



By appointment
to HM The Queen
motor car manufacturers
Bentley Motors Limited
Crewe Cheshire



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BENTLEY

Press Information

THE ALL-NEW BENTLEY W12 ENGINE

- Bentley's legendary 6.0-litre twin-turbocharged W12, originally created in 2002, has been completely redesigned from scratch in a joint development between Bentley and Volkswagen to create the new W12 TSI engine.
- New technologies make the new W12 the most advanced 12-cylinder engine in the world. The unique W-configuration means that the engine is 24% shorter than an equivalent V12, benefitting packaging and maximising usable cabin space.
- 608 PS (600 bhp / 447 kW) @ 6,000 rpm
- 900 Nm (663 lb. ft) from 1,250 rpm to 4,500 rpm. Maximum torque is available in less than a third of the time than on the W12 TMPI engine and, in combination with an eight-speed transmission, negates the need for a low-range gearbox.
- The immense power and torque mean a 0-60 mph time of 4.0 seconds (0-100 km/h in 4.1 secs) and a top speed of 187 mph (301 km/h)
- For the first time, the W12 combines high-pressure direct fuel injection (200 bar injection pressure) with low-pressure injection (MPI, six bar). The combination of these two systems maximises refinement, lowers particulate emissions and optimises power and torque delivery.
- At 292 g/km CO₂, the engine also meets Phase 2 of Euro 6 and US ULEV 125 (LEV3) emissions targets.
- The new W12 sees a 11.9% efficiency improvement compared to the existing powertrain.
- Twin-scroll turbochargers mean minimum turbo response time and an efficient exhaust package. The exhaust assemblies for the three front and three rear cylinders are separate from one another, with the turbocharger housings welded directly to the exhaust manifolds. The turbochargers feature integrated speed sensors, allowing the engine to monitor turbo performance for maximum efficiency.
- Bentley's Variable Displacement system shuts down half of the engine under defined conditions. Intake and exhaust valves, fuel injection and ignition are all shut down on defined cylinders, with the engine running as a 6-cylinder for improved efficiency. The system will run in this mode in gears three to eight, below 3,000 rpm and up to 300 Nm torque output.
- The new W12 features utilises Start-Stop technology and, in Bentley's advanced application, coasting is also made possible. The engine rests not only when the vehicle is stationary but also at 'near to stop' speeds.

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- In 5th to 8th gears, when the driver releases the throttle (at motorway cruising speed, for example) the car will open the torque converter, dropping the engine to idle and simply allowing the car to roll or 'sail'. When the throttle is reapplied, or the car starts going downhill and detects an increase in speed, the transmission is reengaged.
- The engine is mated to a ZF AL952 eight-speed automatic gearbox. The transmission and four-wheel-drive system has been strengthened to handle the demands and high torque levels of off-road driving.
- The engine management system utilises a Flex-Ray communication system and around 1,400 maps, 1,800 curves, 33,000 fixed values and 5,100 matrices populated with data – a total of around 42,000 parameters.
- Despite the addition of new technologies and systems, the new engine weighs 30 kg less than the current Bentley W12 engine. The complete engine assembly weighs 254 kg.
- Off-road capability demanded a new oil system to cope with inclinations in all directions. Suction pumps scavenge oil from the twin turbochargers, while oil pickups and feeds allow oil distribution at up to 35° inclination in all directions.
- The engine includes three separate coolant circuits. The first is designed to bring the cylinder heads up to optimum operating temperature as quickly as possible for best engine performance and low emissions. The second cools the engine block and oil system, while the third handles the thermal load of the turbochargers. Each system has a dedicated water pump, allowing individual control.
- Engine thermal performance has been validated by over 700,000 CPU hours of CFD (Computational Fluid Dynamics) Simulation and over 100 hours in climatic wind tunnels. Test vehicles were equipped with over 300 thermocouples and over 1 km of wiring, with more than 10 weeks of vehicle testing in South Africa, Dubai and Oman.
- The cylinder surfaces are coated to reduce friction and improve corrosion resistance. A low-alloy steel coating is applied to the bores using an Atmospheric Plasma Spray (APS) process.

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