

740 Newton metres (546 lb-ft), all of which the driver will find on tap as low down as 2,000 rpm. Instantaneous torque development maintained into the upper reaches of the rev range is the hallmark feature of the new unit, one underpinned by an array of innovative and globally unique technical wizardry. Taking centre stage – for the first time in a BMW – are a trio of turbochargers. Their arrangement and interplay strategy are the key to the engine achieving its exceptionally high efficiency.

More pressure, more output, more torque: world premiere for six-cylinder in-line diesel engine with three turbochargers.

The coordinated interplay of turbochargers of different sizes endows an engine with instantaneous responsiveness at low revs and allows charge pressure to be increased according to need when the engine is placed under greater loads. BMW uses this concept in the six-cylinder in-line diesel engines with BMW TwinPower Turbo technology fitted in models including the BMW 535d, BMW X5 xDrive40d and BMW X6 xDrive40d. And now the company is set to become the world's first carmaker to present a diesel engine which expands the principle of multi-stage turbocharging to incorporate a third turbocharger. The engine developed for the BMW M Performance Automobiles will, for the first time, see two comparatively small high-pressure chargers working with a larger low-pressure unit. The integration of an additional high-pressure turbo increases the engine's capability when it comes to generating charge pressure, a key ingredient in taking the engine's power output to the next level.

The M Performance TwinPower Turbo technology – including the requisite charge air cooling – is, like its predecessor, integrated into a small space in the main unit. Its compact construction puts the engine in a position to meet future pedestrian protection stipulations, while the arrangement of the three turbochargers is also part of an extremely intelligent system. Both the exhaust inflow to drive the turbos and the supply of fresh air, plus the channelling of compressed air to the combustion chambers, have been designed to ensure that the three compression units work as a team as effectively as possible at all engine speeds. Efficiency is further optimised by the variable turbine geometry of the two high-pressure chargers, which allows them to react even more precisely to the driver's power needs.