

## **The BMW Z8:**

### **A Dream Car with Technical Innovations of the Future**

“If I were to design the 507 today, it would look like the Z8” . This is the statement of a man who should know what he is saying – and at the same time it is a compliment to BMW's design team under the guidance of Christopher Bangle. For the man waxing this kind of lyrical is Albrecht Graf von Goertz, the stylist who once designed the beautiful body of the BMW 507.

When Graf von Goertz unveiled his open two-seater sports car for the first time in New York in 1955, presenting the BMW 507 to the world, he revealed not only a new car, but also a new dimension in beautiful design. So it is no surprise that the rich and the beautiful of the day simply had to have this new car from Munich – and this was at a time when BMW was focusing primarily on motorcycles and small cars.

Exactly 252 units of the BMW 507 left the plant, all of them dream cars in every respect. The concept to place a 150-bhp 3.2-litre V8 within a light aluminium body was both exciting and practical. Just consider that back in the mid-50s only very few road cars were able to reach a top speed of 200 km/h or 125 mph – the top speed offered by that unique BMW 507. And the number of sports cars able to give you a comparable thrill of open-air motoring was also very limited (not to mention the number of cars offering the same kind of muscular sound).

## **Reinstating a classic**

BMW is now reinstating this classic, bringing the same concept back to life – the new Z8 sports car is a modern interpretation of the BMW 507: breathtakingly beautiful, classic in its proportions, offering the very best technology available in modern automobile production. This open two-seater, a dream car far beyond the constraints of fashion and fleeting trends, thus meets the highest standard. It is a truly exceptional automobile for the aficionado, the product of the passionate enthusiasm of dedicated designers and engineers.

The almost endlessly long engine bay of the BMW Z8, its extra-large wheels and the air scoops at the side are reminiscent of the car's legendary predecessor. Indeed, this homage in the guise of the Z8 also has an “ideal figure” – 4.40 metros long, 1.83 metros wide, and just 1.31 metros high.

First presented as the Z07 concept model, this new BMW sports car already thrilled visitors to the 1997 Tokyo Motor Show and the 1998 Detroit Auto Show, its beautiful lines even proving back then that it was the product of experts given free rein in creating an emotional masterpiece on four wheels.

## **The Z8 comes with all the ingredients of a classic roadster**

The result of this design and development process is a classic sports car of unique charm: supple and muscular, sophisticated and outstanding. In its basic design it follows the typical philosophy of a roadster, with a long front end, short overhangs, and a relatively small but luxurious cockpit. The soft, flowing lines of the wheel arches extend back along the wide doors all the way to the short, dynamic rear end. Air scoops at the side between the front wheel cut-out and the door take up one of BMW's wonderful roadster traditions.

The “face” of the Z8 is BMW through and through: The wide kidney grille as well as small, round xenon headlights behind glass covers, essential to good illumination and clarity on the road, again underline traditional features of the BMW marque. But the Z8 also comes with innovations such as neon light technology used in the direction indicators, the rear and brake lights. Introducing this new kind of illumination and light technology – the advantages being a far quicker response time, greater freedom in design, and not least a much longer service life – BMW is once again proving its leadership in modern automotive engineering.

The rear end with its body lines slowly moving down to the bottom, the aerodynamic diffuser and two polished steel tailpipes, is equally impressive. The rear lid opens both by remote control through a button in the key to the car and by means of a switch in the A-pillar. The luggage compartment is big enough for a short trip for two, accommodating either a medium-sized suitcase or two golf bags.

Should the driver prefer a firm roof over his head, for example in winter, instead of the semi-automatic soft roof with its power-assisted closing mechanism helping him pull the roof into position, he can naturally fit the hardtop provided as standard, turning his open Z8 sports car into a coupé with a heated rear window – and in the process changing the design and style of the car into that of an equally outstanding fixed-head coupé.

### **Greater body stiffness thanks to aluminium spaceframe technology**

The progressive body structure of the Z8 is at least as exciting as its external design. For the Z8 comes with a monocoque aluminium spaceframe, meaning that the beautiful lines of the car are built in a similar technology to a timber-

frame house – with high-strength aluminium panels, naturally very light and resistant to corrosion, filling the gaps between the extra-large extrusion-pressed profiles forming the car's stable “skeleton”. On top comes the stylish skin of the car, each panel and component bolted on for easy removal and exchange.

This concept combines optimum weight with a standard of body stiffness unparalleled by any other open sports car in this category. The result for the driver is a truly outstanding, very direct feeling of motoring, naturally without the vibration or body “shake” so typical of an open car.

This aluminium technology also offers the owner of a BMW Z8 lasting body value and quality for a long time, since this elaborate material cannot rust. The side-sill covers as well as the front and rear bumpers are made of impact-proof polyurethane, accommodating the radio, navigation and telephone aerials and deforming smoothly and without damage in impacts up to a speed of 4 km/h.

A glimpse within the engine bay of the BMW Z8 confirms what the onlooker will already assume (or perhaps already hears) from outside – this is where the power is. The BMW Z8 is driven by a high-performance 5.0-litre V8 sports engine. Also characterised by its fascinating sound, this power unit designed and built for two different car concepts, the BMW M5 and the BMW Z8, develops a shattering 400 bhp (294 kW) at 6600 rpm, plus equally impressive maximum torque of 500 Nm (369 lb-ft) at 3800 rpm.

## **Staggering performance from five litres engine capacity**

Variable camshaft adjustment (double-VANOS) carried over from BMW's M models as well as an intake system with electronically controlled individual throttle butterflies ensure superior torque even at low and medium engine speeds and guarantee not only a spontaneous response to the gas pedal, but also optimum combustion with minimum emissions. Further high-tech features of this exceptional four-valve power unit are the oil supply controlled by centrifugal forces, the crossflow cooling system, and an oil/water heat exchanger. The engine "brain" is an in-house BMW development able to execute more than one million commands in one single second – a technical dimension comparable to Formula 1.

In the interest of optimum traction in virtually every situation, this impressive muscle machine is positioned far behind the front axle of the car (in front mid-engine configuration), thus providing an optimum 50:50 weight balance between the front and rear axle. Together with the sports-tuned DSC (Dynamic Stability Control) III anti-spin control system and engine drag force control, this enables the driver to convey all of the 400 bhp smoothly, safely and efficiently on to the road.

Using a very precise, reinforced six-speed gearbox with short shift travel and a self-adjusting single-plate dry clutch ensuring short pedal travel and pedal forces remaining consistent throughout the car's service life, the driver of a Z8 can dose the outstanding power of the V8 power unit with optimum precision. The truly breathtaking power and thrust of the engine then flows on effortlessly to the rear wheels through propeller and drive shafts optimised for minimum weight and maximum strength.

Shifting the gears smoothly and crisply, the driver can accelerate his BMW Z8 to 100 km/h in just 4.7 seconds, then reaching one kilometre after 23.4 seconds, and leaping in just 4.3 seconds from 80 to 120 km/h (50-75 mph) in 4<sup>th</sup> gear. This ongoing thrust driving the 1660-kg (EU standard) BMW Z8 forward, does not end until reaching the car's top speed of 250 km/h or 155 mph, when the electronic control cuts in to gently restrict the car's speed to this sensible limit.

### **Aluminium also on the suspension**

The only way to properly and sensibly convey the outstanding power of the engine to the road is through the modern chassis and suspension of the BMW Z8. Based on an all-aluminium front axle, a spring strut configuration with the track control arm at the bottom, tie-rods and rack-and-pinion steering, plus the integral four-arm rear axle, the suspension rests on 18-inch aluminium wheels with five double spokes (8-inch wheels at the front, 9-inch wheels at the rear). Through their low weight alone, these wheels obviously keep the car's unsprung masses to a minimum.

Specially developed run-flat tires measuring 245/45 R 18 96 W at the front and 275/40 R 18 99 W at the rear ensure safe roadholding at all times. Thanks to their run-flat qualities, these tires are able to take the driver of a Z8 up to a maximum distance of 500 km or 300 miles at a top speed of 80 km/h even after a puncture or tire defect. So clearly there is no need for a spare wheel.

## **Safety tires come as standard on the BMW Z8**

These new wheels accommodate high-performance disc brakes inner-vented front and rear for impressive deceleration and stopping power. Under optimum conditions, therefore, the Z8 travelling at 100 km/h takes only 2.5 seconds or approximately 35 metros to come to a complete standstill. And it goes without saying that the brake system, like on all BMWs, comes as standard with suitably modified ABS anti-lock brakes as well as CBC (Cornering Brake Control) for safe application of the brakes even in a bend.

The Z8 features a sporting, direct, power-assisted rack-and-pinion steering responding precisely to the driver's commands in every change of direction.

BMW's engineers have also given great attention to the need for safety in the BMW Z8. Apart from the superior crash safety offered by the aluminium body, the Z8 gives its driver and passenger the superior protection of an advanced airbag system. The driver is protected by a side airbag in the door and a US-standard airbag in the uniquely designed three-spoke leather steering wheel (an airbag inflating to a varying volume thanks to its two-stage gas generator, depending on the intensity of a collision).

The passenger is protected by an airbag in the instrument panel and an additional airbag in the door. And the BMW Z8 also comes as standard with a leather-covered rollover safety system supplementing the reinforced windscreen frame should the worst ever come to the worst.

The driver and passenger enjoying the BMW Z8 are not only kept very safe, but also in very exclusive and comfortable surroundings. For they are cocooned by the most sophisticated, high-quality leather, enjoying a cockpit made up of

painted and leather-covered surfaces in conjunction with the levers and switches made of aluminium.

Six exterior and four interior colours meet virtually every taste, especially as the particular atmosphere inside the BMW Z8 may be personalised in virtually every manner. And every effort has been made to give the driver and his passenger that proverbial sheer driving pleasure BMW-style: Both occupants will find their perfect seating position on electrically adjustable sports seats with seat heating, also enjoying adjustable headrests, seat belts with automatic belt tighteners and belt force limiters in the interest of optimum safety, as well as a steering column with power adjustment for reach. The side windows are power-operated, air conditioning fitted as standard ensures the right temperature at all times.

### **Another very special touch – instruments and controls in the middle**

Once the driver has electrically adjusted the heated and chrome-plated exterior mirrors and deactivated the electronic immobiliser with his key to the car, all he has to do is press down the clutch pedal and press the starter button to bring the high-performance V8 power unit to life. The steering lock itself is separated from the starter button and is deactivated by turning the key in the ignition lock.

Instruments in the middle provide information quickly and accurately on the car's primary functions – road speed, engine speed, fuel level, and coolant temperature. Further displays in the instrument cluster then inform the driver of the time of day and the mileage he has covered. Clearly, the positioning of the instruments in the middle of the car provides a direct, unobstructed view of the road ahead.



Yet another special feature of the BMW Z8 is the Multi-Information Radio (MIR). Since particularly the driver of a powerful sports car must be able to concentrate entirely on the actual process of driving and not on other functions such as finding the right road, BMW's development engineers responsible for the Z8 have created a system using one single control unit operating the radio functions – a special top-end HiFi system with a 6-CD changer, 250 W amplifier and 10 loudspeakers – as well as the satellite-based GPS navigation system and the mobile phone all housed in the centre console.

Other standard features are the alarm system with radio remote control, central locking, cruise control and – very practical in the cold season – a heated wind-screen wiper rest position.

In all, the BMW Z8 is an attractive driving machine created not merely to move people and their baggage – but also to move emotions. The BMW Z8 therefore focuses on sheer driving pleasure at its best, particularly with the roof down in beautiful weather. Introducing its own unique concept, the BMW Z8 ranks high in the super sports car league. And built in an exclusive, small series in Dingolfing and Munich, the Z8 is truly a unique driving machine for the genuine connoisseur, a car that makes automotive dreams come true.

## **The Design of the BMW Z8**

- Some Reflections on Retro Styling
- The BMW 507 as the Classic Role Model
- The Car and Driver Relationship

Is the Z8 a retro-styled car? “Of course”, says Christopher Bangle, BMW's Chief Designer, expressing a clear view on the latest sports car from Munich. But he is equally convinced that there is nothing negative about retro: “The classic BMW 507 built in the '50s was our reference car, a very special car by all means. And since there is only one 507 in the history of the automobile, built just 252 times, the Z8 is most definitely a retro car. But it is a retro car full of romantic passion.”

BMW has invested a lot of passion and money in pure emotion, focusing quite deliberately on a classic line. Since, in the words of Chris Bangle, “only a car maker with genuine history can create such an homage to a classic heritage model”, retro is not the slightest problem. “You can watch Shakespeare or listen to Beethoven over and over again – but each time their work is interpreted by a new artist”. This is how Bangle describes the whole issue in clear and straightforward terms.

### **The Z8 also comes with a touch of romantic passion**

Graf von Goertz' statement that if he were asked to design the 507 of the year 2000 he would make it exactly like the Z8, beautifully confirms Bangle's theory. Even though the Z8, despite being a dream come true, is the product of an almost “unreal” development process.

“Just looking at those beautiful, classic lines, I get that feeling of romantic passion”, says Bangle with reference to the proportions of the Z8 he regards as almost “erotic”. “This body built in BMW's high-end technology using the most sophisticated aluminium spaceframe represents the ultimate standard of fascinating motoring: A classic roadster – and the Z8 is indeed a classic roadster in every respect – simply has to have a long engine bay, body lines swinging down at the sides from door level, a sexy “derriere” and big wheels”, states BMW's Chief Designer in describing the philosophy of the Z8.

Chris is convinced that this kind of car simply has to embody the power of a muscle, the accentuation of its curved and carved lines being tremendously important. And this power must be displayed clearly and visibly: “That's why we deliberately show the world those 400 horses, the large tailpipes and wide tires clearly telling the world what kind of car this is. Even the sound of the engine must match the car's design, giving you goose-bumps all over.”

Chris does not see any styling alternatives to the design chosen, a point which he makes very clear: “Should we have given this car a seemingly progressive wedge shape?” No, the decision was intentionally in favour of retro design following the example of a classic predecessor. Especially as “this has become an animal of a car beyond the usual constraints of time!” The best perspective, says Chris, is to see the shape and body surfaces of the Z8 in the truest sense of the word, for example when washing the car by hand: “Those round shapes are simply sexy!”

## **The relationship of man and machine**

Then there are also the “gills” at the side, air scoops again reminiscent of the legendary BMW 507. Details of this calibre are part and parcel of the intellectual character of the car, contributing significantly to its emotional success. Indeed, these are precisely the features the admirer gazing at the modern Z8 would expect, anyway.

But not only the design of the Z8's fascinating body is exactly right the way it is; the interior is also appropriate in every respect, fulfilling its own special function. “This cockpit intentionally reduced to the essential is meant to create a very special relationship between the driver and the car”, states Chris in defining the objective in creating the BMW Z8: “Our job was to make you literally feel typical BMW features in this interaction of sportiness and space”.

In practice this means the combination of almost anachronistic design, for example on the multi-spoke steering wheel, with modern technology such as the multi-information radio. And Bangle also lists a number of other important design features: “We deliberately put the instruments of the Z8 right in the middle, enabling the driver to look straight ahead without being distracted in any way. Driving the Z8 is almost like sitting on a motorcycle – you just have the road ahead of you, enjoying a purist view really unique particularly at night. It's like flying a small sports plane”. So most certainly the Z8 is the ideal car for the “alert dreamer”.

## **The erotic starter button**

“Just press the starter button!” Urging the driver to go ahead and start the machine, Chris is quite deliberately referring to one of the highlights in motorsport, the process of starting up a high-performance car. “Pressing that black button with your thumb you literally feel the power of the engine – it's a very emotional thing”. So what the lay observer may not immediately perceive as an experience and “isn't even really logical”, is nevertheless in Chris's words a very personal love affair between man and machine.

There was no doubt from the start that everything in and on the BMW Z8 was to be built in top quality. But the focus was not always on ultra-modern theoretically feasible technology, as Chris underlines in a clear example: “We could have made the soft roof of the Z8 disappear behind a flap when opened. But we didn't want to – our role model was the classic roadster, and classic roadsters have a roof you can see”.

Christopher Bangle is firmly convinced that the customers opting for this kind of car, enjoying the combination of the avantgarde and sporting performance, want to enter a cockpit completely free of the usual gimmicks. So to put it in a nutshell, he defines the BMW Z8 as “exactly the same kind of car the BMW 507 was in its day: the best lifestyle car in the market”.

## The Power Unit of the BMW Z8

- The V8 Front Mid-Engine
- BMW's Very Own Electronic Engine Management
- Electronic Throttle Butterfly Control (EBC)
- Comfort/Sport Gas Pedal Recognition
- Oil Supply Controlled by Centrifugal Forces

As befits a thoroughbred sports car, the heart of the BMW Z8 is its high-performance sports engine created by BMW M from the start for the new M5 in the market since 1998 and, of course, for the BMW Z8.

This fascinating muscle machine presenting itself to the driver and the world around by its thrilling sound is a 5.0-litre V8 of the most modern, up-to-date standard, offering maximum torque and power throughout the entire range. In practice this means supreme performance on the road in every situation, the Z8 accelerating and moving with effortless power regardless of road and traffic conditions.

Developing exactly 400 bhp (294 kW) at 6600 rpm and maximum torque of 500 Nm (369 lb-ft) at 3800 rpm, the Z8 offers a standard of dynamic performance quite unique even in the supreme range of BMW cars.

## **Supreme power – but smooth and refined**

Perhaps the most fascinating feature of this 8-cylinder power unit is not just the performance and muscle it has to offer, but rather the way this power is created. Particular highlights are the infinite, map-controlled double-VANOS already well known from BMW's M models (combined in this case with electronically controlled, drive-by-wire individual throttle butterflies as on the M5) as well as an oil supply system controlled by centrifugal forces.

Considered by themselves, the output and torque data of the Z8 power unit fail to reveal the true character of this exceptional engine. For in developing this all-aluminium power unit also very attractive to behold, BMW's engineers focused not just on superior power and performance, but also on equally superior torque at low engine speeds. Meaning that 85 per cent of the engine's maximum torque is available from just 1500 rpm.

The car's staggering acceleration and power also result from its supreme free-revving qualities quite unique for a V8. Accordingly, the power unit in the new BMW Z8 will rev smoothly up to 7000 revolutions per minute. In conjunction with the overall transmission ratio and, in particular, the sporting, short increments of the six-speed gearbox fitted as standard, this means a lot more practical power at virtually every speed than with an engine revving more slowly and sluggishly.

This engine and drive philosophy offers significant dynamic benefits on the road, for example in terms of smooth and consistent acceleration (e.g. the standing-start kilometre in just 23.5 seconds) and, in particular, engine and driving flexibility. Accelerating from 80-120 km/h (50-75 mph) in 4<sup>th</sup> gear, for example, takes only 4.3 seconds.

## **Crankcase and crankshaft**

As on all BMW V8 power units, the crankcase of the Z8 engine is made of Alusil. The cylinder liners are machine-polished after honing, the cylinder bores measure 94 mm (3.70") in diameter and the distance between cylinders is 98 mm (3.86"). The space of only 4 mm remaining between the cylinders requires special, highly sophisticated metal gaskets on the cylinder head. Coolant flow, in turn, has been optimised to reflect the supreme power and performance of the Z8, entering the crankcase at the front and continuing symmetrically down the two rows of cylinders.

The crankshaft is made of high-strength steel and runs in five bearings. It is fine-balanced by special heavy metal plugs placed in exactly the right position. The crankshaft bearings measure 70 mm (2.76") in diameter and are 22.8 mm (0.90") wide. The connecting rod bearings, in turn, are 49 mm (1.93") in diameter and 21 mm (0.83") across. Axial guidance of the connecting rods is provided by the large conrod opening.

## **Connecting rods and pistons**

The connecting rods are made by forge cracking and come complete with rough castings for balancing weight on the large and small conrod openings with optimum precision.

The pistons feature different-sized valve pockets for the intake and outlet sides of the engine, giving the Z8 power unit pistons varying in size for the two rows of cylinders. The top land of the pistons is 6.1 mm or 0.24" high, compression height is 29.8 mm or 1.17".



The piston shafts are iron-coated (Ferrostan), the compression ratio is 11.0:1. The pistons themselves are cooled by oil injection jets supplied with oil through two separate ducts in the crankcase. The jets do not become active until oil pressure in the engine reaches 2.5 bar.

### **Cylinder head**

The single-piece cylinder head featured in the Z8 power unit is largely the same as on BMW's other 8-cylinders. Two new features, however, are the water casing for crossflow cooling and the intake ducts. The gas cycle is masterminded by two intake and outlet valves on each side, valve drive is by two overhead camshafts on each row of cylinders. Valve clearance, finally, is controlled and balanced by maintenance-free hydraulic tappets.

The cylinder gasket is made of three layers of metal incorporating elastic partitions to separate gas, water (coolant) and engine oil, and to seal off the entire system from outside. The two outer layers are rubber-coated.

### **Camshafts and valve drive**

The two overhead camshafts on each row of cylinders are made of spherical graphite castings, the cams themselves being hardened to the requisite standard by a carefully controlled quenching process while casting, referred to as hard shell casting. Camshaft drive is provided by a duplex roller chain extending from the crankshaft to the two intake camshafts. From here a secondary chain – a simple roller chain – drives the respective outlet camshaft.

The intake camshafts provide an opening angle of  $252^\circ$  with lift of 10.32 mm or 0.41". The outlet camshafts operate at an angle of  $248^\circ$ , with 10.2 mm or 0.40" lift.

Both the intake and the outlet valves are carried over in their principle design from the proven M62 8-cylinder, but are made of even more heat-resistant material on the outlet side. Shaft diameter of the valves is 6 mm or 0.24", the intake valves themselves measuring 35 mm or 1.38" in diameter, the outlet valves 30.5 mm or 1.20". Conical valve springs allow engine speeds of 7000 rpm also in the valve drive system, without jeopardising the engine's endurance and long running life.

### **Oil supply**

A special, brand-new system serves to supply oil to the Z8 power unit. With the cylinder heads on a V8 engine being positioned at an angle of  $45^\circ$ , there is no natural flow of oil out of the cylinder heads under extreme transverse acceleration of more than 1g. In such a case, therefore, the only viable method is to actively extract oil from the cylinder head. And to avoid using too many extraction pumps due to the frictional losses inevitably involved, BMW's engineers have developed an entirely new oil supply system.

This system consists of one pressure and two extraction pumps as well as two electromagnetic switchover valves. As long as the car is driving in a straight line, oil flowing back from the cylinder heads and the crankshaft bearings is pumped into the oil sump at the front end of the engine by the two extraction pumps. When driving round a bend under significant transverse forces, the solenoid valves are automatically activated, masterminding the pump extraction points to ensure that oil is extracted from the oil sump and the cylinder head

on the outer side in each bend. The solenoid valves are activated by the DSC transverse acceleration sensor also providing this function when the driver has switched off the DSC system as such.

### **Thermal oil level sensor**

A thermal oil level sensor also monitors the oil level in the oil sump suitably modified versus the M5 engine, giving the driver a telltale warning in the instrument cluster should the oil level ever drop below the minimum required. The oil change volume is 7.5 liters, oil pressure in the main oil duct is kept at 4 bar. The oil filter is fitted firmly in a separate compartment on the body of the car, connected by flexible steel pipes to the engine.

An oil/water heat exchanger integrated in the main oil circuit serves to quickly warm up the engine oil after the engine has been started cold and prevents the oil temperature from increasing to an excessive level under high power and at high engine speeds. The heat exchanger is connected to the flow of coolant directly through the water casing on the first row of cylinders (cylinders 1-4).

### **Cooling system**

Coolant is fed in equal quantities to the two rows of cylinders by the newly developed water pump. This consistency is ensured by further refinement of the coolant ducts through the entire engine, beginning with the design of the supply ducts leading into the crankcase (crossflow cooling) and extending all the way to the outlet cross-sections on the reflow pipes in the cylinder head.

The supply of water to the individual cylinders can be adjusted by the openings in the cylinder head gasket. A ring slide thermostat positioned above the water pump, in turn, ensures a consistent coolant temperature throughout the entire load and speed range. The coolant pump on the engine of the BMW Z8 delivers 380 liters (84 Imp gals) of water per minute at maximum engine speed.

Thanks to the improved heat transition in the radiator, the system provides greater cooling efficiency than before without an increase in size or dimensions. The Z8 uses a so-called grooved pipe radiator offering in particular the advantage of high pressure resistance and a very good heat transfer. Another new feature is the equalising reservoir ensuring optimum ventilation of the cooling system when refilled and during operation.

### **Intake system**

Intake air for the engine is drawn in symmetrically through two intake ducts, flowing through two intake air silencers and two hot-film air mass meters into the air collector. Due to the V-arrangement of the 8 cylinders, the collector is located above the engine itself.

With the air collector thus being the most prominent design feature in the engine compartment, particular attention has been given not only to its perfect function, but also to the design above all of the top cover. Careful arrangement and configuration of the intake funnels allows a funnel length of 230 mm or 9.06" especially important for the massive torque of the Z8 power unit, the air collector thus fitting snugly into the limited space available, without any small diameters exerting a negative effect on engine power.

Fresh air supply is controlled by individual throttle butterflies. Each of these 8 butterflies is housed in a separate casing ensuring play-free transmission of rotational movements from one to the other throttle butterfly shaft.

The big advantage of these individual throttle butterflies is that they do not require a centre bearing, which reduces the opening force when activated as well as the leakage air rate. The absence of a drive shaft also avoids any additional elasticity and frictional losses within the system. The air collector is connected to the throttle butterfly manifolds by a rubber/metal link on each row of cylinders, separating the collector acoustically and thermally from the engine itself.

The throttle butterfly shafts are activated by an electronically controlled DC motor with a layshaft gear fitted in the middle between the two rows of cylinders and opening the throttle butterflies on cylinders 3 and 6, from where the remaining butterflies are then operated. Measuring 50 mm or 1.96" in diameter, the throttle butterflies control the cylinder charge and filling volume.

Depending on running conditions and the engine's operating point, pressure in the fuel supply system may be up to 5 bar. The fuel pressure regulator is fitted directly on the fuel filter from where fuel not required is fed straight back into the tank. This so-called returnless fuel system offers the particular advantage of keeping the fuel cool, since there is no return pipe leading into the tank.

### **Exhaust system**

The exhaust manifold has been carried over directly from the M62 8-cylinder power unit. A trimetal-coated metal substrate catalyst on each row of cylinders provides optimum conditions for a high-performance engine of this calibre,

keeping pressure loss to a minimum, ensuring a high standard of mechanical strength, and allowing a quick response of the catalyst after the engine has been started cold.

Downstream from the catalyst a crossover link between the two exhaust pipes separated from one another up to that point allows dynamic interaction of the exhaust gas flow. This crossover link serves above all to boost torque at low engine speeds and gives the tailpipes a throaty but harmonious sound. The interim silencers feature absorption-type damping technology.

An oxygen sensor upstream and downstream of the catalytic converters serves to keep the fuel/air mixture at a steady level of  $\lambda = 1$ , the downstream sensors also checking the catalytic converters for proper operation. The two tail silencers, finally, also incorporating absorption technology, have a total volume of 39.4 liter.

## **Sound**

It almost goes without saying that BMW's sound designers have "composed" a very special engine sound for the Z8. The car is audibly full of power, without becoming unpleasantly loud even on long uphill gradients. Elaborate optimisation of the sound spectrum focuses above all on low frequencies, eliminating those disturbing high-frequency sound elements.

Carefully matched to engine load, the unmistakable sound of the BMW Z8 comes out as a deep rumble as long as the driver is cruising in style and comfort, then increasing to a thrilling crescendo as soon as you start to "push" the engine. The obvious impression is one of dynamic performance and power at all times.

The “role model” for this sound was once again the BMW 507 lauded over the decades for the fascinating role of its V8 power unit. Applying the most advanced methods of sound engineering, BMW's specialists have now created a perfect sound effect clearly communicated to the “outside world” by the twin-chamber exhaust and intake system. And again it goes without saying that the Z8 complies in full with all sound standards world-wide.

### **MS S52 engine management**

MS S52 engine management is a further development of BMW's own in-house S50 management system already well-known in the BMW M models. Offering even greater efficiency and higher performance than before, this new engine management unit serves to control the

- engine functions
- EBC Electronic Throttle Butterfly Control
- oil circuit functions
- electronic speed limiter (ESL)
- thermal oil level sensor (TOS)
- catalytic converter protection functions
- as well as the two double-VANOS camshaft control system.

Flipping the Sports switch in the cockpit, the driver of the BMW Z8 can opt for a more sporting or a more comfortable setting of the EBC Electronic Throttle Butterfly Control, choosing a different gas pedal control map by means of this electronic function.

## **EBC Electronic Throttle Butterfly Control**

Like the power unit of the BMW M5, the engine of the Z8 also uses electronic throttle butterfly control commonly known as drive-by-wire. This is indeed an absolute necessity, since operating the 8 individual throttle butterflies mechanically by means of a conventional cable would be quite impossible considering the control forces and the exact dosage required. So electronic management is certainly the method of choice.

The actuator required for this purpose, a DC motor complete with layshaft gearing is housed between the two rows of cylinders. The throttle butterflies of cylinders 3 and 6 are driven by pull rods, then activating the other butterflies accordingly.

This actuator system takes only 120 milliseconds to open the throttle butterflies, that is about as long as a routined driver needs to press down the gas pedal. The driver's specific wish for power and performance is then transferred by two potentiometers in the gas pedal sensor to the MS S52 engine management unit. The optimum throttle butterfly position is calculated and set by the control unit, the actuator itself being triggered by a pulse-width-modulated signal in the engine management.

A potentiometer is fitted on the throttle butterfly shafts of cylinders 4 and 8 in order to monitor the target settings. As soon as this safety concept determines a deviation of actual from target data, the system is automatically switched to the failsafe mode allowing the driver to keep on driving his Z8 at a maximum speed of 100 km/h via the idle speed adjuster.



## **Double-Variable Camshaft Control (Double-VANOS)**

This revolutionary system has already given the BMW M models an exceptional position in the world market – and now it is also featured in the new BMW Z8. Compared with simpler versions of camshaft control, double-VANOS infinitely adjusts the camshaft position throughout the engine's entire load and speed range, fulfilling the following objectives in the process:

- High torque at low and medium engine speeds
- Internal exhaust gas recirculation at low engine speeds and loads
- Reduction of untreated emissions
- Faster warm-up of the catalytic converter after starting the engine cold
- Reduction in fuel consumption
- Reduction in engine combustion noise
- Less unburned residual gas when idling thanks to the reduction of valve overlap
- And, as a result, improved, smoother idling

Double-VANOS adjusts not only the intake, but also the outlet camshaft. It also serves to switch off the engine at its maximum speed of 7000 rpm by interrupting the ignition and fuel injection.

Comprehensive tests with various camshaft and angle configurations have served to determine the best adjustment angles on the intake and outlet camshafts for the Z8 power unit.

Double-VANOS has the task to continuously adjust the intake and outlet camshafts from “retard” to “advance” and vice versa, valve lift remaining unchanged in the process.

The double-VANOS operating principle is very logical and straightforward: The optimum position of the intake and outlet camshafts is determined by the control unit as a function of the throttle butterfly opening angle and the speed of the engine. Permanently scanning the pulse wheel position sensors on the camshafts, the system is able to monitor the relative angle position of the intake and outlet camshafts, comparing this data with the target required and if necessary re-adjusting the camshafts immediately by means of hydraulic control valves.

The actual intervention point is between the timing chain and the camshafts, a control piston carrying out the adjustment process.

## Power Transmission on the BMW Z8

- Six-Speed Manual Gearbox
- Clutch Pedal Forces Remaining Unchanged Throughout the Car's Entire Lifecycle

The Z8 features a six-speed manual gearbox optimised for weight and strength in order to convey the enormous power of 400 bhp to the road. Basically the same as on the BMW M5, the gearbox has been carefully modified to meet the specific needs of the Z8. The gearshift itself is short and crisp, as one would expect on a sports car, offering excellent precision in the shift process.

### The individual transmission ratios:

1 <sup>st</sup> gear	=	4.227:1
2 <sup>nd</sup> gear	=	2.528:1
3 <sup>rd</sup> gear	=	1.669:1
4 <sup>th</sup> gear	=	1.226:1
5 <sup>th</sup> gear	=	1.000:1
6 <sup>th</sup> gear	=	0.828:1
Reverse	=	3.746:1

A further feature is the self-adjusting single-plate dry clutch measuring 240 mm or 9.45" in diameter, keeping pedal forces consistent throughout the car's entire lifecycle. A two-mass flywheel serves additionally to keep out torsional vibrations from the engine and improves the drivetrain acoustics.

The power of the engine is conveyed to the rear wheels by propeller and drive shafts optimised for weight and strength and therefore offering supreme torsional stability. This helps to avoid any bumpiness or jolts which might otherwise reduce motoring comfort, giving the Z8 drive system a smooth response when accelerating.

The final drive ratio is 3.38:1. The final drive gearbox itself is designed for minimum noise and maximum strength, receiving an optimum supply of cooling air via special air guide blades.

## The Chassis and Suspension of the BMW Z8

- Newly Developed Aluminium Spring Strut Front Axle
- Integral Rear Axle
- High-Performance Brake System with ABS and CBC
- DSC III Fitted as Standard
- Special Run-Flat Tires

The Z8 would not be a typical BMW sports car if the engineers creating this unique model had not from the outset given it the right kind of chassis and suspension to meet the following supreme demands:

- precise handling
- superior comfort also on long distances
- a direct feeling for the road with clear feedback to the driver
- forgiving behaviour in transitional situations
- easy-to-anticipate reactions of the car when driving to the extreme
- supreme driving stability under all conditions
- a firm, roadster-specific spring and damper configuration
- excellent directional stability

Ranking as the top model within the BMW range, the Z8 naturally comes with light-alloy suspension. Aluminium, a most demanding material offering superior qualities, is used in abundance on the suspension, serving, first, to keep

unsprung masses to a minimum and, second, to provide excellent handling qualities combined with the highest standard of safety and stability.

### **Even the axles are made of aluminium**

The front wheel suspension on the BMW Z8 is made up of a double-joint spring strut axle with rack-and-pinion steering, an aluminium track control arm, tie-rod and anti-roll bar. This axle design already lauded on the BMW 5 and 7 Series has been modified here to meet the specific requirements made of a roadster in terms of driving behaviour: The focus, therefore, was on maximum absorption of transverse forces and excellent directional stability. In conjunction with the direct steering, this ensures very precise handling and a standard of roll comfort never seen before with a car of this kind.

The front axle subframe is a welded aluminium structure made of extrusion-cast profiles and panels, supporting all front axle components and bolted to the body of the Z8 at six points. The track control arm made of forged aluminium features two ball joints in the interest of exact wheel guidance also with a very dynamic, sporting style of motoring. And to keep front axle vibration to a minimum, a hydraulically dampened rubber bearing is fitted additionally within the aluminium tie-rod.

The front axle incorporates spring struts with drum springs positioned at an angle versus the damper axis in order to minimise frictional forces. Gas pressure dampers with separate spring/damper mounts ensure optimum damper response and behaviour, inward spring travel being limited to 70 mm or 2.76" thanks to the only slight increase in axle load when the car is fully laden as well as the effect of the firm springs.

## **Appropriate suspension for a sporting roadster**

The suspension of the BMW Z8 is characterised by the roadster-specific, firm spring and damper configuration allowing high speeds with minimum sway angles in bends.

The power-assisted rack-and-pinion hydraulic steering positioned in front of the front-wheel centreline contributes to the Z8's outstanding steering behaviour and directional accuracy. With a variable steering transmission ratio providing from 45-52.5 mm (1.77"-2.07") lift per revolution of the steering wheel, the Z8 requires just three turns of the steering wheel from lock to lock.

The steering column complete with a corrugated aluminium deformation unit incorporates two universal joints to ensure a direct response and give the car its sporting character.

The rear axle comes in an integral four-arm configuration, fundamentally a multi-arm design with anti-roll bar patented by BMW.

A further feature of the rear axle is the use of extra-large rubber bearings preventing the transmission of any unpleasant vibrations to the body.

The rear axle also features spring struts, but in this case with centrally arranged springs. Here again, the firm gas pressure shock absorbers and dampers allow inward spring travel under pressure of 80 mm or 3.15". Despite this sporting configuration, roll comfort remains truly outstanding thanks to the sophisticated elastokinematic suspension also at the rear (with defined

longitudinal suspension of the wheels combined with very high transverse stiffness).

Given this optimum design, the handling and behaviour of the Z8 remains neutral even in an extreme situation, free of any unpleasant load change response. These positive driving characteristics are then further supported by the ideal 50:50 axle load distribution, giving the Z8 very good traction and safe driving behaviour even when DSC III stability control is switched off.

### **Brake performance setting the standard in the world of sports cars**

The BMW Z8 is not only able to take all kinds of bends without the slightest problem even under high transverse acceleration (provided, of course, that the driver does not exceed the laws of physics), but also offers truly outstanding brake performance. Indeed, ensuring excellent brake power and minimum stopping distances, the high-performance brake system offers supreme safety reserves.

The brake system and its technology have been developed out of the two-circuit system already featured on the BMW 750i, further improved and modified in this case for the specific requirements of a sports car. The four extra-large inner-vented brake discs measure 334 mm (13.15") in diameter and 32 mm (1.26") in thickness at the front, the corresponding figures for the rear discs being 328 mm (12.91") and, respectively, 20 mm (0.79"). While the front wheels come with two-piston swing-calliper brakes especially designed for sports car motoring, the rear wheels feature BMW's proven single-piston swing-calliper units. And BMW's brake engineers have given particular attention to the service life of the brake linings far above average on the Z8.



The Z8 handbrake operated by a lever between the two seats is a dual servo drum brake measuring 180 mm or 7.09" in diameter, the drums themselves being integrated in the rear brake disc.

The ABS Anti-Lock Brake System with integrated CBC featured in the BMW Z8 is built specifically for the needs and requirements of such a high-performance car.

CBC (Cornering Brake Control) is standard on the BMW Z8. This new system automatically controls the pressure in the individual wheel brake cylinders when applying the brakes in a bend, thus keeping the Z8 precisely on course at all times.

While ABS only becomes active prior to the brakes locking when applied all-out, CBC is activated automatically also in less forceful braking manoeuvres, thus making the entire process of applying the brakes in a bend even safer than before. Technically speaking, the system controls the application of brake forces in a bend in order to neutralise any under- or oversteer.

It almost goes without saying that the BMW Z8 also comes with the latest generation of Dynamic Stability Control, DSC III, a consistent development of ABS and ASC+T (Automatic Stability Control + Traction). With ASC controlling only longitudinal wheel spin, DSC III also monitors the dynamic transverse forces, improving the car's transverse behaviour whenever necessary.

## **Modern electronics for extra driving safety**

Whenever the car starts to under- or oversteer on a slippery road, DSC III will automatically apply the brakes on the inner/outer rear wheel, also intervening if necessary on the inner/outer front wheel in a bend and thus stabilising the car in its position. As a result, even a less experienced driver is able to keep the car steadily on course. A telltale in the cockpit tells the driver that DSC III is active and, accordingly, that the car has reached the limit to its driving stability.

BMW DSC III has been specially modified to meet the requirements of the BMW Z8, thus maintaining the supreme agility of this sporting roadster despite electronic intervention (which the driver may deactivate at any time, if he wishes). The first consideration was to not unnecessarily limit the car's supreme performance, the second was to keep the driver of the Z8 aware at all times of this performance and its potential on the road.

A fast lap on the legendary, roughly 20-km Northern Circuit of Nürburgring proves that BMW's engineers have done a good job in reaching this ideal compromise: With its DSC III deactivated, the BMW Z8 is able to lap Nürburgring in a respectable 8:15 minutes, the same car with DSC III switched on requiring only a few seconds more. And EDC Engine Drag Control in the Z8 also remains active when DSC III has been switched off.

The 18-inch light-alloy wheels styled exclusively for the Z8 are truly a beauty to behold, re-interpreting that classic spoke-wheel design from the past. The wheels themselves are 8 inches wide at the front and 9 inches at the rear, running on high-performance 245/45 R 18 96 W tires up front and 275/40 R 18 99 W tires at the rear, a combination of two sizes ensuring a particularly good balance of driving characteristics.

The BMW Z8 is also available with special run-flat winter tires measuring 245/45 R 18 96 H M+S and even able to carry snowchains.

### **Special tires for a special car**

Like all BMWs, the Z8 comes on tires specially developed for the car. And in the process of developing these run-flat tires, BMW's engineers focused in particular on

- supreme dynamic performance and safety plus good comfort
- a sporting, direct response
- the potential to withstand high transverse forces
- good directional stability
- very precise steering also at high speeds, superior stability in bends and when changing lanes
- forgiving, easy-to-control driving behaviour in the wet, even when driving to the extreme.

So the special tires on the BMW Z8 offer all these features. And they have been designed in particular for perfect harmony of traction and cornering qualities, on the one hand, and DSC Dynamic Stability Control, on the other.

## **Safety tires fitted as standard**

Launching the Z8, BMW is also taking a significant step into the future through the introduction of the most progressive tire safety technology. Again beating the competition, the Z8 features run-flat tires making BMW the first European car maker to use this technology as a standard feature.

These run-flat tires for extra safety on the road are an important feature within the RFC (Run-Flat Combination) wheel/tire system consisting of self-supporting tires, special hump rims, and a tire pressure warning system.

In their design and configuration, the self-supporting tires are made up primarily of reinforced side walls with additional inserts and rubber compounds extremely resistant to temperature. This technical combination allows even a defective tire without pressure to largely maintain its shape and driving/guidance characteristics for a certain distance, enabling the driver to keep on going until he reaches a repair shop.

Compared with conventional tires, run-flat tires offer a number of significant advantages, while retaining the same high standard of safety and handling on the road:

In the event of a puncture the driver of a BMW Z8 benefits from extra safety and motoring comfort, since he does not have to stop in order to repair the tire. Even with the tire being absolutely empty without any pressure – a condition shown to the driver through a sound signal and the display in the instrument cluster – and regardless of the load the car is carrying, the driver of a BMW Z8 can keep on going, driving carefully, at a maximum speed of 80 km/h for a

distance of up to 500 km or 300 miles, until reaching the next tire dealer or BMW service station.

The proper position of the tire on the wheel is ensured through the use of specially developed rims (EH: Extended Hump).

Even with an empty tire, the Z8 retains all its electronic control systems such as ABS or DSC, meaning that all safety systems are fully functional and the driver will not suffer any impairment.

The Tire Pressure Warning (TPW) forming part of the system is a so-called run-flat indicator operating according to a very clear and straightforward principle: Whenever tire pressure drops by at least 30 per cent, the tire roll radius and, accordingly, its circumference will change in the process. This also means that the wheel will start to turn at a different speed. TPW measures wheel rotation via the sensors in the four-channel ABS, compares this measurement with the average wheel speed, and is thus able to recognise any major loss of pressure. Within a very short time of just 1-3 minutes and from a speed of at least 15 km/h, TPW is able to trigger a pressure loss signal, warning the driver both through a telltale in the display and acoustically.

## The Bodyshell and Production of the BMW Z8

- Aluminium Bodyshell in Spaceframe Technology
- Superior Bodyshell Stiffness
- Ideal Crumple Behaviour in a Crash
- Superior Resistance to Corrosion
- Hardtop with Rear Window Heating Provided as Standard
- Rollbar Fitted as Standard

Right from the start the prototype preceding the BMW Z8, the Z07 presented at various motor shows, offered a clear idea of how the designers of the Z8 interpreted the classic two-seater sports car. The concept was to create a car with impressive dimensions on the one hand, but good handling and nimble behaviour on the other. A car with the proportions typical of a roadster: a long engine bay, short overhangs front and rear, and a front air dam extending far down to the road. The slender, high-rising rear lights, the air scoops at the side, extra-large wheels and special design features such as neon technology, chrome-plated rear-view mirrors, and tailpipes made of polished steel, clearly underline the Z8's design philosophy.

Both the power unit as well as the passengers themselves were to be moved back as far as possible to the middle and, respectively, the rear third of the car, thus ensuring optimum traction under all conditions.

BMW's designers and engineers had also given themselves the ambitious objective to create a car reminiscent in its looks of the legendary BMW 507, but at the same time to make the Z8 an ideal sports car for everyday motoring.

Today they are proud to note that they have achieved both of these goals, the bodyshell coming with a wide range of high-tech features quite unusual even in this top segment of the market.

### **Aluminium spaceframe**

The first highlight is the use of aluminium spaceframe technology to be admired with BMW for the first time on the body of the Z8. The entire structure is made up of so-called extrusion-pressed profiles comparable to the trusses of a timber house and forming the frame with the body panels then providing the outside “skin”. The extrusion-pressed profiles and body panels are held together to form the overall spaceframe by approximately 1,000 rivets and 57 meters of fused welding seams (MIG).

BMW's decision to opt for aluminium spaceframe technology featured here for the first time on a production car is attributable to several considerations:

- This technology offers supreme stiffness in an open sports car
- A basic structure of this kind guarantees excellent behaviour and safety in a crash
- This structure is a genuine spearhead in technology, plus the option to gain new experience in working with a new material

A crucial point in this context is that BMW's aluminium spaceframe does not come from a supplier, but is largely built in-house, providing a wealth of new know-how. At a special aluminium production shop at the Dingolfing Plant, the pre-processed extrusion-pressed profiles and the aluminium panels obtained from suppliers are put together to create the spaceframe. Dingolfing was the

obvious choice for this operation, since BMW already had an Aluminium Processing Centre here, already manufacturing the hardtop for the 3 Series convertible and the engine compartment lid for the 7 Series. And when it comes to welding, the specialists in Dingolfing can resort to a wide range of experience in axle production.

### **Quality – the No 1 priority**

An obvious necessity in this development process was to establish a special quality benchmark, with new quality standards for the process of joining parts, for the repeated use of standard parts, for the paintwork and surface treatment. This clearly enables BMW to maintain its well-known and much-appreciated level of excellence also in this area. And the Z8 comes additionally with deep-drawn components in order to keep the bodysell absolutely tight without the slightest leakage in either direction.

A further reason for choosing aluminium spaceframe technology was that the BMW Z8 is being built in a small production series, meaning that a conventional steel shell structure would not have been economically viable. And last but certainly not least, the low weight of aluminium with advantages already well-known in motorsport and aviation, as well as its resistance to corrosion, were important arguments for using this material also on the Z8. In a nutshell, therefore, the Z8 comes with an extremely light body offering supreme torsional stiffness.

Introducing spaceframe technology on the Z8, BMW is not only launching a product built of an unusual material, but is also taking a very special approach in the design and production of the car's entire structure.



The usual approach when building a convertible or roadster is to cut the roof of a coupé – which usually means a dramatic loss of stiffness and dynamic body strength. Then this drawback is set off in part through the use of reinforcements and additional supports and bars bolted on to the car.

### **An open sports car with supreme body stiffness**

BMW's philosophy in creating the Z8 was very different: With the roof not being simply “cut off”, but rather only lowered a bit from its usual position, and with the roof frames coming closer together at the sides, the roof will ultimately come to rest on the tunnel between the two seats. Meaning that the two roof pillars lead from the middle of the car to the longitudinal supports front and rear.

The tunnel support is thus able to provide a perfect connection between the front and the rear end of the car, respectively, and the passenger cell itself, thanks to the diagonal connection units extending from the side-sills and tunnel to the longitudinal arms. This superior body stiffness of the Z8 also makes it possible to keep the side-sills much lower than normal compared with other cars of this kind.

At the same time this stiffness is the basic precondition for the Z8's nimble and sporting suspension tuning combined with excellent feedback to the driver in all dynamic manoeuvres.

On a horizontal plane the diagonal connection between the spaceframe and the front end of the car by so-called Y-arms is also of great significance. In principle these arms are made up of two profiles, the engine supports and the tunnel beams, as well as three structure panels bent round the edges.

## **The secret is the “Y”**

Such profile units incidentally account for a large share of all the spaceframe components to be found on the Z8, especially as they connect perfectly to the 2-D-bent extrusion-pressed profiles. Castings are not used on the Z8, since casting knodes and junction points would be a weak spot due to their fracture behaviour.

The advantage of this Y-arm construction on the BMW Z8 is its much better absorption of impact forces, for example in a crash, transferring such forces to the middle floor pan far more efficiently than a conventional structure. As the crash expert would say, such Y-arms fold ideally, since the flow of forces is either in a straight line or ideally supported on either side. A further benefit provided by the Z8's package is the superior support of the longitudinal arms at the rear by means of an extra-large profile panel, so-called supplementary geometry sensibly reducing the number of components.

Compared with other spaceframe structures the Y-arm solution chosen by BMW at the front and, in a concealed form, at the rear, helps to optimise the car's structure. The big advantage for the customer is that the Z8 not only takes all kinds of bends more smoothly and with greater stability, but also offers a significant improvement of torsional and transverse stiffness.

## **Very high standard of crash safety**

Compared with the competition, the spaceframe in the Z8 is not only about 30 per cent lighter, but also offers higher characteristic torsional frequency of a standard otherwise to be found only in cars with a roof.

It is no surprise, therefore, that the Z8 easily passes all of BMW's ambitious safety tests such as the roof press-in test, the rollover strength test, and the general operating strength requirements, at the same time naturally fulfilling all international crash standards.

After the standardised frontal and side collisions as well as the NCAP offset test with 40 per cent overlap at an impact speed of 64 km/h, the passenger cell of the BMW Z8 remains completely intact, just as the car easily passes the EU side impact test at a speed of 50 km/h.

Depending on the severity of an accident, an "intelligent" airbag system will activate the frontal and side airbags inside the cockpit of the Z8. Seat belts with belt force limiters and pyrotechnical belt latch tensioners ensure not only optimum safety for the two occupants, but also a further reduction of restraint forces. Two rollbars fixed in position protect the driver and passenger in the Z8 additionally in the event of a rollover, the very stable windscreen frame providing further support.

## **Aluminium repairs at special service centres**

BMW's experts responsible for building the bodyshell of the Z8 have also provided for the eventuality of body repair. The first point is that damage to the

body structure caused by minor impacts at speeds of up to approximately 25 km/h can be repaired by means of “cold” joining technologies. With the front end of the Z8 being bolted on, it is also easy to replace if necessary.

Wherever repairs involve the simple replacement of body panels bolted on to the car, every BMW dealer with sufficient experience in panel-beating technology can do the job. And wherever the need arises to glue, rivet or even weld aluminium components on the Z8, the car can be repaired efficiently at BMW's special aluminium service stations.

### **Six standard colours**

Following production, the body-in-white is painted in one of six standard colours, naturally with a wide range of additional colours being available as an option. The paint-application procedure applied on the Z8 is most demanding, since it has to be defined in advance in every detail on account of the various interior components finished in the same paintwork colour as the exterior.

Thanks to the supreme resistance of the Z8's aluminium bodyshell to corrosion, there is no need for preservation of the car's hollow cavities.

All of these production and assembly processes extending all the way to the finished bodyshell of the Z8 are conducted at BMW's Dingolfing Plant.

### **Three BMW plants work on the Z8**

Largely built by hand, the complete front and rear bumpers of the Z8 come from BMW's Body Equipment Division at the Landshut Plant, as do the sill- and side window frames again available in all standard and special colours.

Once all these processes have been concluded on the bodyshell of the Z8, the car goes to BMW's Munich Plant for final assembly. The reason why these final processes are carried out here is quite simply that more than 10 years ago BMW already gained important experience at its Munich Plant when producing the Z1 in a small series of exclusive models.

A separate area has been set aside at the former Munich Pilot Plant for the Z8, where operations are not affected by ongoing production of the 3 Series. All of the job processes the cars go through are located in one single building, the ready-painted bodyshell of the Z8 being created here in a total of 31 job cycles.

### **Craftsmanship is the name of the game**

With the Z8 being a highly exclusive car built in small numbers, the entire production process is hardly automated. Most jobs are therefore done by hand, selected associates with years of experience putting the Z8 together. In this process the associates monitor and record their own work and the level of quality achieved. Obviously, job processes here are a lot slower than in large-scale production, the complete assembly and finishing period for the Z8 being about 10 times as long as for the 3 Series saloon.

The Z8 hardtop delivered as standard is made up of aluminium extrusion-pressed profiles surrounded by foam plastic. With its extremely resistant outer shell, this sandwich construction allows not only very good insulation, but also very good stiffness and the reduction of exterior and wind noise to an absolute minimum.

## **Features and Equipment of the BMW Z8**

- Hydraulic Roof Operation with Electrical Closing Aid
- Separate Steering Lock and Starter Button
- Neon Technology for the Direction Indicators and Tail Lights
- Sophisticated Sound System
- Multi-Information Radio with Telephone and Navigation System
- Instruments in the Middle of the Cockpit

What would even the most exclusive car be without the right ambience, the right atmosphere going far beyond the usual standard? In consideration of this obvious fact, the designers and engineers creating the BMW Z8 focused from the start on a luxurious interior, an instrument panel in the middle of the car for reasons of design, and a wide range of high-tech features.

True to the motto that travelling only becomes really pleasant when the driver and passenger are properly surrounded by the right features, BMW has given the Z8 a most sophisticated, high-class interior in every respect.

### **Luxury class features and equipment**

Like its legendary predecessor, the BMW 507, the Z8 was also intended to come from the start with a high standard of features leaving nothing to be desired – which is precisely why there are no extras available from the factory. And this is a remarkable achievement, considering that it was not easy for the engineers developing this car to accommodate all the amenities of modern motoring within an intentionally snug roadster cockpit.

The BMW Z8 comes with a choice of six paintwork colours – black and bright red non-metallic, titanium silver metallic, topaz blue metallic, stratus (grey metallic) and criollo (red metallic) – plus four interior colours: black, sports red/black, cream/black, and cream alone. In all cases, the car features a black roof and a hardtop finished in body colour, although a beige roof is available as an option.

Various surfaces are also painted within the interior of the Z8, interacting with the controls made of aluminium such as the rotating buttons on the instrument panels to provide superior harmony in design. Complete leather upholstery all round in fine-grain nappa is only natural in a car of this class, while the tonneau cover made of leather and protecting the open roof when folded back is certainly an exceptionally feature even in this category. Even the rollover safety system behind the two seats is finished in leather, and the wind deflector comes as standard.

The driver of the BMW Z8 sits at a three-spoke aluminium steering wheel with a US airbag and a leather-coated rim, combining truly unique design with a sporting diameter of 375 mm or 14.8". And thanks to power adjustment of the steering column featured as standard, the steering wheel can be moved infinitely fore-and-aft for every driver.



## **Safety always comes first**

Both the driver and passenger airbag operate according to the impact-dependent system: Instead of opening in only one stage, the airbags incorporate two-stage gas generators (environmentally friendly without acid) for inflating their front soft cushions. Depending on the intensity of an impact, the two stages inflate either with a very short or a longer time lag, the electronic “brain” distinguishing between various kinds of impact by means of a precise control map. The advantage of this system is that the occupants are only exposed to the maximum restraining forces absolutely necessary in the event of a collision.

Both passengers will find comfortable space on ergonomically well-designed sports seats adjusting electrically to a wide range of different positions and featuring integrated seat heating. The first switch for seat squab control moves the seat either forwards or backwards, turns the seat on its axis of rotation, or modifies seat height. The second switch responsible for the backrest allows simple adjustment of the seat position without the slightest risk even while driving.

## **Two golf bags fit conveniently into the luggage compartment**

The tank filler flap leading to the 73-litre (16.1-imp gal) fuel tank and the rear lid providing access to the 203-litre (7.10-cu ft) luggage compartment both open up by means of switches in the A-pillar. The luggage compartment can accommodate either a medium-sized hard-shell suitcase or two golf bags, meaning it is large enough for a weekend for two. Beneath the floor carpeting in the luggage compartment you will find not only the battery, but also a warning triangle and the first-aid kit.

The fully retracting soft roof complete with inner lining and an insulation layer opens fully automatically and closes semi-automatically thanks to hydraulic operation at the touch of a button in the centre console. To facilitate the process of opening and closing the roof, there is also an electrical servo closing mechanism: Once the roof is approximately three-quarters closed, all the driver or his passenger have to do is pull the grab recess on the roof frame and the roof will close completely under gentle pressure.

### **Many sensible features and ideas to the last detail**

It once again goes without saying that features such as cruise control, electrically adjustable and heated rear-view mirrors, electric window lifts and air conditioning including a microfilter are standard on a car of this calibre. But the Z8 also offers its proud owner other, quite exceptional features. The rest areas for the wipers on the windscreen, for example, are heated, the aerials for the navigation system, radio and telephone are concealed within the rear bumper, and a comprehensive package of courtesy lights illuminates not only the glove compartment and ashtray whenever required, but also includes map reading lights and cutout lights in the wide-opening doors. And an electrochromatic interior mirror with an automatic anti-dazzle function is also standard on the BMW Z8.

Superior illumination technology of this kind is to be found not only in the cockpit of the Z8, but also outside on the car's outer panels. Up front, for example, you will see xenon headlights under glass covers with automatic headlight range control precluding any dazzling of oncoming traffic.

It is a well-known fact that xenon lights illuminate the side area and the area in front of the car much more brightly and consistently than conventional halogen

lights. Xenon headlight technology uses a light arc instead of an incandescent coil to generate very powerful and intense light, a mixture of rare gases and metal vapour within a quartz piston being ignited by high electric voltage.

### **Further leadership in technology: the first-ever neon lights on a car**

At the side the Z8 stands out in particular through its air scoops complete with integrated direction indicators, a clear visual reminder of the legendary BMW 507. And at the rear the brake, tail and direction indicator lights (the latter also at the front) in neon technology add a particularly striking feature.

BMW is the first-ever manufacturer to use this neon light technology on a car with such a wide range of functions, thus once again proving the competence and leadership in technology BMW is able to offer. The advantages of neon light technology are quite significant:

A short response time almost faster than human perception. Neon light responds approximately 10 times faster than a conventional bulb, almost comparable in its response to a flashlight. In practice this means that a driver following a Z8 at a speed of, say, 140 km/h has approximately 7 meters more stopping distance when the driver of the Z8 suddenly applies the brakes, simply because he is able to detect the braking process a lot earlier. A further point is that the direction indicators and brake lights are far more conspicuous thanks to the faster build-up of light intensity.

Very good recognition from various angles thanks to the equally distributed and consistent illumination over the entire width of the lights.

## **A service life virtually just as long as the life of the car itself.**

Like every BMW, the Z8 comes with an elaborate and highly sophisticated safety system naturally comprising an electronic immobiliser as well as an anti-theft warning unit including radio remote control, surveillance of the car's interior, and an angle sensor. Particularly the third generation of electronic immobilisers makes things difficult for a potential thief: With the code exchanged between the electronic chip in the key and the car itself constantly changing, it is virtually impossible to copy the code and therefore steal the car. Whenever an intruder tries to break into or manipulate the car, the alarm system will generate acoustic signals and switch on the hazard warning flashers. And if the Z8 is raised up, an angle sensor will also generate an optical and an acoustic alarm.

The key to the car serves to lock the two doors, the rear lid and fuel tank filler flap, the glove compartment and the large storage box between the seats. The push button operating the central locking from inside is positioned on the centre console. Smaller odds and ends also fit into two trays on the centre console or within the two doors. The space behind the passenger's seat, finally, serves to accommodate the computer for the navigation system fitted as standard, while the CD changer is located behind the driver's seat.

## **The electronic steering lock**

BMW has developed an electronic steering lock especially for the Z8. Located in the instrument panel behind the ignition lock and the separate starter button, as on BMW's pre-war models(!), this new electronic steering lock features the most advanced electronics in the interest of superior comfort and optimum security.

Like the electronic immobiliser, the key comprises an electronic chip allowing an exchange of signals between the control unit in the car and the key once the driver inserts the key into the ignition. As soon as the immobiliser receives the message that the proper key is in the ignition lock, an electric motor will unlock the steering column otherwise kept firmly locked to prevent unauthorised use of the car. Then the authorised user is able to turn the key further towards the radio and drive position, subsequently briefly pressing the starter button and bringing the V8 power unit to life.

Yet another special feature of the Z8 is the arrangement of the instruments in the middle providing particularly good looks. Apart from the large speedometer with a digital display for total and trip mileage at the bottom, an equally large rev counter with an integrated analogue face clock dominates the instrument cluster. Two smaller dials then provide additional information on the tank level and coolant temperature.

### **The control system right in the middle**

Various telltales spread out on the speedometer and rev counter scales provide clear information on the Dynamic Stability Control (DSC), anti-lock brake system (ABS), electronic engine drag control (EDC), battery charge level, operation of the roof, tire pressure control (TPC), handbrake and brake hydraulics, brake linings, Cornering Brake Control (CBC), engine management and the engine oil pressure/level. Further telltales in the cockpit inform the driver and passenger on whether they are wearing their seat belts, whether the high beam is switched on and whether the airbag is possibly not operating properly.

Focusing on the audio and communication system, BMW is taking an entirely new approach with the Z8, introducing a Multi-Information Radio (MIR) comprising three functions all in one:

- A GPS navigation system with a map CD
- The radio
- The mobile phone with hands-off operation fitted as standard

BMW's new trip navigation system offers clear orientation with the help of arrows and voice messages. Operated by a menu button and a push/turn knob, the system is able to determine the respective location of the car – with ongoing satellite control – down to an accuracy of 10 metres. Destination guidance messages are provided by means of arrows (together with the street names and distances) on the LC display, a voice giving the driver additional information over the loudspeakers.

This radio navigation system provides information not only on the route the driver wishes to take, but also the time he will presumably require. And on request it gives the driver and passenger information on hotels, museums, sights, filling stations or BMW dealers, thus acting as a valuable aide on the road.

The radio and CD changer in the Z8 are just as sophisticated, the Z8 being equipped as standard with a Harman Kardon top-end HiFi system complete with amplifier and a total of 10 loudspeakers spread out as follows:

- Woofers serving as a base reflector system in the footwells of the A-pillars
- Tweeters and sub-woofers in the door-sills
- Wide-band loudspeakers as well as 4 x 40 W and 4 x 25 W amplifiers beneath the seats
- Additional sub-woofers in the rear side-sills

The advantages of this highly sophisticated audio system are lots of power for emotional sound, an appropriate base effect for an open car (considering wind noise), and, in all, a superior sound effect at all times.

# Performance and Fuel Economy of the BMW Z8

## Acceleration:

0 - 50 km/h = 1.9 sec

0 - 80 km/h = 4.7 sec

0 - 180 km/h = 13.4 sec

0 - 200 km/h = 16.4 sec

Standing-start 400 metres = 12.9 sec

Standing-start km = 23.5 sec

## Flexibility:

80 - 120 km/h (in 4<sup>th</sup> gear) = 4.3 sec

80 - 120 km/h (in 5<sup>th</sup> gear) = 5.2 sec

## Top speed:

250 km/h (155 mph) (electronically limited)



**Fuel consumption:**

Urban: 21.1 litres/100 km

Extra-urban: 10.6 litres/100 km

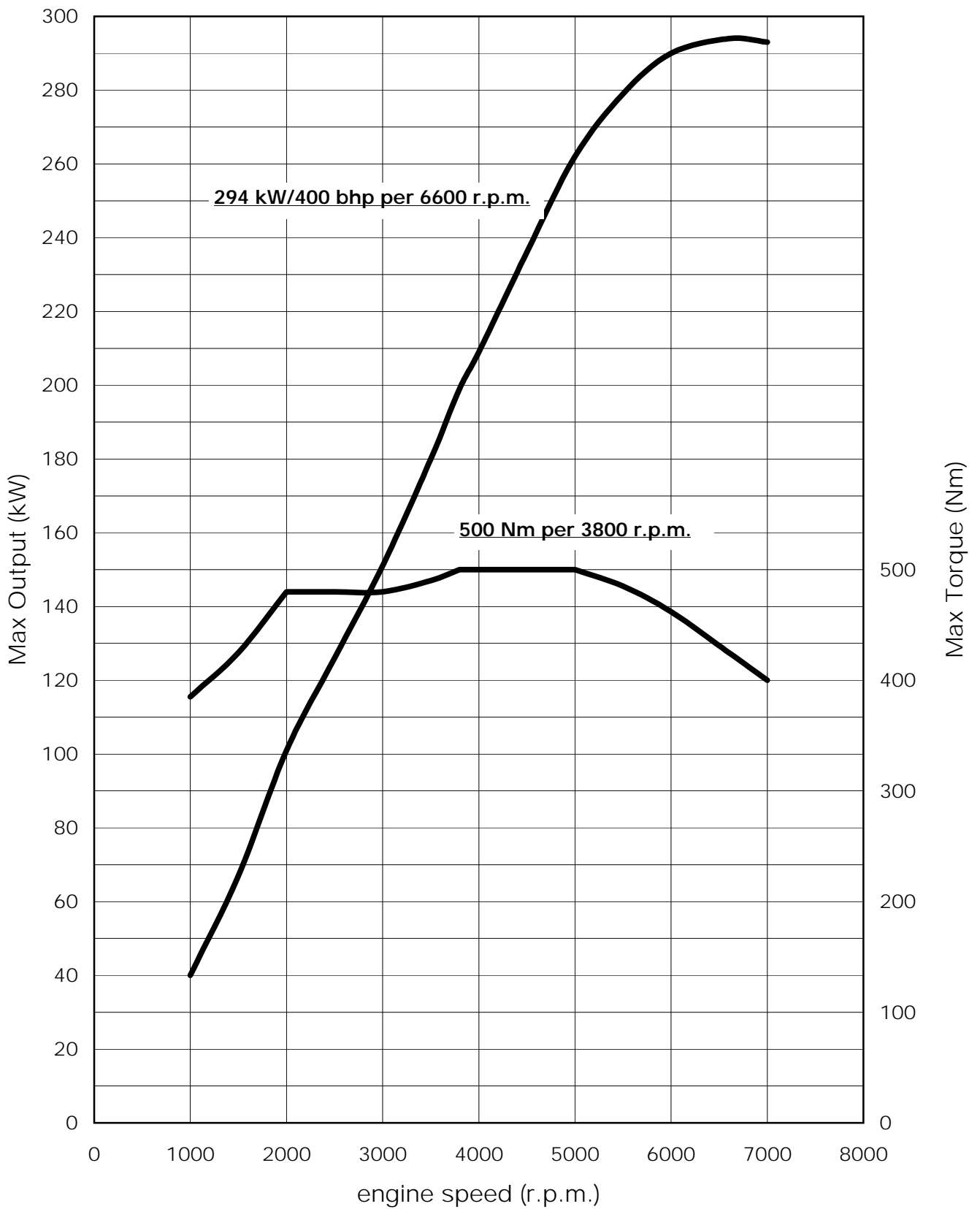
Composite: 14.5 litres/100 km

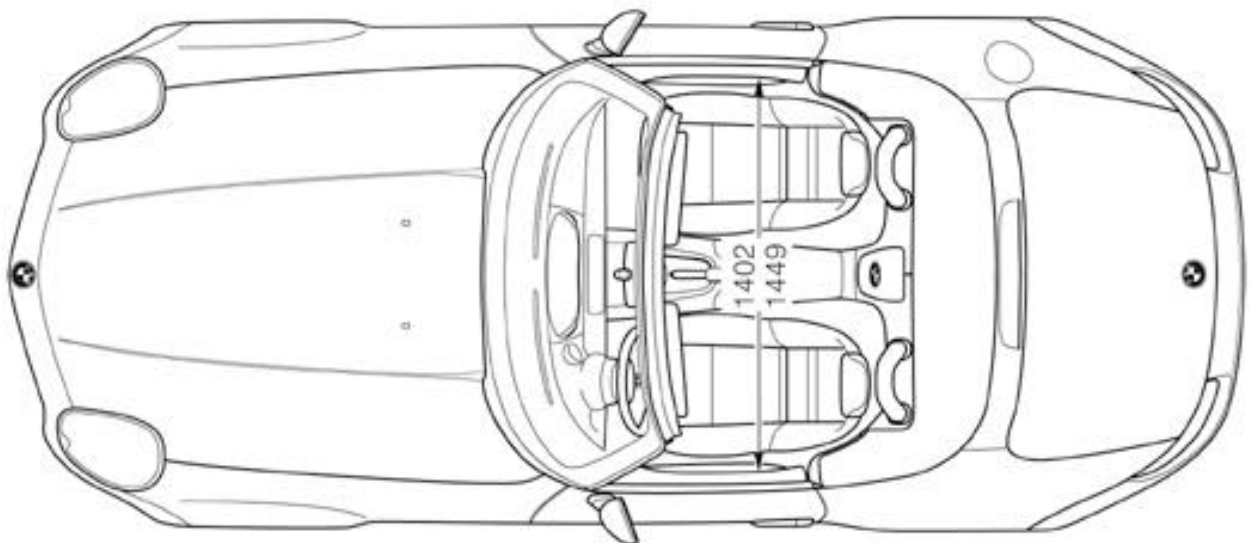
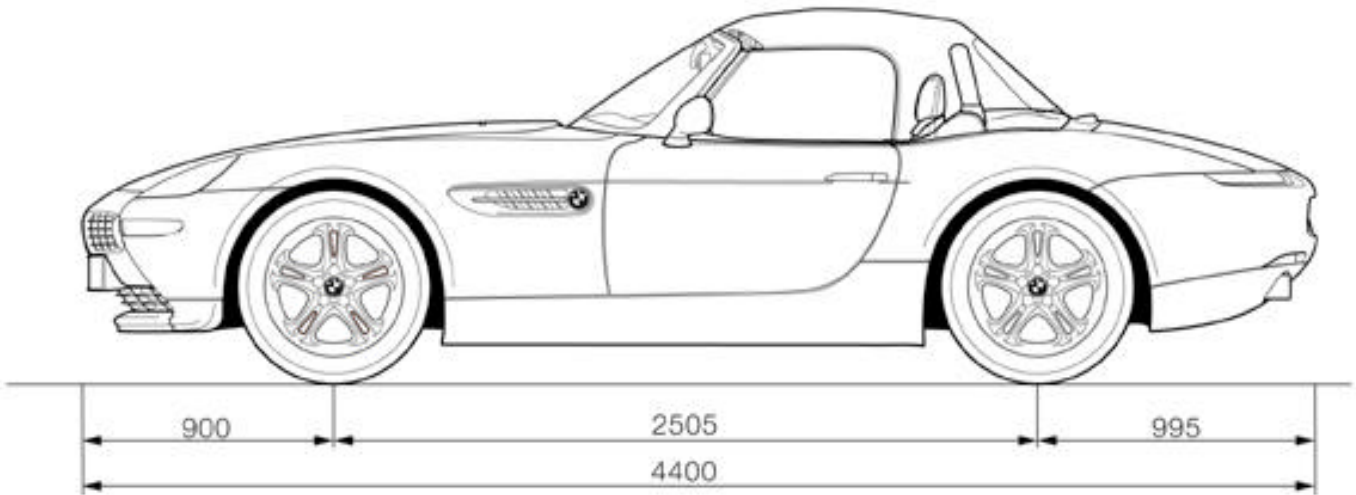
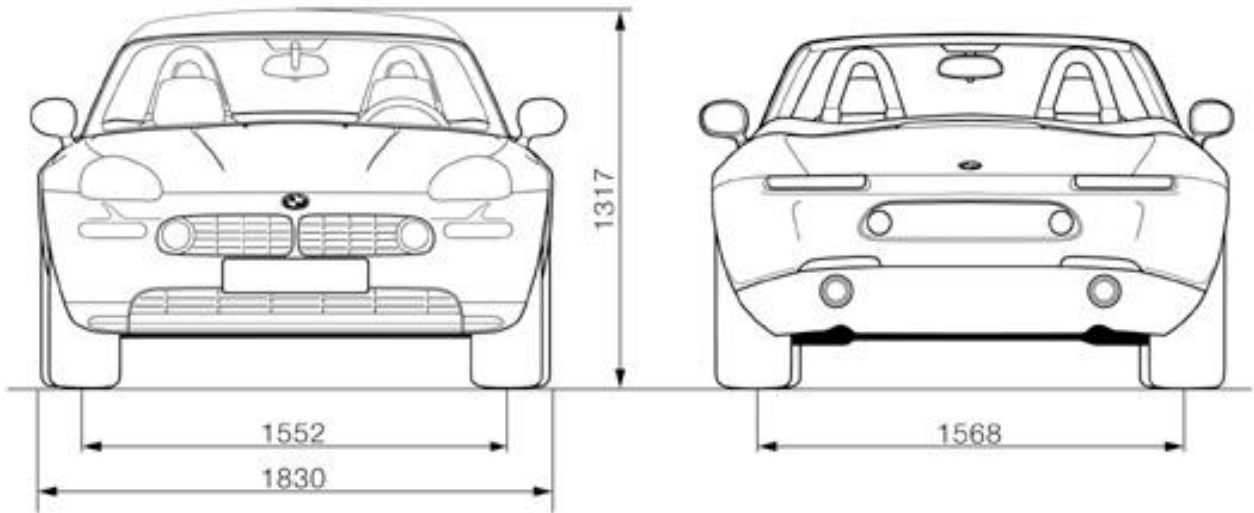
CO<sub>2</sub>: 349 g/km

		Roadster			
Specifications: BMW car range		Z8			
Body, dimensions and weights	No. of doors/seats		2/2		
	Length/width/height (unladen)	mm	4400/1830/1317		
	Wheelbase	mm	2505		
	Track, front/rear	mm	1553/1568		
	Turning circle	m	11.8		
	Fuel tank capacity	ltr	73		
	Cooling system incl. heater	ltr	12.45		
	Engine oil	ltr	7.5		
	Transmission fluid	ltr	1.8		
	Final drive fluid	ltr	1.2		
	Weight, unladen (DIN)	kg	1585		
	Weight, unladen (EU) °	kg	1660		
	Max. load	kg	240		
	Max. permissible weight	kg	1900		
	Max. permissible axle load, front/rear	kg	900/1070		
	Max. trailer load, braked 12% / 8% unbraked	kg	--		
Max. roof load, trailer nose weight	kg	--			
Luggage comp. capacity, VDA standard	ltr	203			
Drag coefficient/front area	Cd x A	0,39 x 1,98 <sup>1)</sup>			
Engine	Layout/No. of cylinders/valves		V/8/4		
	Engine management		MSS 52		
	Displacement, effective	cc	4941		
	Bore/stroke	mm	94.0/89.0		
	Compression ratio/fuel grade	:1	11.0 / ROM 98		
	Max. output at engine speed	kW/bhp rpm	294/400 6600		
	Max. torque at engine speed	Nm/lb-ft rpm	500/369 3800		
	El.	Battery/location	Ah/-	90/luggage comp	
Alternator		A/W	120/1680		
Chassis/power transmission	Front suspension		Double-joint spring strut axle with track control arms and tie-rods		
	Rear suspension		Integral axle		
	Brakes, front		Two-piston swing-calliper disc brakes		
	Diameter	mm	334, vented		
	Brakes, rear		Single-piston swing-calliper disc brakes		
	Diameter	mm	328, vented		
	Driving stability system		ABS, DSC, CBC		
	Steering, overall ratio		Rack-and pinion power steering, 20.5:1		
	Type of transmission		SG 6		
	Transmission ratios	I	:1	4.227	
		II	:1	2.528	
		III	:1	1.669	
		IV	:1	1.226	
		V	:1	1.000	
	VI	:1	0.828		
	R	:1	3.746		
Final drive ratio			3.38		
Tyres	front		245/45R18W		
	rear		275/40R18W		
Wheels	front		8 J x 18 LM		
	rear		9 J x 18 LM		
Performance	Power-to-weight ratio	kg/kW	5.64		
	Output per litre	kW/ltr	59.5		
	Acceleration	0-100 km/h	sec	4.7	
		standing-start k	sec	23.4	
	in 4 <sup>th</sup> gear	80-120 km/h	sec	4.3	
Top speed		km/h	250 <sup>2)</sup>		
Fuel consumption	EU cycle	(ltr/100 km)			
	EU, urban		21.1		
	EU, extra-urban		10.6		
	EU, overall		14.5		
CO <sub>2</sub> g/km			349		
° Weight, unladen, including 75 kg for driver		1) Applies to car with hardtop 2) Limited			
These specifications are for the German market. Deviations from the model variants described here are possible in various countries.					

**BMW Z8 5.0 V-8-cylinders**

**M 2000**





Maße/Mesures in mm/millimetres