

Press Release

Stuttgart, May 16, 2023

MAHLE: Thermal management is a growth driver

- No efficient e-mobility without efficient thermal management
- Jumana Al-Sibai: “Thermal management triples sales potential and drives electrification at MAHLE.”
- MAHLE aims to profit from strongly growing thermal management market
- MAHLE technologies bring more cruising range, improved fast-charging capability, and comfort to the e-car

Efficient thermal management is what makes efficient e-mobility possible in the first place. Heating and cooling in vehicles is an essential technology field for electrification and MAHLE core business. “The sales potential for thermal management in e-cars is three times higher than for vehicles with combustion engines. Thermal management is the driver of electrification at MAHLE,” said Jumana Al-Sibai, member of the Management Board of the MAHLE Group responsible for this business unit. The market for these technologies is growing significantly due to e-mobility. Coming from a total global volume of around 35 billion euros for thermal management products in 2021, MAHLE expects it to reach more than 50 billion euros by 2030. “We want to participate disproportionately in this growth. We will further expand our established status as a systems provider with a focus on energy efficiency and air conditioning,” said Al-Sibai. The Group has developed innovative technologies to increase the cruising range and fast-charging capability of electric vehicles, as well as to bring more comfort to e-cars.

“Thermal management and electrification are fundamental strategic pillars of the MAHLE Group. We are one of the largest suppliers of modular and highly efficient thermal management systems with a global footprint. We will leverage these strengths, and advance sustainable mobility,” said Jumana Al-Sibai at an event in the MAHLE climatic wind tunnel in Stuttgart. With around 4.5 billion euros (+16 percent compared with 2021), thermal management was the strongest area of MAHLE in terms of sales and growth in 2022.

Electrification and thermal management are closely interwoven. MAHLE is one of the very few suppliers that are active in both fields with excellent expertise. “This allows us to help our customers achieve better solutions for battery electric

vehicles, hybrids, and conventionally powered vehicles,” said Dr. Uli Christian Blessing, head of global development thermal management at MAHLE. “With our high level of systems expertise, we enable smaller installation space, higher efficiency and performance, and lower overall costs.”

In the case of the e-car, key acceptance factors for end customers depend on thermal management: the service life of the battery, the cruising range of the e-car, the performance of the drive system, and fast-charging capability. At all times and under all climatic conditions, each component of the drive system requires the correct temperature. At the same time, thermal management ensures a feel-good climate in the vehicle cabin—comfort for the driver is not only pleasant but also a safety factor. The interior air conditioning must have as little influence as possible on the cruising range. This results in high demands on the complete system and the complexity and value of the individual components increase considerably. For compact electric vehicles (C segment), for example, MAHLE expects the value of components to increase by more than 100 percent in comparison with a car with an internal combustion engine.

To reduce cost and complexity of the system while increasing efficiency, MAHLE has developed a new thermal management module. It combines, for instance, a heat exchanger, coolant pumps, condenser, chiller, sensors and valves in one unit. “We save installation space, engineering effort and costs. At the same time, we are becoming significantly more efficient: Up to 20 percent more cruising range can be achieved with our module in a system network with a heat pump in comparison with a pure electric heater architecture. The higher cooling performance improves fast-charging capability,” said Blessing.

MAHLE has also developed numerous new system components, such as a electric fan. It ensures efficient cooling during charging and remains pleasantly quiet. Air-conditioning compressors also play an important role. The latest MAHLE development is the most powerful in the world with up to 18 kilowatts. The total order volume for electric air conditioning compressors to date is around 1.4 billion euros. Another successful product is battery cooling plates, which ensure fast charging, long cruising range and long service life for sensitive lithium-ion batteries. In addition, MAHLE is one of the top suppliers worldwide with its innovative heat pump systems. They help reduce the energy consumption of an electric vehicle and enable the installation of smaller and lower-cost batteries.

The MAHLE climatic wind tunnel in Stuttgart is an essential element of the thermal management development of the Group and has been pioneering mobility for over 85 years. The facility was built in 1937 as the world’s first wind tunnel for the automotive industry. In 2000, it was completely modernized as part of a new construction. MAHLE has continuously developed the climatic wind tunnel as a pioneer in this field to this day. The facility enables realistic, precise and repeatable measurement and test conditions—so it literally brings the street into the

laboratory. Lastly, it was expanded to include a fast-charging capability to simulate charging operations under all climatic conditions. In addition, test procedures with hydrogen are possible.

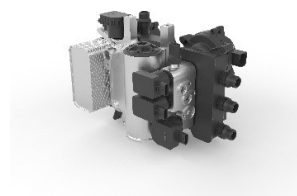
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Thermal management, i.e. heating and cooling, is elementary for the e-car.



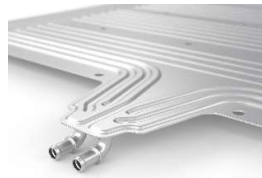
The demands on thermal management increase massively from the combustion engine (left) to the electric car. The added value potential for MAHLE triples.



The MAHLE thermal management module: Up to 20 percent more cruising range, less installation space and lower system costs.



Electric compressor: MAHLE is writing a success story with the heart of the air conditioning system for electric vehicles.



The battery cooling plate from MAHLE ensures fast charging, a long cruising range, and long service life.



The MAHLE climatic wind tunnel has been pioneering mobility for 85 years. It was recently expanded to include a fast-charging option and the possibility of test procedures with hydrogen.

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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 CO₂ 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 more than EUR 12 billion in 2022. The company is represented with around 72,000 employees at 152 production locations and 12 major research and development centers in 30 countries. (Last revised: 12/31/2022)

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