

# BMW

## U.S. Press Information

### **Introducing The All-New 5<sup>th</sup> Generation BMW M5**

**Woodcliff Lake, NJ – June 22, 2011...** Since the “M5” badge was first placed on the deck lid of a BMW back in 1988, this iconic model has exemplified the luxury and daily usability of a top range BMW sedan combined with true super-car performance. Now, in its 5<sup>th</sup> generation, the all-new BMW M5 is again poised to redefine the performance envelope possible in a luxury sedan.

The new BMW M5 is a high-performance sports car whose exceptional dynamic potential is geared squarely towards the demands of track use, while – at the same time – sets a new benchmark in daily driving with its touring comfort and innovative equipment features. It also sets the pace in its class in terms of efficiency.

In order to achieve these lofty performance goals, the new BMW M5 introduces the most powerful engine ever fitted in a series-produced model from BMW M GmbH mated to a new high-torque 7-speed M-Double Clutch (M-DCT). An innovative Active M Differential, which optimizes power transfer to the rear wheels combined with extensive chassis upgrades developed on the history of extensive racing expertise, ensures that the engine’s performance can be transferred to the ground.

Under the hood of the new BMW M5 lies a newly developed, high-revving V8 engine with M TwinPower Turbo (consisting of Twin Scroll Twin Turbo technology, a cross-bank exhaust manifold, High Precision Injection fuel direct injection and VALVETRONIC fully variable valve control), maximum output of 560 hp (US preliminary figure) (412 kW) at 5,750 – 7,000 rpm and peak torque of 500 lb-ft (680 Nm) between 1,500 and 5,750 rpm. The instant power delivery and sustained thrust that M cars have built their reputation on results in an acceleration of 0–62 mph (0–100 km/h) in 4.4 seconds and 0–124 mph (0–200 km/h) in 13.0 seconds. While the engine’s output has increased by around 10% and maximum torque is up by more than 30%, the new BMW M5 consumes roughly 30% less fuel and has substantially higher range than its predecessor.

The significantly improved balance between the performance-focused M experience and the car’s fuel consumption originates from the efficiency of the new V8 engine and from leading edge BMW EfficientDynamics technology, including the Auto Start-Stop function in conjunction with the standard seven-speed M Double Clutch Transmission with Drivelogic.

In order to channel the engine's impressive power into inspiring performance characteristics, the new BMW M5 boasts chassis technology – including electronically controlled dampers, M-specific Servotronic steering, a stability control system with M Dynamic Mode and high-performance compound brakes – developed from racing expertise and tuned to the output profile of the engine.

In turn, the aerodynamics of the new M5 have been tuned to optimize the supply of cooling air to the engine and drivetrain, maximize high-speed stability and enhance the dynamic design typical of BMW M cars.

Ultimately, all systems have been refined in extensive and detailed testing on the Nordschleife circuit at the Nürburgring. This ensures unbeatable longitudinal and lateral acceleration, handling characteristics and braking performance on the circuit or the commute to work.

The interior design of the new M5 is a reflection of the dual performance/luxury nature of the car. Sports seats, an M leather steering wheel, and an M-specific instrument cluster and center console lend the cockpit a classical sports car feeling. For the first time, two M Drive buttons are fitted as standard for the driver to command the ideal car set-up for various driving conditions to their own individual preferences. “Efficient,” “Sport” and “Sport Plus” modes are available.

Top-quality materials, generous levels of space and the extensive range of standard equipment generate the premium, modern ambience of luxury. In addition, customers can give their car the personal touch since virtually the full range of options for the BMW 5 Series Sedan is also available for the M5, including a host of BMW ConnectedDrive mobility services and driver assistance systems.

The engine: High-Revving V8 Engine with M TwinPower Turbo Technology.

The new BMW M5 engine has the highest output ever generated by a BMW M car, and at the same time provides the most efficient balance between performance and fuel consumption. It is characterized by immediate throttle response, a linear power curve and an unusually high and flat torque curve. The new engine produces around 10% higher output than the V10 engine of its predecessor and torque is up by over 30%. At the same time, fuel consumption and CO<sub>2</sub> are expected to be reduced by approximately 30%.

To achieve the performance levels demanded by the M5, the engineers at BMW M started with the proven BMW M-developed V8 engine from the BMW X5 M – X6 M (internally known as the S63)

and further developed it for its duty in the M5. Internally designated as the S63Tü, this new engine uses similar M Twin Power technology combined with the reverse flow V8 layout. The result is that the high-revving V8 engine with M TwinPower Turbo technology lends a whole new intensity to the powerful thrust at the higher rev ranges for which M cars are known. The 4.4-litre engine develops a peak output of 560 hp (412 kW) at 5,750 – 7,000 rpm (versus 555 hp at 6,000 rpm for the S63), while its maximum torque of 500 lb-ft (680 Nm) is on tap between 1,500 and 5,750 rpm (versus 500 lb-ft from 1,500 to 5,650 rpm for the S63). The rev limiter intervenes at 7,200 rpm (up 200 rpm from the S63 engine). The rev band, which offers extremely dynamic acceleration between peak torque and the availability of maximum output, is therefore almost three times as wide as that of the V10 engine in the previous generation M5.

As in the V8 engine of the X5 M, the two twin-scroll turbochargers are placed (along with the catalytic converters) in the V-space between the two cylinder banks. This layout results in an unusually compact engine where the intake is moved outboard and the exhaust inboard – the opposite of conventional V-engines. The lengths of intake and exhaust tracts are thereby reduced and their diameters increased, reducing pressure losses – especially on the exhaust side. A further advantage of the layout is the short distance between the cylinders' combustion chambers and the primary catalytic converters; this leads to quicker warm-up of the catalysts after the engine is started and therefore lower start-up emissions.

The patented crossover exhaust manifold, first introduced in the S63 engine of the X5 M is also employed in the S63Tü. This exhaust manifold is a special 8-into-4 setup that combines the exhaust from two cylinders (on opposite banks) that are 360° of crankshaft rotation apart from each other. Each of the eight runners is of identical length to ensure perfectly regular timing of exhaust gas pulses.

Each of the four manifold outlets is fed into each of the four available scrolls of the two twin-scroll turbochargers. The two scrolls of a twin-scroll turbo lead each exhaust pulse directly to the turbine without feedback or interference from other scroll (that are fed by cylinders at other points in the combustion process). Additionally, dividing the gases into two smaller paths (scrolls) results in higher gas velocity than in a single larger path. This enhances the turbocharger's response thereby reducing lag. The crossover manifold is configured so that second scroll of the turbo is fed by two cylinders that are 180° out of phase with the first scroll. In this way each turbocharger receives distinct exhaust pulses every 180° of crankshaft rotation (from one of four cylinders). Furthermore, the two turbos that receive exhaust pulses are 90° offset from each other. The result is that throttle

response is sharpened and turbo lag is reduced to a minimum. The new engine also sports larger air to liquid intercoolers and a tuned exhaust which results in the engine making power more quickly than previously possible. Finally, the S63Tü uses a maximum boost pressure of 1.5 bar (22 psi) absolute versus 1.2 bar for the S63 engine.

BMW's efficient High Precision direct fuel injection also plays a major role in this engine's combination of high performance and fuel efficiency. High Precision direct fuel injection ensures an extremely precise supply of fuel to the combustion chambers. Injectors positioned centrally between the valves within immediate range of the spark plugs spray the mixture into the combustion chambers with maximum pressure of 200 bar (nearly 3,000 psi), providing smooth and clean combustion. Innovative solenoid valve injectors in the new BMW M5 engine use multiple injections to achieve an extremely precise mixture preparation. The fuel also has a cooling effect on the combustion that allowed the M engineers to endow the engine with a high compression ratio: yet another technical attribute that contributes to both performance and efficiency, while also reducing exhaust emissions and even having a positive effect on how the engine sounds.

Throughout each of its four previous generations, the heart of the BMW M5 has been its high-revving, high output-per-liter engine fed by individual throttle plates. The new M5 engine introduces the VALVETRONIC variable valve control system for the first time on a BMW M engine – effectively providing 16 individual throttles.

VALVETRONIC is BMW's patented fully variable valve control system that eliminates the need for conventional throttles. Engine power is instead controlled directly by varying the amount of lift of the intake valves. Throttle losses in the gas cycle are minimized with this system, which has a positive impact on both the efficiency and torque. VALVETRONIC has also sharpened the responsiveness of this engine compared to the V10 engine it replaces.

The M TwinPower technology of the new V8 engine also includes BMW's Double VANOS<sup>1</sup> infinitely-variable valve timing system which optimizes the engine's efficiency and generates high torque at low engine revs. In addition, a volume-controlled oil pump and a range of other EfficientDynamics measures deliver an extra boost to efficiency. The new BMW M5 features both Brake Energy Regeneration and the Auto Start-Stop function, which automatically switches off the

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<sup>1</sup> VANOS = **V**ARIABLE **N**OCKENWELLEN **S**TEUERUNG = variable camshaft control, or variable valve timing.

engine when the car comes to a stop. The extensive use of efficiency-enhancing technology produces fuel consumption and emissions values to levels unmatched in this segment.

The engine's exhilarating thrust gives the new BMW M5 impressive acceleration. The sprint from rest to the 62 mph (0-100 km/h) mark is all over in 4.4 seconds and from that point progress continues with barely any let-up. Indeed, the M5 needs just 13.0 seconds to race from 0–124 mph (0-200 km/h). Maximum speed is electronically restricted to 155 mph (250 km/h).

M TwinPower Turbo technology also shapes the development of the V8 engine's soundtrack. The concept of crossover exhaust manifolds plays a key role in delivering a multi-layered collage of sound. The twin-tailpipe exhaust system of the new BMW M5 runs largely in a straight line and has a large cross-section. The two exhaust gas ducts feed into a single muffler from which the customary M twin tailpipes extend out through the far left and right-hand sides of the rear apron.

#### **7-speed M Double Clutch Transmission with Drivelogic.**

The new V8 engine M TwinPower Turbo engine is mated to a newly developed 7-speed double-clutch transmission designed to handle the high torque and high revving nature of the engine. The M DCT with Drivelogic System developed especially for the new M5 has been tuned to the performance characteristics of the engine. It delivers exceptionally fast and clean gear changes in both automatic mode (D) and manual mode (S). No clutch pedal is required for manual gearshifts and the driver can keep their foot on the accelerator during gear changes. The driver uses the model-specific M gear selector to choose between D and S mode and to engage reverse. The transmission offers a sequential shift pattern for the manual gearshift mode. Alternatively, the driver can also change gears manually using the shift paddles on the steering wheel – the right-hand paddle upshifts, the left-hand paddle for downshifts. Comfort is further enhanced by the new Low Speed Assistance function, which smoothes power delivery in stop-and-go traffic with a light touch of the accelerator pedal.

M DCT with Drivelogic offers three shift programs in both automated and manual mode. The driver selects his/her desired mode using the rocker switch positioned immediately behind the shift lever on the center console. The D1 program is selected automatically when the engine is started, tailoring gear selection to deliver the most efficient possible driving style. D2 mode supports laid-back cruising with gear changes carried out according to engine revs and load. And, to promote a sporty driving style laced with dynamic acceleration, shift times in D3 mode are set up to delay gear changes until the engine has climbed higher up the rev range.

The driver can also adapt the shift characteristics to their requirements in manual mode. S1 mode generates comfortable and smooth gear changes. In S2, the gear changes are completed noticeably faster and accompanied by significant shift kick at higher revs. S3 is the one to choose for maximum driving dynamics; it enables even sportier gear changes and is required to initiate the Launch Control function. When the stability control system is switched off, Launch Control allows the driver to achieve maximum acceleration from a standstill as permitted by conditions. During a launch control acceleration, each gear change takes place automatically and at the optimum engine speed.

### **Active M Differential.**

The Active M Differential in the new M5 is an electronically controlled multi-plate limited-slip differential programmed to optimize traction, stability and sporting character.

The rear axle's multi-plate limited-slip differential works with high precision and speed. Its control unit is connected with the Dynamic Stability Control (DSC) system via FlexRay high-speed data transfer technology and constantly cross-checks the data collected by its sensors with the feedback from DSC. It then uses this information to calculate the locking force required to deliver optimum traction and stability. The data recorded by DSC sensors is also passed on if the stability control system is switched off. The locking force within the differential can be varied continuously between 0 and 100%. The ABS system retains full functionality in all situations.

In addition to its own data and that provided by DSC, the Active M Differential's control unit also takes into account the position of the accelerator pedal, the rotational speed of the wheels and the car's yaw rate. Every driving situation is therefore analyzed so that any loss of traction on one side of the car is identified at an early stage. The degree of lock is adjusted as required within a fraction of a second, enabling wheel spin to be prevented on slippery surfaces, when the right and left rear wheel have widely differing friction coefficients, and in tight corners. Optimizing traction in this way also provides unbeatable driving stability in challenging conditions and allows impressive dynamic acceleration out of corners.

### **M-Specific Chassis.**

Each component in the suspension and chassis of the new M5 has been developed based on the extensive race expertise of BMW M engineers. Specially tuned axle kinematics and newly developed suspension components boasting impressive strength and minimized weight meet both the requirements of everyday road driving and the specialized demands of track use. Reinforced

chassis mountings at the front and rear axles ensure that dynamic forces are passed evenly through to the body structure. The result is that the BMW M5 continues the BMW M tradition of engineering a chassis that is faster than the engine. As with every BMW M car, the engineers carried out the fine-tuning during extensive testing on the Nürburgring Nordschleife circuit.

Dynamic Damper Control (DDC) electronically controlled dampers are standard on the new BMW M5. DDC uses electro-hydraulic damping force adjustment to provide a set-up suited to the driving situation and the wishes of the driver. The damper settings can be adjusted at the touch of a button. In “Comfort” mode the dampers respond adaptively to the condition of the road surface and the driver’s style. “Sport” mode activates a noticeably stiffer damper set-up, while “Sport Plus” allows further stiffening of the suspension to achieve maximum longitudinal and lateral acceleration in ultra-dynamic driving situations.

At the touch of a button, the driver can also select from three settings for the M-specific Servotronic speed-sensitive power steering. “Comfort” mode requires only a small amount of steering force when parking or maneuvering, but still provides the M brand’s hallmark direction-changing precision at higher speeds. “Sport” ensures the driver enjoys more intensive feedback across all speed ranges. “Sports Plus” is the highest level of steering dynamics that can be selected where the driver is called on to use even greater force with the steering wheel.

The new BMW M5 also uses BMW’s most advanced Dynamic Stability Control (DSC) and Anti-lock Braking System (ABS) that includes Cornering Brake Control (CBC), Dynamic Brake Control (DBC), Brake Assistant, brake fade compensation, a Brake Drying function and Start-off Assistant. The DCS system has three levels of operation. The default is “DSC On” which provides the greatest level of stability and traction control. M Dynamic Mode (MDM) can be activated to override the basic setting by pressing the DSC button on the center console. This mode allows for very spirited driving – as on a race track – while still providing safety by raising the intervention thresholds of DSC. “DSC Off” mode can also be activated at the touch of a button for complete deactivation of the system.

### **High-Performance Brake System.**

The high-performance braking system of the new BMW M5 guarantees outstanding stopping power matching the overall performance of the car. The typical BMW M compound rotors have been further improved for the new M5. These rotors thermally separate the central hub (constructed of aluminum) and the vented and cross-drilled cast iron rotor disk. As a result, the rotors are free to

expand and contract without warping. Six-piston fixed-calipers are radically bolted to the pivot bearing. Together, the brake system provides exceptional braking performance, fade resistance and pedal feel.

The standard M5 wheel and tire combination is 19 in. M-specific light alloy wheels fitted with 265/40 R19 tires in the front and 295/40 R 19 tires at the rear. 20 in. forged M light-alloy wheels can be ordered as an option.

**Design: Exterior.**

The design of the BMW M5 showcases its stand-out character. The dynamic proportions and stylish authoritative appearance of the BMW 5 Series Sedan have been further enhanced by the addition of M-specific design features. The carefully selected enhancements are geared to meeting technical demands, making them a central element of the Sedan's performance. The car's extraordinary potential is highlighted subtly and with impressive authenticity by the distinctive design elements on its front, sides and rear end.

The design of the front fascia embodies the impressive power of the new V8 engine. The contour lines of the hood converge in a V to the brand's hallmark double-kidney grille. The wide-spread arrangement of the customary M black slats – like the three air intakes in the lower section of the front apron – emphasizes the engine cooling capacity behind the grille. The arrangement of the air intakes over various levels creates an impressive depth which accentuates the dynamic, forward-thrusting appearance of the Sedan.

The functional significance of the forward-projecting central aperture is emphasized by the width of the car, which spreads out towards the road surface, and the protruding form of the contour lines. The two side air intakes have a dynamic curving form positioned far to the outer edges of the car. It emphasizes the wide track and fills the spaces in the front apron of the BMW 5 Series Sedan normally reserved for fog lamps. At the lower edge of the front end, air-channeling flaps developed on the race track ensure optimized aerodynamics.

The standard Adaptive Xenon headlights of the new BMW M5 generate the daytime running lights with visually unique LED light rings. The indicator lights positioned on the car's outer edges each consist of 10 LED units. LED accent lights cut across the top of the customary BMW twin round headlights to perfect the intent look – both during day and night-time driving – characteristic of all BMW models.

The long wheelbase, set-back passenger compartment and High-gloss Black side window borders clearly accentuate the stretched silhouette of the new BMW M5. Muscular flared wheel arches spotlight the wide track. Wheels sitting flush with the bodywork and a 13mm lowered suspension enhance the car's sporting presence when viewed from the side. The unique 19-inch M light-alloy wheels in double-spoke design also assist in defining its presence and road holding dynamics. The lightweight construction of the optional 20-inch forged wheels is highlighted by its five slim double-spokes. This design clears a line of sight to the high-performance brakes with six-piston fixed calipers, hinting at the precision with which the driver can modulate the car's braking prowess.

The front fenders carry a fresh take on the hallmark M grilles. The three-dimensional shaping, a wide chrome frame and the free-floating look of the indicator bar, which bears the M logo, give the intakes an extremely deep-set look. The aerodynamically optimized form of the exterior mirrors is emphasized by a horizontal crease. The mirror caps are painted in body color, the mirror base and lower edge in High-gloss Black.

The sills of the new BMW M5 also have a unique design of their own. A particularly powerful bulge at the back end of the skirts and a crease rising slightly to the tail divert the eye to the rear wheel arches – and therefore to the drive axle of this high-performance sports sedan.

The design of the rear fascia provides an effective expression of the superior sports performance of the new BMW M5. There are further design elements of the new BMW M5 that focus on the car's width through the dominance of horizontal lines driving additional emphasis to an athletically formed rear fascia. The tailored rear fascia of the M5 provides a fluid transition into the wide wheel arches, drawing even more attention to the drive forces channeled through the rear wheels.

A diffuser integrated into the lower edge of the rear fascia provides efficient air flow out the rear of the car under the floor section. A signature M feature of the new BMW M5 is the twin-pipe exhaust system, where tailpipes are positioned wide to either side of the diffuser and have aerodynamically formed surrounds. The subtle Gurney-style rear spoiler on the trunk lid also aids the car's aerodynamics by providing additional downforce at high speeds.

The L-shaped rear lights fit the brand's template down to the distinctive night-time look. Three LED-powered light strips shape the face of the characteristically homogeneous units, and the turn signals and brake lights are also fed by LED units. The reflectors are arranged immediately below

the rear lights. This is higher up on the rear apron than normally located on the regular BMW 5 Series Sedan and accentuates the car's powerful muscular form.

**Design: Interior.**

The interior of the new BMW M5 brings together the incomparable combination of a driver-oriented cockpit design of a sports car, the spaciousness and luxurious feel of a premium automobile. Customized M sports seats, Merino extended leather upholstery, door sills with "M5" lettering, an M driver's footrest, exclusive Aluminum Trace interior trim strips and the BMW Individual roof liner in Anthracite are all standard equipment, as is the iDrive control system with a 10.2-inch Control Display. This screen is centrally positioned and like the controls in the central section of the instrument panel, slightly oriented towards the driver.

The instrument cluster with black-panel-technology includes classic circular instruments in traditional BMW M car style, with red needles and white illumination, as well as model-specific displays and the M logo on the rev counter. The shift program currently selected and gear engaged are shown in the center of the instrument cluster. Feedback from all the drive and chassis settings selected at the touch a button are also displayed in the cockpit.

**Sports Car Cockpit – Custom Tailored.**

**M Drive Buttons.**

On the left-hand steering wheel spoke, the driver has two M Drive buttons which can be used to call up a pre-configured set-up for the car. For example, the driver can save a sporty configuration using the "M1" button and a comfort-biased set-up via the "M2" button. The set-up selected will remain activated until it is either cancelled by pressing the button again or the driver switches to another M Drive setting. Once the system has been switched off – as when the engine is started – it reverts back to a default configuration focusing on efficiency and ride comfort.

The M Drive system in the new BMW M5 allows the driver to adjust no fewer than six parameters: the engine management, the responses of the Servotronic steering system, the M DCT with Drivelogic shift program, the DSC mode, the responses of DDC and the information in the Head-Up Display. The desired settings for the engine, chassis systems and Head-Up Display can be configured in any combination via the iDrive menu. Plus, the driver can also save the current set-up configuration selected earlier using the buttons on the center console by holding down one of the two M Drive buttons for a few seconds. For safety reasons, a set-up involving the DSC settings "MDM" or "DSC Off" requires confirmation from the driver – by pressing the M Drive button

again – before it can be activated. The set-up configuration selected is shown by a clear symbol displayed in the instrument cluster.

### **Head-Up Display.**

The M Drive configuration also includes the information shown on the standard Head-Up Display and projects important information onto the windscreen directly in the driver's field of vision. A full spectrum of colors is used to display graphics and symbols and the all-color capability means road sign symbols can be reproduced very realistically. In addition to a digital speed read-out, the M-specific version of the Head-Up Display also shows the gear currently engaged and a color rev counter symbol, complete with Shift Lights.

### **The Body Structure and Safety.**

The hallmark M handling and occupant protection both are made possible due to the extraordinary strength of the BMW M5 body structure. Incredibly, durable load-bearing structures and large precisely defined deformation zones keep the forces released in a collision away from the extremely stiff passenger compartment. The new BMW M5 includes front and side airbags, side curtain head airbags for both rows of seats, three-point inertial reel seat belts on all seats, front belt force limiters, seat belt tensioners, and ISOFIX child seat attachments in the rear all as standard equipment.

The BMW M5 weight is minimized by an intelligent mix of materials containing a high proportion of high-tensile and ultra-high-tensile steel, as well as aluminum. The hood, front fenders and doors of the new BMW M5 are made of aluminum. With a power-to-weight ratio of approx. 71b/hp, the high-performance Sedan represents a substantial step forward from its predecessor.

The new BMW M5 is expected to arrive in authorized US BMW Centers in the Spring of 2012. Pricing, US technical specification, EPA mileage ratings, standard and optional equipment will be announced closer to the on-sale date.

## **BMW Group in America**

BMW of North America, LLC has been present in the United States since 1975. Rolls-Royce Motor Cars NA, LLC began distributing vehicles in 2003. The BMW Group in the United States has grown to include marketing, sales, and financial service organizations for the BMW brand of motor vehicles, including motorcycles, the MINI brand, and the Rolls-Royce brand of Motor Cars; DesignworksUSA, a strategic design consultancy in California; a technology office in Silicon Valley and various other operations throughout the country. BMW Manufacturing Co., LLC in South Carolina is part of BMW Group's global manufacturing network and is the exclusive manufacturing plant for all X5 and X3 Sports Activity Vehicles and X6 Sports Activity Coupes. The BMW Group sales organization is represented in the U.S. through networks of 339 BMW passenger car and BMW Sports Activity Vehicle centers, 138 BMW motorcycle retailers, 105 MINI passenger car dealers, and 36 Rolls-Royce Motor Car dealers. BMW (US) Holding Corp., the BMW Group's sales headquarters for North America, is located in Woodcliff Lake, New Jersey.

Information about BMW Group products is available to consumers via the Internet at:

[www.bmwgroupna.com](http://www.bmwgroupna.com).

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