



Media information
22 February 2022

For the highest level of well-being in the luxury segment: the BMW i7 undergoes acoustic testing at the new FIZ North site.

Optimised noise insulation, aeroacoustics and vibration comfort: in order to ensure the best possible comfort ever realised in a BMW, the new BMW i7 is undergoing a diverse range of tests in the BMW Group's laboratories and on its test benches. The testing programme is also designed to ensure electromagnetic compatibility.

Munich. The BMW i7 (combined power consumption: 22.5 – 19.5 kWh/100 km according to WLTP; CO₂ emissions: 0 g/km; forecast based on the vehicle's development status to date) is being developed with the aim of combining hallmark driving pleasure with a level of comfort that is in a class of its own. One key factor here is the acoustic properties. The level of well-being in the interior of the purely electrically powered luxury sedan is largely determined by the degree to which disturbing noises can be kept away from the occupants. There are a variety of potential noise sources to be taken into account here, so near-production prototypes of the BMW i7 – and indeed all other model variants of the future BMW 7 Series – undergo an extensive programme as part of their acoustic testing.

At the Research and Innovation Centre (FIZ) in Munich, test and development engineers check the full range of the vehicle's sound emissions and immissions. Motor and rolling noise are analysed in detail, as are the aeroacoustics and vibration comfort, in order to fully determine the acoustic properties of the new luxury sedans. This also includes precise alignment of acoustic pedestrian protection and the motor sound emitted in the interior of the BMW i7 – the latter having been developed as part of BMW IconicSounds Electric, a collaborative venture between the BMW Group and Hollywood film music composer Hans Zimmer.

The driver of the BMW i7 has a choice: characteristic silence or BMW IconicSounds Electric developed in collaboration with Hans Zimmer.

The acoustic test benches at the new branch of the BMW Group's Research and Innovation Centre FIZ North are specially designed to meet the requirements of electromobility and enable all driving situations to be simulated realistically. Here, any irritating noises registered by development engineers during test drives on the road can be recreated and selectively eliminated. Roller dynamometers with a unique quiescent level and interchangeable surface coverings enable the measurement and validation of drive acoustics and tyre noise on all road surfaces that are relevant to day-to-day traffic anywhere in the world.

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The BMW i7 aspires to redefine the high standards of the luxury segment – and this very much applies to acoustic comfort as well. Great importance was attached to noiseless power delivery of the electric motor. Contributing factors here include acoustic optimisation of the electric drive units, a model-specific mount concept and a newly developed noise encapsulation for the electric motors. Taken together, these measures enable the BMW i7 to achieve effective acoustic decoupling across a wide frequency range, thereby ensuring maximum acoustic comfort in the interior in all driving situations. As a result, the driver of the purely electrically powered luxury sedan always has the choice of enjoying either the characteristic silence of the motor or the emotionally powerful BMW IconicSounds Electric developed in collaboration with Hans Zimmer.

Increased body rigidity at the front end and tyres with a foam absorber on the inside for integrated noise insulation likewise help raise the acoustic and vibration comfort of the new luxury sedans to an outstanding level.

Acoustic testing on the climatic test bench and in the wind tunnel.

In order to be able to test the effectiveness of all measures under extreme climatic conditions too, the development engineers at FIZ North use an acoustic climate test bench specially designed for this purpose. Here, all globally relevant conditions can be simulated and a wide variety of noise sources can be analysed and optimised such as the acoustics of the air conditioning and ventilation system throughout the entire vehicle – in particular at very low or very high temperatures.

In the same way as the motor and tyre rolling acoustics, ambient noise can also be selectively reduced. For this purpose, the aeroacoustics of the BMW i7 are perfected in the acoustic wind tunnel. Clear-cut body surfaces, flush-integrated door handles, aerodynamically optimised exterior mirrors and an almost completely closed underbody not only contribute to the low air resistance of the luxury sedan, they also help create its excellent acoustics.

Innovative materials for optimised sound insulation.

In addition to the noise and vibrations emanating from the vehicle itself, it is primarily the noise sources from the outside that can impair the experience of comfort while driving. The new acoustic simulator at FIZ North enables the noise emitted in day-to-day traffic to be simulated under laboratory conditions – this includes the sounds made at road construction sites and by passing trucks, for example. Numerous loudspeakers are used to project these sounds onto the vehicle prototypes from all directions to test the effectiveness of the interior noise insulation.



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Highly effective and also weight-optimised sound insulation is enabled by the use of innovative materials developed in conjunction with acoustic lightweight construction. One of the ways in which outstanding shielding of external and intrinsic noise is achieved is by means of sound absorbers incorporated in the pillar trim, seats, roof liner and rear shelf. Together with the comfort glazing, which prevents unwelcome noise from entering through the window panes, this adds the final touch of perfection to the customer experience. There are also fleece elements in the doors and on the sill and wheel arch trim which reduce rolling noise, thereby maximising the experience of comfort.

Intense testing of electromagnetic compatibility.

With their detailed analyses and precise optimisation, the development and test engineers seek to ensure that the new luxury sedans offer the best comfort experience ever realised in a BMW. This also includes an analysis of electromagnetic compatibility (EMC). In the so-called EMC absorber hall at the FIZ, prototypes of the new luxury sedans are exposed to powerful electromagnetic fields so as to test the susceptibility of their electrical systems to interference and see how they interact with the environment.

The test engineers are able to analyse the diagnostic results transmitted from the vehicle in real time via fibre optic cables. The test programme in the EMC absorber hall enables comprehensive protection of the entire vehicle, ensuring absolutely reliable functioning of the suspension control and assistance systems and interference-free reception of online data, telephone, radio, TV and navigation signals.

The fuel consumption, CO₂ emissions, electric power consumption and electric range figures are determined according to the European Regulation (EC) 715/2007 in the version applicable. They refer to vehicles in the German market. Where a range is shown, NEDC figures consider the different sizes of the selected wheels/tyres, while WLTP figures take into account the impact of any optional extras.

All values were calculated based on the new WLTP test cycle. Any NEDC values that are shown have been translated into equivalent NEDC measurements where appropriate. WLTP values are taken as the basis for determining vehicle-related taxes or other duties based (at least inter alia) on CO₂ emissions as well as eligibility for any applicable vehicle-specific subsidies. Further information on the WLTP and NEDC measurement procedures can also be found at www.bmw.de/wltp.

Further information on official fuel consumption figures and specific CO₂ emission values of new passenger cars is included in the following guideline: 'Leitfaden über den Kraftstoffverbrauch, die CO₂-Emissionen und den Stromverbrauch neuer Personenkraftwagen' (Guide to the fuel economy, CO₂ emissions and electric power consumption of new passenger cars), which can be obtained free of charge from all dealerships, from Deutsche Automobil Treuhand GmbH (DAT), Hellmuth-Hirth-Str. 1, 73760 Ostfildern-Scharnhausen and at <https://www.dat.de/co2/>.



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The BMW Group

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises 31 production and assembly facilities in 15 countries; the company has a global sales network in more than 140 countries.

In 2021, the BMW Group sold over 2.5 million passenger vehicles and more than 194,000 motorcycles worldwide. The profit before tax in the financial year 2020 was € 5.222 billion on revenues amounting to € 98.990 billion. As of 31 December 2020, the BMW Group had a workforce of 120,726 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company set the course for the future at an early stage and consistently makes sustainability and efficient resource management central to its strategic direction, from the supply chain through production to the end of the use phase of all products.

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