BMW ActiveHybrid 5.
Contents.

1. At a glance.

- World premiere of the BMW ActiveHybrid 5, the most powerful and efficient full hybrid in its segment.

- Exceptional balance between power output (250 kW/340 hp) and CO_2 emissions (149 g/km).

- Prominent electric driving experience; range under purely electric power: four kilometres (approx. 2.5 miles), top speed under purely electric power: 60 km/h (37 mph).

- Coasting mode (with the engine switched off) active at up to 160 km/h (100 mph).

- Forward-looking intelligent energy management.

- E-boost function delivers extremely dynamic acceleration.

- Stationary climate control as standard.

2. Intelligence breeds efficiency: The BMW ActiveHybrid 5.

BMW takes the development of intelligent hybrid drive systems to the next level with the introduction of the BMW ActiveHybrid 5 – another series-produced model in which a combustion engine and electric motor join forces to enhance both efficiency and the brand's hallmark driving pleasure. The BMW ActiveHybrid 5 brings together a BMW TwinPower Turbo six-cylinder in-line engine, an electric drive system and an eight-speed automatic gearbox for the first time. The latest generation of BMW ActiveHybrid technology also adds precisely controlled – and therefore extremely effective – energy management to the mix. All of which gives the BMW ActiveHybrid 5 an exceptional balance of performance and fuel economy for the premium executive car class. Its drive system generates combined output of 250 kW/340 hp, allows the car to be driven on electric power alone up to 60 km/h (37 mph), accelerates the BMW ActiveHybrid 5 from 0 to 100 km/h (62 mph) in 5.9 seconds, limits average fuel consumption to between 6.4 and 7.0 litres per 100 kilometres (44 – 40 mpg imp) and has CO_2 emissions of just 149 – 163 grams per kilometre (figures according to EU test cycle, may vary according to the tyre format specified).

The 225 kW/306 hp six-cylinder in-line engine with BMW TwinPower Turbo technology in the BMW ActiveHybrid 5 is the same unit renowned for its free-revving capability, pulling power and efficiency in the BMW 535i. The electric motor, meanwhile, develops 40 kW/55 hp and is supplied with energy by a high-performance lithium-ion battery integrated into the luggage area.

A harmonious blend of power from the two drive systems is transferred to the rear wheels by the eight-speed automatic gearbox. In addition to its full-hybrid construction, which enables purely electric and therefore emission-free driving in urban conditions, the BMW ActiveHybrid 5 boasts not only the sportiest performance in its market segment but also a double-digit percentage improvement in fuel economy over the BMW 535i.

In order to fully exploit the potential of the BMW ActiveHybrid technology, the intelligent energy management of the power electronics in the

BMW ActiveHybrid 5 uses a host of innovative functions to ensure the drive system runs efficiently. The lithium-ion high-performance battery is charged when the car is coasting or braking, the electric motor performing the role of a generator feeding energy into the high-voltage battery. By contrast, under acceleration the electric motor takes on a boost function. Here, it assists the petrol engine by generating an ultra-dynamic burst of power, lending the sedan's sporty driving experience a noticeably sharper edge. Added to which, while coasting at speeds of up to 160 km/h (100 mph) in ECO PRO mode, the combustion engine can be switched off and fully decoupled. This coasting mode combines comfortable driving with optimum utilisation of the kinetic energy already generated. To avoid periods with the engine running at idle – at junctions or in traffic tailbacks, for example – the BMW ActiveHybrid 5 is equipped with a hybrid start-stop function. Plus, the power electronics in the BMW ActiveHybrid 5 are linked up with the standard-fitted navigation system Professional. This allows forward-looking analysis of the driving situation, enabling the drive components to be primed to deliver maximum efficiency (the effect may vary according to the quality of the available navigation data). All the hybrid-specific components of the drive technology and energy management systems have been developed specially for use in the BMW ActiveHybrid 5. The result is an extremely well-rounded overall concept, which also provides a convincing demonstration of the BMW ActiveHybrid technology's qualities out on the road. Needless to say, all of the new hybrid components are designed to last for the life of the vehicle.

The BMW ActiveHybrid 5 sees the sporty yet elegant body design of the BMW 5 Series Sedan complemented by bespoke touches which highlight the identity of its drive technology. The "ActiveHybrid 5" lettering on the C-pillars, BMW kidney grille with galvanised slats and exhaust matt chrome tailpipes set the exterior apart from the other models in the range. Available as an option, meanwhile, are 18-inch Streamline light-alloy wheels displaying exceptional aerodynamic efficiency. The BMW ActiveHybrid 5 is the only model in the BMW 5 Series line-up to be available in the exterior paint shade Bluewater metallic, and it also stands out visually from all other 5 Series variants with door sill strips bearing "ActiveHybrid 5" lettering, an aluminium plate on the centre console with the same ID, a bespoke engine cover and the visible "ActiveHybrid Power Unit" inscription on the special casing for the high-performance battery accommodated in the luggage area.

The selection of interior colours, upholstery and interior trim elements reflect the range offered for the other BMW 5 Series Sedan variants. And added to the standard-fitted array of comfort-enhancing features is not only the navigation system Professional, but also a 4-zone climate control system with stationary air conditioning. A wide range of driver assistance systems and BMW ConnectedDrive mobility services, as well as virtually all the other optional extras available for the conventionally powered BMW 5 Series Sedan, can also be specified for the BMW ActiveHybrid 5.

Innovative combination: award-winning six-cylinder in-line engine, newly developed electric drive system.

This is the first time that a six-cylinder in-line engine has been included as part of a BMW ActiveHybrid system. The 3.0-litre petrol unit, which develops 225 kW/306 hp and peak torque of 400 Newton metres (295 lb-ft), represents a passport to increased driving pleasure and efficiency. The BMW TwinPower Turbo technology of the six-cylinder engine, which has already won the international Engine of the Year Award two years in succession, comprises a twin-scroll turbocharger, High Precision Direct Injection and VALVETRONIC variable valve timing.

The synchronous electric motor of the BMW ActiveHybrid 5 is integrated into the housing of the eight-speed automatic gearbox, saving space. The link-up between the electric motor and gearbox is controlled by a clutch and the motor's operating temperature is regulated by the combustion engine's cooling system. The electric drive system develops 40 kW/55 hp and makes 210 Newton metres (155 lb-ft) of torque available from rest. The motor is supplied with energy by a lithium-ion high-performance battery, likewise specially developed for the BMW ActiveHybrid 5. The high-voltage battery is encased in a special high-strength housing and positioned between the wheel arches in the luggage area, providing it with optimum protection. It consists of 96 cells, has its own cooling system and offers usable energy capacity of 675 Wh. The integration of the lithium-ion high-performance battery into the luggage area reduces the load capacity of the BMW ActiveHybrid 5 to 375 litres, 145 litres lower than that of a BMW 5 Series Sedan variant powered purely by a combustion engine.

The BMW ActiveHybrid 5 has both a conventional 14-volt power supply and a high-voltage supply with an operating voltage of 317 volts. They are linked up by a voltage transformer ensuring that maximum electric energy can be used to enhance driving dynamics and comfort in any operating phase. Like the electric motor, the air conditioning compressor is also fed with power from the lithium-ion high-performance battery exclusively via the high-voltage supply. This ensures a pleasant interior climate, even when the combustion engine is switched off – i.e. when the car is at a standstill, operating purely on electric power or in coasting mode. In addition, the stationary climate control function can be used to cool the interior before the engine is started up.

Intelligently controlled hybrid technology: unprecedented precision for superior efficiency.

Up to a speed of 60 km/h (37 mph), the BMW ActiveHybrid 5 can operate in all-electric mode for zero emissions in town. The lithium-ion high-voltage battery can store sufficient energy to give an all-electric driving range of up to four kilometres (approx. 2.5 miles) at an average speed of 35 km/h (22 mph).

The internal combustion engine is only started when the driver requires more power: it is then engaged automatically. The electric motor provides a “boost” function to supplement the engine when accelerating. Maximum combined power is 250 kW/340 hp, with maximum torque of 450 Newton metres. Under combined ICE/electric power, the BMW ActiveHybrid 5 delivers a 0 to 100 km/h (62 mph) acceleration time of 5.9 seconds.

Hybrid-specific Auto Start-Stop function and coasting mode.

Thanks to the specially designed Hybrid Auto Start-Stop function, there are no compromises on comfort even when the vehicle is stopped in traffic for longer periods – after the internal combustion engine is shut off, the automatic climate control simply runs off the lithium-ion battery. When the driver releases the brake, the vehicle will restart on either the electric motor alone or the electric motor and the petrol engine, depending on the high-voltage battery’s current charge level and on how much power the driver wants.

Another innovation being pioneered in the BMW ActiveHybrid 5 further improves efficiency by shutting the internal combustion engine down not only when the vehicle is stationary, or when driving in town, but also on overrun. In the BMW ActiveHybrid 5, this coasting mode is available at any speed up to

160 km/h (100 mph). Coasting mode switches off the petrol engine and disconnects it from the drive shaft. From this point on, the BMW ActiveHybrid 5 continues moving soundlessly, with zero emissions and with no engine braking effect. The potential efficiency improvements are further enhanced by tyres with reduced rolling resistance. In coasting mode too, as with all-electric mode for urban driving, all safety and comfort functions remain fully operational.

Intelligent energy management with proactive analysis of the driving situation.

The advanced power electronics coordinate the operation of the internal combustion engine and electric motor with precise reference to the driving situation. For even more efficient energy management in the BMW ActiveHybrid 5, this functionality has been extended to include proactive analysis of the driving situation. To support this, the power electronics are integrated with the standard-fitted Professional navigation system, which means they can access and analyse data indicating an upcoming change in external conditions or driver requirements at a very early stage. Based on this analysis, the vehicle can be prepared in advance for the relevant requirements so that all powertrain systems and the on-board electronics are managed appropriately and in such a way as to make the most efficient possible use of the available energy.

Factors that may cause a change in powertrain operating strategy include the topography of the route and speed limits. For example, if the system knows that a hilly stretch is coming up soon, the BMW ActiveHybrid 5 can invest all the high-voltage battery's electrical energy in providing supplementary driving power, since the battery will be recharged "at no cost" during the subsequent descent. On longer downhill sections the electric motor's generator function, too, can be enlisted to recharge the high-voltage battery with no loss of speed. The operating strategy can also be managed so as to ensure that the high-voltage battery is as fully charged as possible when nearing the end of the journey, thereby increasing the electric driving range on the "last lap".

The operating status of the powertrain components is shown in intuitive, model-specific displays in the instrument cluster and in the Control Display of the BMW ActiveHybrid 5. As well as the energy flow and energy recuperation

display, these include a further gauge next to the rev counter which shows the boost effect being provided by the electric motor during acceleration. A display in the iDrive interface provides a variety of information – for example on the lithium-ion high-voltage battery's current charge level and the power-sharing between the internal combustion engine and the electric motor in the course of a journey.

Exceptional hybrid model, typical BMW 5 Series: highest standards of driving dynamics, safety and comfort.

The chassis specifications of the BMW ActiveHybrid 5 include a double-wishbone front axle and integral rear axle, electromechanical power steering including the Servotronic speed-sensitive power assist function, a high-performance brake system and 17-inch alloy wheels. Dynamic Damper Control, featuring electronically controlled damping, is optionally available. The Dynamic Stability Control (DSC) system, which stabilises the vehicle by applying braking pressure and reducing engine power, also incorporates functions such as Dynamic Traction Control (DTC), the Anti-lock Braking System (ABS), Cornering Brake Control (CBC), Dynamic Brake Control (DBC), Brake Assist, Fading Compensation, a Dry Braking function and Start-Off Assistant.

The hybrid-specific safety features, which protect the lithium-ion high-voltage battery and the power electronics, are integrated in the BMW 5 Series' elaborate integrated active and passive safety concept. In a collision, high-strength structural components and large deformation zones help to keep impact forces away from the passenger cell and also from the hybrid drive components. Other standard safety systems on the BMW ActiveHybrid 5 include front and side airbags, side curtain head airbags for both rows of seats, three-point inertia-reel belts on all seats, belt force limiters and belt latch tensioners on the front seats and ISOFIX child seat attachments in the rear.

In the BMW ActiveHybrid 5, too, the standard-fitted Driving Experience Control switch offers not only Sport+, Sport and Comfort set-ups (as well as Comfort+ mode if the optional Dynamic Damper Control is specified), but also ECO PRO mode. The latter supports a particularly relaxed and fuel-efficient driving style, and makes more frequent use of all-electric mode. As an

alternative to the standard-fitted automatic transmission, a sports automatic with faster shift times is optionally available.

BMW ConnectedDrive systems optionally available for the BMW ActiveHybrid 5 include Park Distance Control, a rear-view camera, Surround View, Adaptive Headlights, High-Beam Assistant, Speed Limit Info, BMW Parking Assistant, Lane Change Warning, Lane Departure Warning, BMW Night Vision with pedestrian recognition and the BMW Head-Up Display. Innovative technologies also allow in-car integration of the Apple iPhone, other smartphones and music players, and use of the Real-Time Traffic Information and Apps functions.

To further enhance comfort and individuality, the standard-specification 4-zone automatic climate control and navigation system Professional can be supplemented by options such as active seats, active seat ventilation, Comfort Access, the Smart Opener for the tailgate, the Soft Close Automatic function for the doors, a power-operated glass roof and high-end audio and rear entertainment systems.

BMW ActiveHybrid 5: intelligent technology points the way forward.
The BMW ActiveHybrid 5 features newly developed hybrid components that are combined for the first time with a six-cylinder BMW TwinPower Turbo engine, and innovative functions for further improved efficiency and driving enjoyment. At the same time it broaches yet another market segment, taking BMW's hybrid development work a further step forward. As always, BMW ActiveHybrid technology is offered in a form which is optimally adapted to the requirements of the particular vehicle concept and market segment.

3. Specifications.
BMW ActiveHybrid 5.

		BMW ActiveHybrid 5
Body		
No. of doors/seats		4 / 5
Length/width/height (unladen)	mm	4899 / 1860 / 1464
Wheelbase	mm	2968
Track, front/rear	mm	1600 / 1627
Ground clearance		141
Turning circle	m	11.95
Tank capacity	approx. l	67
Cooling system incl. heating	l	10.3
Engine oil[2)]	l	6.5
Weight, unladen, to DIN/EU	kg	1850 / 1925
Max load to DIN	kg	550
Max permissible weight	kg	2400
Max axle load, front/rear	kg	1140 / 1350
Max trailer load, braked (12%)/unbraked	kg	– / –
Max roof load/towbar download	kg	100 / –
Luggage comp capacity	l	375
Air drag	c_d x A	0.28 x 2.35
Engine		
Configuration/No. of cyls./valves		R / 6 / 4
Engine technology		BMW TwinPower Turbo technology with twin-scroll turbocharging, High Precision Direct Petrol Injection and fully variable valve control (VALVETRONIC)
Effective capacity	cm^3	2979
Bore/stroke	mm	89.6 / 84.0
Compression ratio	:1	10.2
Fuel grade		min RON 91
Output	kW/hp	225 / 306
at	min^{-1}	5800
Torque	Nm	400
at	min^{-1}	1200-5000
Output electric motor	kW/hp	40 / 55
Torque electric motor	Nm	210
System output	kW/hp	250 / 340
System torque	Nm	450
Electrical system		
Battery/Installation	Ah/–	90 +50 / luggage comp.
High-voltage battery	Wh	1350
Alternator	A/W	200 + 170 / 2800 + 2400
Driving dynamics and safety		
Suspension, front		Double track control arm with separate lower track arm level, aluminium, small steering roll radius, anti-dive
Suspension, rear		Integral-V multi-arm axle, aluminium, with anti-squat and anti-dive, double acoustic separation
Brakes, front		Frame-type aluminium single-piston floating-calliper disc brakes
Diameter	mm	348 x 36 / vented
Brakes, rear		Aluminium single-piston floating-calliper disc brakes
Diameter	mm	345 x 24 / vented
Driving stability systems		Standard: DSC incl. ABS and DTC (Dynamic Traction Control), CBC (Cornering Brake Control), DBC (Dynamic Brake Control), Dry Braking function, Fading Compensation, Start-Off Assistant, optional: Dynamic Damper Control
Safety equipment		Standard: airbags for driver and front passenger, side airbags for driver and front passenger, head airbags for front and rear seats, three-point inertia-reel seatbelts on all seats with belt stopper, belt latch tensioner and belt force limiter integrated in the front seats, crash-activated head restraints at the front, crash sensors, Tyre Defect Indicator
Steering		Electric Power Steering (EPS) with Servotronic
Steering ratio, overall	:1	17.1
Tyres, front/rear		225/55 R17 97W
Rims, front/rear		8J x 17 light-alloy

BMW ActiveHybrid 5

BMW ConnectedDrive	
Comfort	Optional: BMW Assist incl. Enquiry Service, remote-control functions, Real-Time Traffic Information, BMW TeleServices, integration of mobile devices
Infotainment	Optional: internet access, BMW Online incl. Park Info, National Info, Google Local Search, News, Realtime Weather, BMW Routes, Office functions, Bluetooth Audio Streaming, Online Update Music Tracks, apps
Safety	Optional: Adaptive Headlights with cornering lights, variable light distribution and adaptive headlight range control, High Beam Assistant, Park Distance Control, rear-view camera, Surround View incl. Top View and Side View, BMW Night Vision with pedestrian recognition, Head-Up Display, Parking Assistant, Lane Change Warning, Lane Departure Warning, Speed Limit Info, Active Protection, Advanced eCall

Transmission			
Type of gearbox			Eight-speed automatic with Steptronic
Gear ratios	I	:1	4.714
	II	:1	3.143
	III	:1	2.106
	IV	:1	1.667
	V	:1	1.285
	VI	:1	1.000
	VII	:1	0.839
	VIII	:1	0.667
	R	:1	3.317
Final drive		:1	2.929

Performance			
(System) Power/weight ratio		kg/kW	8.2 (7.4)
Output per litre		kW/l	75.5
Acceleration	0–100 km/h	s	5.9
	0–1000 m	s	25.5
in 4th gear	80–120km/h	s	–
Top speed		km/h	250

BMW EfficientDynamics	
BMW EfficientDynamics standard features	BMW ActiveHybrid, Brake Energy Regeneration with energy flow and efficiency display, hybrid-specific Auto Start-Stop function, EPS (Electric Power Steering), ECO PRO mode, intelligent lightweight construction, air flap control, on-demand operation of ancillary units, climate compressor integrated in the high-voltage network, map-controlled oil pump, tyres with reduced rolling resistance

Fuel consumption EU [3]		
with standard tyres: rims 8J x 17, tyres 225/55 R17 (SA 2K1)		
Urban	l/100km	5.7
Extra-urban	l/100km	6.7
Combined	l/100km	6.4
CO_2	g/km	149
rims 8J x 18 and tyres 245/45 R18 or winter tyres (SA 2AU, 2HM, 2K2, 931)		
Urban	l/100km	6.1
Extra-urban	l/100km	7.3
Combined	l/100km	6.8
CO_2	g/km	160
rims 8J x 18 front, 9J x 18 rear and tyres 245/45 R18 front, 275/40 R18 rear (SA 2AH, 2DC, 2NC), rims 8.5J x 19 front, 9J x 19 rear and tyres 245/40 R19 front, 275/35 R19 rear (SA 2K3, 2WC, 2MZ, 2ND), rims 8.5J x 20 front, 9J x 20 rear and tyres 245/35 R20 front, 275/30 R20 rear (SA 2H9)		
Urban	l/100km	6.2
Extra-urban	l/100km	7.4
Combined	l/100km	7.0
CO_2	g/km	163
Emission rating		EU5

Insurance group
3P / FCC / FC [4]

Specifications apply to ACEA markets; data relevant to homologation applicable in part only to Germany (weight)

[1] Height with roof fin: 1475 mm
[2] Oil change
[3] Fuel consumption and CO_2 emissions vary according to the wheel and tyre sizes selected
[4] Data not yet available