

Press Release

Stuttgart/Germany, 7 September 2022

MAHLE at the IAA: Systems provider for sustainable transport

- MAHLE is presenting technologies for CO₂-neutral powertrain mixes for commercial vehicles at the IAA Transportation trade fair in Hanover, Germany
- World premiere: SCT electric motor for especially high, continuous power
- Systems solutions for battery electric drives, fuel cells and hydrogen engines
- Modular thermal management provides efficiency and cost advantages
- MAHLE charging infrastructure solution “chargeBIG” can be experienced at the Campus

MAHLE is expecting a significant increase in the variety of drives in the commercial vehicle market. The technology group believes that by the year 2035, about 30% of all commercial vehicles worldwide will be purely electric with batteries or fuel cells. The automotive supplier is presenting technologies for all types of drives at the IAA Transportation trade fair in Hanover, Germany. MAHLE is premiering its new SCT electric motor (Superior Continuous Torque), which provides extremely high continuous power and is therefore especially suited to commercial vehicles. In addition, MAHLE is presenting its newest systems solutions for battery electric drives, fuel cells and cleaner combustion engines which can also be fueled with hydrogen. The Group offers modular thermal management systems with greater efficiency and clear cost advantages in all drive variants. MAHLE’s chargeBIG charging infrastructure solution can be experienced on test drives and at the trade fair’s Plug & Play Campus. The IAA Transportation takes place from 20–25 September 2022 in Hanover, Germany. The MAHLE stand is in Hall 12, Stand C37.

“We provide the transport sector’s necessary contribution to climate protection through a realistic and technology-neutral view of customers and markets. We are therefore concentrating our development activities on three areas: battery

electric drives and fuel cells, thermal management and highly efficient, clean combustion engines,” said Michael Frick, Chairman of the MAHLE Management Board (ad interim) and CFO. The commercial vehicle sector is a significant business area for MAHLE: This sector contributes about 20% of the group’s total sales. MAHLE’s customers include all the large global vehicle manufacturers.

World premiere: SCT electric motor

The new MAHLE SCT (Superior Continuous Torque) electric motor solves a dilemma common to many electric motors: the great discrepancy between continuous and peak power. While previous electric motors can only provide their peak power for a short time and then drop to around 60 to 70 percent, the MAHLE SCT electric motor can be operated continuously at over 90 percent of its peak power. This means it can run indefinitely at high power and is significantly smaller and lighter than a conventional electric motor with the same continuous power. This makes it suitable for use in all vehicle classes, including heavy commercial vehicles. MAHLE achieved the necessary technological leap for the SCT electric motor by using an innovative, integrated oil cooling system. With the introduction of the new electric motor, MAHLE becomes a full-range supplier in the field of electric drives. Its offerings range from pedelecs and e-scooters to passenger cars and delivery vans, as well as heavy-duty commercial vehicles, off-road vehicles, and industrial applications — MAHLE electrifies everything that runs on wheels.

MAHLE is a systems provider for electric commercial vehicles

At the IAA Transportation, MAHLE is showing for the first time how its systems work together in electric commercial vehicles. The focus is on the overall drive and thermal management systems. “We are addressing exactly those issues that still pose a particular challenge to our customers when developing electric vehicles: cruising range, performance, fast charging capability and comfort in the driver’s cabin,” said Dr. Martin Berger, Head of Corporate Research and Advanced Engineering at MAHLE. Thanks to a portfolio breadth unrivaled in the industry, the group is able to perfectly coordinate individual components and subsystems. This is the most important prerequisite for an efficient complete system, especially with battery electric drives.

MAHLE provides broad expertise with fuel cell peripherals

MAHLE traditionally has strong expertise in the areas of air management, filtration, thermal management and electronics. The technology group uses this expertise in its latest fuel cell technologies. The preparation of the outside air before it is fed to the fuel cell is of particular importance. MAHLE air filters protect the fuel cells from particles and harmful gases with absolute reliability and throughout the entire service life of the vehicle. A modular concept makes the application simple and cost-effective. In order to be able to work optimally, fuel cells need humid air. MAHLE's flat membrane humidifier accomplishes this. It increases efficiency and protects the cell from drying out. Reliable humidification is also very important for maintaining a level of efficiency and contributes to the long service life of these expensive components. MAHLE developed the flat membrane humidifier in conjunction with other partners. This development was sponsored by the Federal Ministry for the Economy and Climate Protection (BMWK). In order to stabilize the voltage provided by the fuel cell across all load ranges, the company has developed a high-voltage DC/DC converter. It covers high outputs of up to 180 kW, reaches an efficiency of more than 97 percent and achieves very high power density. Together with the sophisticated thermal management, MAHLE thus maps the essential systems in fuel cell peripherals.

New components for highly-efficient hydrogen engines

In addition to the fuel cell, the use of hydrogen as a combustion fuel has the potential to make many heavy-duty and off-highway applications climate-neutral particularly quickly. Hydrogen engines are ideal for high load cycles with sudden load steps and handle heat, contamination and vibration well. At MAHLE, more than 100 years of experience flow into the development of the necessary engine components. A new power cell unit will be presented for the first time at the IAA — a system consisting of pistons, piston rings, conrods, pins and, if necessary, a cylinder liner as well as a high-pressure impactor for flushing the crankcase. This means that hydrogen can be used highly efficiently and safely in combustion engines with a long service life.

Ideal thermal management system architecture for commercial vehicles

Thermal management — vehicle heating and cooling — is of particular and overarching importance in the development of efficient CO₂-neutral drives. Complexity and demands on its performance increase significantly in battery electric drives and fuel cell systems. "In view of the increasing diversification in

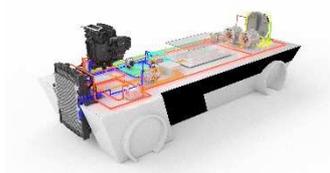
the drive mix for commercial vehicles, it is our task to offer our customers the right solution for all drive types. We have to keep an eye on costs, because the transport industry is still sensitive here,” said Dr. Roger Busch, head of global development for the thermal management business unit. This is achieved through a modular structure of the system, which MAHLE is showing at the IAA. Ideal system architecture can be developed for every application and every vehicle and the large number of individual driving profiles and vehicle classes in the commercial vehicle sector can be covered — with high efficiency and at optimal costs. The core components of the system are the cooling module, air conditioning, high-voltage heater, electric compressor, battery and electronic cooling systems, coolant pump and an oil management module for temperature control of the electric motor.

MAHLE chargeBIG charges the IAA test vehicle fleet

At the Test Drives and Plug & Play Campus in Hall 11, Stand PP40, the group is showing its chargeBIG charging infrastructure solution. With the goal of “Charging as quickly as necessary, not as quickly as possible”, chargeBIG offers scalable and cost-effective charging infrastructure for fleet operators and other areas of application from 18 to 100 or more electrified parking spaces. The charging infrastructure on display is connected to electricity and is used by well-known vehicle manufacturers who charge their test drive vehicles during the day or overnight at the trade fair. Test drivers can experience and test the charging process live on the chargeBIG charging infrastructure.



World premiere: For the first time, MAHLE is showing its SCT electric motor for particularly high continuous performance at IAA Transportation.



Systemic interplay: At the IAA Transportation, MAHLE is showing its technologies for battery electric vehicles in a tech demonstrator.



The MAHLE flat membrane humidifier is a key component for the reliable operation of fuel cells.



MAHLE engine components make it possible to use hydrogen in combustion engines.



Thermal management — heating and cooling in vehicles — is gaining importance in increasing efficiency. MAHLE covers all drive types with modular systems.



Visitors to IAA Transportation can find MAHLE in Hall 12, Stand C37.

Contact persons for MAHLE communications:

Ingo Schnaitmann

Head of Media Relations

Phone: +49 711 501-13185

E-mail: ingo.schnaitmann@mahle.com

Ruben Danisch

Spokesperson for Product and Technology

Phone: +49 711 501-12199

E-mail: ruben.danisch@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, such as fuel cells and hydrogen motors, 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 combustion engines that also run on e-fuels or hydrogen. MAHLE already generates over 60 percent of its sales independently of the passenger car combustion engine. This should increase to 75 percent by 2030. Today, one in every two vehicles globally is equipped with MAHLE components.

MAHLE generated sales of around EUR 11 billion in 2021. The company is represented with over 71,000 employees at 160 production locations and 12 major research and development centers in more than 30 countries. (Last revised: 12/31/2021)

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