

# Press release

---

Stuttgart, April 21, 2025

## MAHLE: Bionics optimizes air conditioning systems

- Bionic design: penguin fin serves as model for new product design of the radial blower in the air conditioner
- Designed for demanding installation spaces, especially in electric vehicles
- Revolutionary technology reduces sound output by 60 percent in comparison with similar fans and improves efficiency by 15 percent
- Jumana Al-Sibai, Member of the Management Board: "This development underscores our systems expertise and benefits from state-of-the-art AI applications."
- Suitable for all vehicle classes
- World premiere of the bionic radial blower at Auto Shanghai 2025

**MAHLE presents a pioneering bionic radial blower for automotive air conditioning systems that improves efficiency while significantly reducing noise development. The development, which has been specially designed for vehicles with challenging installation space, has been guided by an example from nature: The aerodynamic shape of the fan blades has been modeled after the fins of a penguin, which glide swiftly and quickly through the water. Thanks to this innovative design, the bionic fan is 4 decibels (dB) or 60 percent quieter in comparison to similar components. At the same time, it is around 15 percent more efficient as the motor requires less energy due to the optimized design. MAHLE is setting a new benchmark with this innovation. "The development of the new bionic radial blower underscores our comprehensive systems expertise in thermal management and benefits from the use of artificial intelligence," said Jumana Al-Sibai, member of the MAHLE Group Management Board and responsible for the Thermal and Fluid Systems business unit. The bionic radial blower can be used in all passenger car classes as well as in light and heavy-duty commercial vehicles. The technology group is presenting the innovation to the public for the first time at the Auto Shanghai trade fair in China. The motor show is taking place from April 23 through May 2, 2025 at the National Exhibition and Convention Center (NECC) in Shanghai.**

## **Modeled on nature and AI-supported design**

“Evolution has equipped the penguin with fins that allow it to glide through the water with minimal resistance and, therefore, ultrahigh efficiency. The fin shape served as a model in the optimization process of the impeller of our radial blower,” said Dr. Uli Christian Blessing, Vice President R&D Thermal and Fluid Systems at MAHLE. The Group has already used nature as a guide on several occasions in the past. The bionic cooling plate and bionic high-performance fan for electric vehicles enable the automotive supplier to improve efficiency considerably.

The most crucial factor in the rapid development process was a company-owned AI tool. “The application of artificial intelligence has been enormously useful in the optimization of the bionic radial blower. Our engineers guided the AI and provided it with data and information, enabling it to create more than 30 million virtual designs in a very short time,” explained Uli Blessing. “Internally, we are referring to this as ‘superhuman engineering’.” The MAHLE engineers were able to use this to work out the perfect shape and positioning of the fan blades and quickly produce prototypes.

## **Space-saving and efficient solution**

The bionic radial blower sits in front of the evaporator and makes the design of the air conditioner symmetrical and narrow. This creates more space for other components, a crucial advantage especially in battery electric vehicles. This development by MAHLE therefore represents an innovative alternative to conventional fans.

## **MAHLE at Auto Shanghai 2025**

Visitors to Auto Shanghai can see the new bionic radial blower for the first time at the MAHLE stand in Hall 1.2 of the National Exhibition and Convention Center in Shanghai. Also to be discovered are the bionic high-performance fan for particularly demanding fuel cell and battery electric vehicles, as well as the bionic battery cooling plate for electrified vehicles. At the center of the 300 m<sup>2</sup> MAHLE stand is a technical demonstrator that provides a simple and clear explanation of the importance and the connection between the electric powertrain and thermal management system. Electrification, thermal management, and components for efficient, clean combustion engines are the three fields of the future that MAHLE is pursuing as part of its strategy MAHLE 2030+ for the future of mobility.

Help for editors: The press release and accompanying photo material can be found at <https://newsroom.mahle.com/press/en/>.

Image copyright: MAHLE GmbH



The penguin fin served as a model for the aerodynamic and slightly curved shape of the fan blades of the bionic radial blower.



The bionic radial blower sits in front of the evaporator and therefore provides a symmetrical air conditioning system.



The innovative design enables the MAHLE bionic fan 4 decibels (dB) or 60 percent quieter in comparison with similar components.



Jumana Al-Sibai, Member of the Management Board of the MAHLE Group and responsible for the Thermal and Fluid Systems business unit



Dr. Uli Christian Blessing, Vice President R&D Thermal and Fluid Systems MAHLE Group

**Contact persons for MAHLE communications:**

Kerstin Lau

Head of Media Relations

Phone: +49 173 6180956

E-mail: [kerstin.cynthia.lau@mahle.com](mailto:kerstin.cynthia.lau@mahle.com)

Benjamin Haas

Spokesperson

Phone: +49 173 3197151

E-mail: [benjamin.haas@mahle.com](mailto:benjamin.haas@mahle.com)

---

**About MAHLE**

MAHLE is a leading international development partner and supplier to the automotive industry with customers in both passenger car and commercial vehicle sectors. Founded in 1920, the technology group is working on the climate-neutral mobility of tomorrow, with a focus on the strategic areas of e-mobility and thermal management as well as further technology fields to reduce carbon emissions, such as fuel cells or highly efficient, clean combustion engines that also run on synthetic fuels or hydrogen. Today, one in every two vehicles globally is equipped with MAHLE components.

MAHLE generated sales of €11.7 billion in 2024. The company has almost 68,000 employees at 135 production locations and 11 technology centers in 28 countries. (as at: 12/31/2024)

#weshapefuturemobility