels are able to convey to the road according to the force the wheel with the lower frictional coefficient is able to transmit. But if the wheels are running on a surface with a very low frictional coefficient, for example on snow, gravel or even polished ice, the traction benefits offered by such a conventional differential concept are limited due to the very low cut-off force of the differential.

Precisely with this in mind, the engineers at BMW M GmbH have developed a brand-new system, the Variable M Differential Lock featured for the first time in the third-generation BMW M3. This lock is in a position to offer crucial advantages in terms of traction even in the most difficult and demanding situations, that is with the drive wheels running on surfaces with an extreme difference in their frictional coefficient.

Accordingly, the Variable M Differential Lock enables the current BMW M3, in combination with fine tuning of DSC Dynamic Stability Control and the car's well-balanced axle load distribution, to offer winter driving qualities previously regarded as quite impossible on a sports car with rear-wheel drive.

A further advantage of the Variable M Differential Lock is that it builds up growing locking action as a function of the increasing difference in speed between the drive wheels. Hence, a wheel "relieved" of its load, for instance the inner wheel on a fast mountain pass, is now longer able to completely interrupt the flow of drive power, with appropriate torque and power thus being maintained at all times.

Intelligent lightweight technology not only on the BMW M3 CSL.

Even a car with the power and performance of the BMW M3 offers an even greater potential for dynamic motoring through the reduction of weight. While the conventional method in reducing weight was simply to remove comfort features and all kinds of luxury appointments from the interior of a sports car, the modern engineer opts for a different solution, using modern materials such as carbonfibre-reinforced plastics (CFP), glass-fibre plastics carried over from aerospace or aluminium to save some kilos here and a few pounds there.

Introducing the BMW M3 CSL, the engineers at BMW M GmbH clearly proved their leadership in the area of intelligent lightweight technology, with the complete roof of the car being made of several layers of CFP at BMW's Plant Landshut, the home of BMW's lightweight experts. At the same time these experts have also looked at parts and components normally regarded as relatively insignificant on the body, replacing the conventional floor of the luggage compartment, for example, by a paper honeycomb sandwich structure.

VANOS: intelligent camshaft adjustment for extra torque.

Entering the market in 1992, the second-generation BMW M3 featured no less than two outstanding premieres within its engine compartment: First, this was the first BMW M3 with a six-cylinder power unit; second, this was the first BMW power unit to feature VANOS variable camshaft spread, a system infinitely adjusting the spread angle of the intake and outlet camshafts.

The big advantage of this innovation was the adjustment of the intake valve opening times to engine speed and load, optimising torque, engine power and fuel consumption all at the same time. And so, developing maximum torque of 320 Newton-metres or 236 lb-ft at 3,600 rpm, the new power unit in the BMW M3 immediately became the leader in the naturally-aspirated segment: No other normal aspiration engine at the time provided the same output (96 hp) and the same torque (108 Newton-metres/80 lb-ft) per litre.

Digital Motor Electronics (DME).

Introduction of an engine management system able to outperform the capacity of the units available at the time was essential for appropriate control and management of a high-performance power unit like in the BMW M3. So BMW developed DME Digital Motor Electronics especially for its gasoline-engine models, a system monitoring and controlling all engine functions such as the ignition, fuel injection and oxygen sensor control with extreme precision. The result was optimum power on minimum fuel and clean exhaust emissions under all running conditions.

Stereo lambda control.

The lambda probe or oxygen sensor on cars with a controlled catalyst ensures that the fuel/air mixture in the cylinders remains at the level of lambda = 1 required for optimum efficiency of the catalyst at all times. Focusing on the BMW M3, BMW's engineers then developed the existing system of lambda control to an even higher standard, adjusting it to the two-chamber exhaust manifold in this outstanding sports car. Hence, each exhaust pipe came with its own lambda probe monitoring the composition of exhaust gases with even greater precision and, as a result, reducing emissions even further.



6. The BMW M3 Models.

BMW M3 (E30):

BMW M3 (144 kW/195 hp)
BMW M3 (159 kW/215 hp)
BMW M3 Evolution (147 kW/200 hp)
BMW M3 Evolution II (162 kW/220 hp)
BMW M3 Convertible (159 kW/215 hp)
BMW M3 Sports Evolution (175 kW/238 hp)

BMW M3 (E36):

BMW M3 (210 kW/286 hp)
BMW M3 (236 kW/321 hp)
BMW M3 Convertible (236 kW/321 hp)
BMW M3 Saloon (236 kW/321 hp)
BMW M3 GT Coupé (217 kW/295 hp)

BMW M3 (E46):

BMW M3 (252 kW/343 hp)
BMW M3 Convertible (252 kW/343 hp)
BMW M3 GTR (258 kW/350 hp)
BMW M3 CSL (265 kW/360 hp)