



Press Release

## **25 years of BMW 12-cylinder engines: setting new standards in the luxury class.**

**Munich.** BMW's second-generation 7 Series, unveiled in 1986, featured two new top-of-the-range sedans whose formidable six-cylinder in-line engines generated universal enthusiasm in the motoring media. Nevertheless, it was an open secret that an even bigger star was waiting in the wings: the first German 12-cylinder luxury model in half a century.

Expectations were running high, fuelled by BMW's release of various advance details of the new model's technical specifications. In September 1986, one news magazine informed its readers: "BMW will be opting for an aero engine-style design. That means most engine systems on the 12-cylinder 7 Series model, which is due for market release in June 1987, will be duplicated. There will even be two lambda sensors. And even if half the engine capacity failed, for some reason, speeds of over 200 km/h would be possible even on just six cylinders." Last but not least, BMW's development chief at the time was quoted as saying: "if the engineers wanted to go for nothing but the best of everything, we didn't try to stop them."

The rumour mill was rife with speculation about the future top-of-the-line engine's capabilities. One story doing the rounds claimed that: "BMW is doing everything it can to promote a sense of exclusiveness and cachet. They even want the licensing authorities to allow them to state the performance not in figures but in words – to the effect that the engine is appropriate in power and performance for the requirements of the vehicle."

In February 1987, BMW finally put an end to the speculation and released the technical specifications of the 12-cylinder engine in the new BMW 750i, ahead of its world debut at the Geneva Motor Show the following month. The new engine, which had been designed completely from scratch, would develop 300 horsepower from a displacement of five litres. Its refinement, low noise levels and excellent balance between performance and fuel consumption set new benchmarks in engine design. These objectives were achieved by using state-of-the-art technologies and a raft of innovative ideas right across the board. In short, the BMW 750i's 12-cylinder engine had been built with the aim of setting

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a new and groundbreaking benchmark that would occupy the highest echelons of automotive engineering.

**“Definitely the finest engine built”: over 3,000 pre-orders even before its Geneva debut.**

The motoring media had no doubts at all. The 12-cylinder engine, seen first-hand at last in Geneva, was “definitely the finest engine ever built by the Munich engine plant”. Visitors flocked to admire a compact exhibit comprising the V12 engine, transmission block and front axle. Illuminated display boards revealed the advantages of this engineering masterpiece such as its “unlimited power combined with silky-smooth running”. This was illustrated by a picture showing “coins balanced on the engine block which remained upright even when the engine was running”.

The market – and not just confirmed BMW customers – had long been waiting for a luxury sedan like this: the sales office had received over 3,000 pre-orders even before the first official showing of the BMW 750i. And in due course, just 10 months after the launch of the first models in the new BMW 7 Series, the new flagship 12-cylinder model joined the range as well. It was offered in two versions: the 750i and the 750iL long-wheelbase version. Both were a class apart: an all-new vehicle as impressive in terms of individual details as in its overall balance, and harmoniously mated with an engine of unprecedented power and refinement. At the same time there was no denying the close affinity between the 750i and its two six-cylinder siblings, the 730i and 735i. The timelessly modern sedan, with its elegant, crisp, uncluttered lines, epitomised the distinguished sporty elegance of the new 7 Series. Nevertheless, small but subtle differences set the flagship model apart.

**Hallmarks: wider twin-kidney grille and squared-off exhaust pipes.**

It was the frontal view of the 12-cylinder model that was most distinctive. The BMW twin-kidney grille and the vent on the bonnet were considerably wider than on the other models due to the increased cooling requirements, further accentuating the dynamic elegance of the 12-cylinder model. The six- and 12-cylinder 7 Series models could also be told apart by their tailpipes, which on the 750i were squared off, symbolically echoing the kidney grille at the front.



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The long-wheelbase 750iL was particularly distinguished and elegant in appearance. Not only was it 114 millimetres longer than the other 12-cylinder model, its lines were even more refined and – a particularly important requirement – it offered easier boarding and alighting for passengers as well as even more generous space at the rear. The extra length was added in the rear door area, leaving the front and rear overhangs untouched. The big advantage of this solution was that it left the weight distribution between the front and rear axles largely unchanged. As a result, the excellent handling of the BMW 7 Series in general was a hallmark of the long-wheelbase version too. It boasted what all the experts had cited about the other 7 Series models too: it combined the spaciousness of a luxury sedan with the easy handling of a compact car. So even in this BMW segment, the accent remained firmly on driving enjoyment.

#### **BMW 750iL: long-wheelbase version offering superlative comfort.**

The BMW 750iL set new standards. Many of its functions, based on the advanced electronics of the 7 Series, were unique. The BMW 750iL was equipped as standard with a four-speed automatic transmission, while likewise standard-fitted self-levelling rear suspension maintained a constant ride height at all times, and a new on-board computer monitored all vehicle functions. Also new was the Servotronic power steering system. The principal advantage of this system was that unlike conventional power steering systems, which were engine rpm-based, this new electronic system was solely vehicle speed-based, and therefore offered a wider range of power assistance. When the vehicle was stationary, the steering could literally be turned from lock to lock using a single finger, yet conversely, when driving at speed, the system provided the kind of direct road feel previously confined to the sportiest of such systems. Features like the new high-pressure headlight washer system, the high-intensity windscreen washer and the infrared central locking system completed the specification list.

The L-version's occupants were treated to the highest levels of comfort. A new feature was the automatic climate control with separately variable temperature control for the two sides of the vehicle and pre-programmable auxiliary ventilation. This climate control system also provided three different automatic air distribution settings. These three programmes could be separately selected



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for the driver and passenger sides of the vehicle, giving a total of six different options. It was also possible to separately control the footwell air distribution. The interior came with full nappa leather upholstery as standard. In addition to the seats, head restraints and rear centre armrest, this leather was also used on the door panels, the B-pillars, the centre console, the transmission tunnel, the underside of the instrument panel and the glove compartment. The leather upholstery was available in seven different shades, and could therefore be closely coordinated with the exterior paintwork. Optionally, the all-leather upholstery was also available in buffalo leather.

Rear-seat passengers in the 750iL were particularly privileged. Like the front seats, the two single rear seats offered multiple electric adjustment of both the seat squab and the backrest. The standard-fitted rear head restraints, likewise electrically adjustable, only emerged from their rest position when pressure was detected on the seat squab. The purpose of this was to prevent the head restraints restricting rear visibility when the seats were not in use. As soon as a passenger got into a rear seat, the head restraint popped up automatically. Reading lights and a rear windscreen blind were further amenities for rear-seat passengers.

### **Two in one: world debut of Electronic Damper Control.**

The launch of the 750i marked the beginning of a new era in ride comfort in the luxury class, with the world debut of Electronic Damper Control. Offering two selectable damping settings, this system allowed drivers to choose between a soft, comfort-biased setting and tauter, sportier characteristics. The dual-rate shock absorbers each comprised two independently actuated valve systems, operating in double pistons. An electric motor was used to switch between the two damping rates. The two valve systems for the first time allowed the compression and rebound damping characteristics to be matched to either sporty or comfort-oriented requirements. The two damping rates differed by a factor of 3, i.e. the sporty setting provided approximately three times firmer damping than the comfort setting. All the driver had to do was to flick a switch on the centre console to select the required programme in advance.



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### **A handsome masterpiece: the 12-cylinder engine.**

Of course, the absolute highlight of the BMW 750i was its 12-cylinder engine. The aim had been to break new ground in engine technology at the highest end of the car market – and the results made a handsome sight. The five-litre V12 alloy engine set a new benchmark with an overall weight of 240 kilograms. Its maximum output of 300 hp at 5,200 rpm, with a specific output of 60 hp per litre of displacement, and maximum torque of 450 Newton metres at 4,100 rpm, went beyond any comparable competitor offerings of the time – even including engines without exhaust aftertreatment – and often by a large margin. This was achieved by using the very latest technologies and by the introduction of innovative ideas across the board.

Above all, the BMW 12-cylinder engine set out to combine optimal functional qualities with low weight. That inevitably meant using an aluminium crankcase. The two cylinder banks were positioned at an angle of 60 degrees and their main dimensions were similar to those of the 2.5-litre engine used in the BMW 325i, including a bore of 84 millimetres. The forged seven-bearing crankshaft had a 120° crankpin offset, while the trapezoidal bowls in the piston crowns formed part of the combustion chambers. The result was added volume, with centrally positioned spark plugs, within compact dimensions. The advantages were short flame paths and virtually complete mixture combustion. The absolutely identical cylinder heads had very narrow valve angles and vertical inlet ports. Like the pistons, they were designed to ensure excellent cylinder charging and thus high internal efficiency.

Also groundbreaking on the new 12-cylinder unit was the engine management system: two entirely separate state-of-the-art electronic management systems, one for each bank of cylinders, controlled fuel injection and ignition. A particularly advanced feature was the interfacing between the engine management and other electronic systems such as the transmission controller and the ASC and MSR stability programmes.



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### **15 years in the making: the forerunners of the V12.**

The engine of the 750i was the first post-Second World War 12-cylinder engine from a German manufacturer to appear in production form. But it was not the very first 12-cylinder engine BMW had actually built during that time. Following the development of the legendary BMW six-cylinder engine of 1971, it was decided in early 1972 to carry out exploratory work on a 12-cylinder engine under the project codename M33. The obvious solution was to combine two six-cylinder units to create a V12 with 60-degree cylinder bank angle. By 1974 an engine had been built which had a displacement of five litres, was equipped with petrol injection and developed maximum output of 300 hp.

However, with a weight of 315 kilograms, this engine was too heavy. Therefore, BMW began a second development project based on the newer, smaller six-cylinder engine. The M66, too, was a 60-degree V12, and two displacement versions – 3.6 and 4.5 litres – were developed. The larger version, whose output was bench-tested at 275 hp in 1977, was 40 kilograms lighter than the M33. However, in due course this project, too, was shelved due to the increasingly critical situation on the world energy markets, which was hardly the right climate in which to launch a 12-cylinder sedan.

By 1982 the situation had eased significantly, and in November of that year the BMW development team resumed their talks. It was not long before it became clear that this time the new top-of-the-line engine would not simply be created by merging two existing six-in-line engines. Instead, it was decided to develop a new engine from scratch. Design work began on December 1, and less than a year later, in early October 1983, the first powerplant was already purring away on the test bench.

### **BMW 750i: the right concept at the right time – and still an impressive machine today.**

This engine, which in due course made it to the production line, gave the new sedan impressive performance: “The power comes on stream without any fuss whatsoever, and without any hint of aggressiveness. At the same time the effortless and smooth power delivery is coupled with powerful acceleration, which commands respect. And in terms of smoothness, the BMW machine is



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definitely streets ahead,” reported Germany’s leading motoring magazine, clearly impressed. “Upwards of 150 km/h, you won’t even hear the V12 engine at all; any sounds from it are replaced by road noise and wind noise. The typical BMW dynamic performance leaves nothing to be desired either. With its smooth revving up the range and eager acceleration, you almost want to rev the engine just for the fun of it,” enthused one tester. “You can feel your head being gently but firmly pushed back as the vehicle accelerates – which it continues to do until the speedometer needle has climbed to just over 260 km/h. Even at top speed, this long 12-cylinder model maintains an impeccably straight line.” In agreement with other vehicle manufacturers and taking into account the tyre capabilities of the time, the top speed of the BMW 750i was electronically limited to 250 km/h. Otherwise the car would have been perfectly capable of carrying on up to a top speed of around 270 km/h.

That first 750i has lost very little of its appeal, even today. “The driving experience in the large BMW is as awesomely effortless as the styling,” reports a leading classic car magazine. “The car purrs with energy, it has amazing capabilities, and its smoothness and balance are exemplary. Slip it off the leash and its attacking instincts are ferocious. The short-wheelbase version in particular is a sports car in all but name.” Clearly, the first BMW 750i was, is and remains an exceptional automobile.

### **1994: a new 750i – more powerful, refined and fuel-efficient.**

In July 1994, the meteoric career of the first 12-cylinder BMW 7 Series model drew to a close, as the first 750i bowed out to make way for a new generation. Around 50,000 of these cars had been sold. In other words, almost one in six 7 Series models were fitted with the V12 engine. Clearly, the aim of placing such a special flagship at the head of the model range had been a complete success. It was a foregone conclusion therefore that the third BMW 7 Series would be headed by a 12-cylinder model too. The first customers took delivery of this new BMW 750i in autumn 1994. The BMW’s head of development, speaking at the press launch, commented: “We’ve done our level best to raise the bar yet again.” The new sedan boasted exceptional qualities: generous comfort, low vibration and noise, excellent suspension and an ergonomic, luxurious interior. Developed on the basis of the M70, the M73 had a displacement of 5.4 litres





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and produced maximum output of 326 hp. The increase in maximum power had not, however, been the primary development goal. The accent had been on achieving an approximately 13 per cent improvement in fuel efficiency, on reduced emissions and on improving the refinement of the new 12-cylinder model. These goals were attained by reducing friction losses, for example by using roller rocker arms, and by increasing the compression ratio from 8.8:1 to 10.0:1, for efficient operation on premium unleaded fuel. The power was managed by a five-speed automatic transmission with adaptive control. The further improved DSC system provided stability control and optionally, for the first time, an on-board computer with navigation capability was available.

#### **The third BMW V12 sedan: 760i with direct injection and active suspension.**

The BMW 750i continued to carve out a successful career, and sales of the first two generations of the 750i/iL had reached exactly 73,776 units by the time the next BMW 7 Series was introduced to the public in autumn 2001. The new model's typical BMW qualities quickly positioned it as the trendsetter in the luxury class. The innovative, intuitive iDrive controller and the characterful design language confirmed BMW's position as a technology and innovation leader. And a new 12-cylinder flagship soon followed, in late 2002. Bristling with high-end drivetrain technology and luxurious specification, the 760i/Li top-of-the-line models, whose six-litre V12 engine delivered a maximum output of 445 hp, set new superlatives in automotive engineering, above all with their 12-cylinder engine – the world's first ever direct-injection 12-cylinder unit. The new model also boasted four valves per cylinder and VALVETRONIC fully variable valve timing. Also, no other luxury-class sedan offered customers such a wide choice of options for tailoring this high level of driving refinement to their own personal requirements. The highest, and optimal, specification level was an unprecedented combination comprising the 12-cylinder engine, six-speed automatic transmission, Dynamic Drive active suspension, EDC-K Electronic Damper Control and pneumatic rear suspension.

#### **The new BMW 760i/760Li: top performance in every way.**

Needless to say, the current BMW 7 Series likewise includes a 12-cylinder flagship model. Its engine, internally codenamed the N74, was completely





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redeveloped in 2009. Thanks to BMW TwinPower Turbo technology, direct petrol injection and Double-Vanos continuously variable camshaft timing, this new V12 sets the benchmark not only for performance and refinement but also for remarkable efficiency.

Displacing 497.7 cc per cylinder, the engine offers exactly the dimensions acknowledged by engine specialists as ideal. A bore of 89 millimetres and a stroke of 80 mm provide a ratio between these two parameters of 0.9. This turbocharged engine (compression ratio 10.0:1) develops maximum power of 400 kW/544 hp at 5,250 rpm from a displacement of 5,972 cc. Peak torque of 750 Newton metres is maintained between 1,500 and 5,000 rpm.

With the standard-fitted 8-speed automatic transmission, the BMW 760i achieves a 0 – 100 km/h acceleration time of just 4.6 seconds, on the way to an electronically limited top speed of 250 km/h. Nevertheless, average fuel consumption is just 12.8 litres/100 km, corresponding to CO<sub>2</sub> emissions of 299 g/km.

Every aspect of the all-aluminium engine block was designed to provide maximum rigidity combined with reduced weight – for example with a “closed-deck” crankcase design, i.e. the cylinder head is bolted to the crankcase bedplate for maximum rigidity. And with its 60-degree cylinder bank angle, the V12 comes closer to the physical optimum in terms of vibration performance than any other engine of this type.

It all results in a remarkable engine sound. At idle and when driving at constant speed, you would have to look at the rev counter to be absolutely sure that the engine was running. Controlled by the engine management system as a function of engine operating parameters, rear silencer exhaust flaps precisely match the engine sound to the current driving situation. At higher rpm, for example, the engine sound gives the driver audible feedback on the amount of power being delivered. Particularly vehement acceleration is accompanied by a powerful V12 sound, which faithfully reflects the dynamic character of the BMW 12-cylinder engine.



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Superior suspension technology, meanwhile, ensures that both the BMW 760i and the BMW 760Li deliver breathtakingly dynamic handling and unsurpassed comfort. Standard specification on both models includes Integral Active Steering, Dynamic Damper Control with Driving Experience Control and Dynamic Drive roll stabilisation. Like all current members of the BMW 7 Series family, this top-of-the-line model is equipped with air suspension, including self-levelling rear suspension.

Visual differentiation from the other versions of the BMW 7 Series includes V12 badging, V12 door sill finishers, twin tailpipes on either side of the rear apron, more extensive wood trim and opulent standard specification.

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#### **The BMW Group**

The BMW Group is one of the most successful manufacturers of automobiles and motorcycles in the world with its BMW, MINI, Husqvarna Motorcycles and Rolls-Royce brands. As a global company, the BMW Group operates 29 production and assembly facilities in 14 countries and has a global sales network in more than 140 countries.

In 2011, the BMW Group sold about 1.67 million cars and more than 113,000 motorcycles worldwide. The profit before tax for the financial year 2011 was euro 7.38 billion on revenues amounting to euro 68.82 billion. At 31 December 2011, the BMW Group had a workforce of approximately 100,000 employees.

The success of the BMW Group has always been built on long-term thinking and responsible action. The company has therefore established ecological and social sustainability throughout the value chain, comprehensive product responsibility and a clear commitment to conserving



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resources as an integral part of its strategy. As a result of its efforts, the BMW Group has been ranked industry leader in the Dow Jones Sustainability Indexes for the last eight years.

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