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BMW Group Plant Leipzig introduces terahertz-based measurement of plastic components in series production.

+++ New inline solution enables non-destructive measurement of paint layer thickness +++ First application of terahertz technology for exterior plastics +++ Digitalisation continues to advance in paint operations +++

Leipzig. As the BMW Group systematically advances the digitalisation of its production processes, Plant Leipzig is introducing a terahertz-based measurement system for plastic exterior components in series production. Capable of determining paint layer thickness non-destructively, the new technology has recently been scaled up to enable automated, precise and reproducible quality inspections directly within the production process.

“Terahertz measurement technology replaces complex manual inspection with a fully automated solution, taking quality assurance to an entirely new level,” says Christoph Theiselmann, Head of Exterior Plastics, Production at Plant Leipzig.

At the heart of the innovation is the terahertz measurement system “Irys”, developed by technology partner das-Nano specifically for industrial inline inspections. The system enables contactless, non-destructive measurement of multi-layer paint systems and delivers real-time data, representing a significant advance over previous inspection methods.

From manual inspection to inline measurement

Until now, paint layer thickness inspections on plastic exterior components at Plant Leipzig have been carried out manually during production, using scalpels and microscopy, thereby destroying parts in the process. This not only generated unnecessary waste but also meant that deviations from specifications were often only identified at a later stage.

Terahertz technology fundamentally transforms this process: sensors mounted on two robots in the existing end-of-line measurement cell are automatically and precisely positioned in relation to the component, where they measure the thickness of the

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individual paint layers by analysing the time-of-flight of reflected terahertz waves. Measurements take only seconds and achieve accuracy down to the micrometre level.

The new technology not only delivers objective and reproducible measurement results, but also enables the early detection of process deviations. By eliminating destructive testing, it reduces waste and material consumption while improving both process efficiency and cost-effectiveness. The resulting digital measurement data enhance transparency within production and provide a robust foundation for data-driven process control.

"The combination of higher measurement accuracy, direct process integration and full digitalisation delivers tangible benefits across the entire production chain, strengthening quality, economic efficiency and resource conservation in equal measure," Christoph Theiselmann adds.

Digitalisation of plastic component paint operations

Following the introduction of automated surface inspection in 2024, terahertz measurement technology marks the next step towards a fully digital paint shop for plastic components at Leipzig. The measurement and quality data it generates are available entirely in digital form, creating the basis for advanced data-supported analysis. In the future, this data will be analysed using AI-based methods to identify deviations early, evaluate trends and continuously optimise process parameters.

Pioneering role within the BMW Group and the plastics segment

By scaling terahertz measurement technology for industrial use, Exterior Plastics at Leipzig has broken new ground in more than one respect. As well as being the first BMW Group site to integrate the new technology into in-house production, Plant Leipzig sets new standards in the plastics segment more widely, being the first to use terahertz technology to inspect paint layer thickness on plastic components.

Following successful piloting and ramp-up, the new technology can now be deployed with all component carrier systems, or 'skids', and is currently being enabled for all colour variants as well. It also offers significant potential for rollout at other plants, particularly in painted body shops and across the supplier network.



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The Exterior Plastics team is part of the Purchasing and Supplier Network division at Leipzig. Its 450 employees specialise in the manufacture of injection-moulded plastic exterior body components – such as bumpers, side sills and spoilers – which it supplies not just to Leipzig, but also to the BMW Group plants in Dingolfing and Regensburg.

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BMW Group Plant Leipzig

BMW Group Plant Leipzig first started series production in March 2005. Today it manufactures up to 1,300 vehicles a day, which currently comprise the BMW 1 Series, BMW 2 Series Gran Coupe, BMW 2 Series Active Tourer and the MINI Countryman. The BMW Group has invested a total of more than €5.6 billion in its Leipzig site, where the regular workforce currently totals more than 6,600 employees.

Internet: <https://www.bmwgroup-werke.com/leipzig>
Instagram: <https://www.instagram.com/bmwgroupwerkleipzig>

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 services. The BMW Group production network comprises over 30 production sites worldwide; the company has a global sales network in more than 140 countries.

In 2025, the BMW Group sold 2.46 million passenger vehicles and more than 202,500 motorcycles worldwide. The profit before tax in the financial year 2025 was € 10.2 billion on revenues amounting to € 133,5 billion. As of 31 December 2025, the BMW Group had a workforce of 154,540 employees.

The economic success of the BMW Group has always been based on long-term thinking and responsible action. Sustainability is a key element of the BMW Group's corporate strategy and covers all products – from the supply chain through production to the end of their useful life.

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