



Media information
January 5, 2022

Magical exterior colour-change. BMW iX Flow featuring E Ink.

+++ World premiere at CES 2022 +++ Body surface with real color change thanks to electrophoretic technology +++ Potential for future interior and exterior applications +++

Las Vegas. Digitisation is delivering an integrated user experience characterised by individuality and emotionalisation in the interior of current BMW models. The My Modes allow the driver to tailor the atmosphere in the interior entirely to their personal mood and the driving experience they want. With the BMW iX Flow featuring E Ink being presented at CES 2022, the Munich-based premium car manufacturer is offering the prospect of a future technology that uses digitisation to also adapt the exterior of a vehicle to different situations and individual wishes. The surface of the BMW iX Flow featuring E Ink can vary its shade at the driver's prompting.

Frank Weber, Member of the Board of Management of BMW AG, Development: "Digital experiences won't just be limited to displays in the future. There will be more and more melding of the real and virtual. With the BMW iX Flow, we are bringing the car body to life."

The fluid colour changes are made possible by a specially developed body wrap that is tailored precisely to the contours of the all-electric Sports Activity Vehicle from BMW. When stimulated by electrical signals, the electrophoretic technology brings different colour pigments to the surface, causing the body skin to take on the desired colouration. Adrian van Hooydonk, Head of BMW Group Design: "The BMW iX Flow is an advanced research and design project and a great example of the forward thinking that BMW is known for."

The innovative E Ink technology opens completely new ways of changing the vehicle's appearance in line with the driver's aesthetic preferences, the environmental conditions or even functional requirements. The technology thus offers unprecedented potential for personalisation in the area of exterior design. The BMW iX Flow featuring E Ink demonstrates this potential to impressive effect. Against this background, the BMW Group is driving the development of the technology so that a new form of personalisation can be experienced both on the outside and in the inside of future production vehicles.

Already today, the colour chosen for a car is an expression of the driver's personality. The choice of exterior paints available for current BMW models covers a wide colour spectrum. In this way, the longing for a wildly expressive, extravagant, or sporty appearance on the outside can be taken into account as well as the desire for an understated, subtle or elegant appearance. New variants are added each year that reflect the characteristics of the model in question and that allow the brand to keep setting trends in the area of exterior design.



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New technologies will provide a whole new level of decision-making freedom in the future. "This gives the driver the freedom to express different facets of their personality or even their enjoyment of change outwardly, and to redefine this each time they sit into their car," says Stella Clarke, Head of Project for the BMW iX Flow featuring E Ink. "Similar to fashion or the status ads on social media channels, the vehicle then becomes an expression of different moods and circumstances in daily life."

How a variable exterior colour can increase efficiency.

A variable exterior colour can also contribute to wellness in the interior and to the efficiency of the vehicle. This is done by taking account of the different abilities of light and dark colours when it comes to reflecting sunlight and the associated absorption of thermal energy. A white surface reflects a lot more sunlight than a black one. By implication, heating of the vehicle and passenger compartment as a result of strong sunlight and high outside temperatures can be reduced by changing the exterior to a light colour. In cooler weather, a dark outer skin will help the vehicle to absorb noticeably more warmth from the sun.

In both cases, selective colour changes can help to cut the amount of cooling and heating required from the vehicle's air conditioning. This reduces the amount of energy the vehicle electrical system needs and with it also the vehicle's fuel or electricity consumption. In an all-electric car, changing the colour in line with the weather can therefore also help to increase the range. In the interior, the technology could, for example, prevent the dashboard from heating up too much.

E Ink technology itself is extremely energy efficient. Unlike displays or projectors, the electrophoretic technology needs absolutely no energy to keep the chosen colour state constant. Current only flows during the short colour changing phase.

Millions of paint capsules in a custom wrap.

Electrophoretic colouring is based on a technology developed by E Ink that is most well-known from the displays used in eReaders. The surface coating of the BMW iX Flow featuring E Ink contains many millions of microcapsules, with a diameter equivalent to the thickness of a human hair. Each of these microcapsules contains negatively charged white pigments and positively charged black pigments. Depending on the chosen setting, stimulation by means of an electrical field causes either the white or the black pigments to collect at the surface of the microcapsule, giving the car body the desired shade.

Achieving this effect on a vehicle body involves the application of many precisely fitted ePaper segments. Generative design processes are implemented to ensure the segments



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reflect the characteristic contours of the vehicle and the resulting variations in light and shadow. The generative design algorithms enable the necessary formability and flexibility required to tailor the ePaper exactly to the design lines of the vehicle.

Laser cutting technologies guarantee high precision in generating each segment. After the segments are applied and the power supply for stimulating the electrical field is connected, the entire body is warmed and sealed to guarantee optimum and uniform colour reproduction during every colour change.

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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 2020, the BMW Group sold over 2.3 million passenger vehicles and more than 169,000 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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