

Media Information

27 August 2024

Things get colourful in Debrecen – Paint shop becomes first technology to go on-stream at new BMW Group plant

- Pre-series production set to launch in Hungary in autumn 2024
- High standards will ensure most resource-efficient production possible
- Gas-free paint operations using power-to-heat process

Debrecen. BMW Group Plant Debrecen is taking shape: The state-of-the-art paint shop is the first technology to be commissioned at the new production location in Hungary. Through the use of various new processes and systems, such as power-to-heat, Heat Grid and eRTO, the Debrecen facility will become the first paint shop in the BMW Group's global production network to operate entirely without fossil fuels. The new site in Debrecen, where pre-series production of the Neue Klasse will ramp up in autumn of this year, provides a blueprint for all future plants based on the principles of the BMW iFACTORY.

The new paint shop in Debrecen is designed to paint 30 vehicle bodies per hour in a fully automated painting process. This capacity may be increased to accommodate up to 60 vehicles per hour at a later date. The installation will be enabled using BMW X1 bodies. The cutting-edge system was developed and planned by leveraging existing expertise within the production network. With a footprint of 33,000 square metres, the three-story paint shop building provides ample workspace for modern production.

Power-to-heat significantly reduces carbon footprint

The power-to-heat principle is essential to operating the Debrecen paint shop without fossil fuels like natural gas. All ovens and other processes necessary for painting will run entirely on electricity, rather than natural gas, as was the case in the past. This principle significantly reduces the paint shop's carbon footprint, even if power consumption will increase, due to running without natural gas. In Debrecen, we obtain the external power required for production exclusively from renewable energy sources.

Heat Grid achieves another ten percent energy savings

The Heat Grid energy efficiency project was successfully implemented during the planning stage of the new paint shop. The innovative concept combines several measures for efficient energy recovery, enabling additional energy savings of up to ten percent. The centrepiece of the project is a large,

multivalent storage boiler that consolidates waste heat from the compressed air supply, drying ovens and cooling systems. This waste heat is then used to preheat the water circuit.

Another of Debrecen's unique features is that the whole system operates at a water supply temperature of just 65 degrees Celsius, compared to 90-120 degrees Celsius in previous installations. The hot water is used to supply the paint shop's hall ventilation systems, maintaining stable conditions in the spray booths at a process temperature of 22 degrees Celsius and a humidity of 60-65 percent.

Exhaust purification in innovative eRTO process

Debrecen will rely on the innovative eRTO process for exhaust purification. eRTO stands for electric regenerative thermal oxidation, a process that purifies exhaust air from the paint shop at temperatures of 800-1,000 degrees Celsius and, unlike in the past, runs exclusively on electricity. During the purification process, the exhaust air passes through a ceramic bed where solvent residues are burned off. To do this, the air has to be heated to high temperatures in a short space of time. Due to its high thermal recovery rate, with heat effectively retained within the system, the eRTO system delivers a very high level of energy efficiency.

Fully automated dry separation

Like many other BMW Group locations, the new paint shop in Debrecen uses modern, environmentally-friendly dry separation technology. Any paint overspray that does not adhere to the body in the spray booth is filtered out and mixed with limestone powder. This significantly reduces water consumption and allows the spray booth to operate with up to 90 percent recirculating air. This means only ten percent of the air needs to be temperature controlled and humidified, rather than 100 percent, resulting in substantial energy savings. The used stone powder can also be fed back into the material loop and reused, for example, in the cement industry, rather than requiring disposal as contaminated wastewater, as was the case in the previous wet-scrubbing method.

Comprehensive digitalisation

Alongside innovative technologies, such as Heat Grid and eRTO, comprehensive digitalisation also contributes to the new Debrecen paint shop's high level of efficiency. For example, fully automated driverless AGVs

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(Automated Guided Vehicles) transport car bodies to their respective operations. In addition, Automated Surface Inspection (AOI) is employed, utilising artificial intelligence to detect post-painting irregularities and identify any areas requiring post-processing. The planning for the paint shop was implemented virtually. This allowed the structural planning to be tested virtually before actual construction began. Preliminary training sessions for employees were also held virtually.

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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 over 30 production sites worldwide; the company has a global sales network in more than 140 countries.

In 2023, the BMW Group sold over 2.55 million passenger vehicles and more than 209,000 motorcycles worldwide. The profit before tax in the financial year 2023 was € 17.1 billion on revenues amounting to € 155.5 billion. As of 31 December 2023, the BMW Group had a workforce of 154,950 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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