

**New development from MAHLE allows steel pistons to be used in powerful passenger car engines**

- New production technology clears the way for lower fuel consumption and CO<sub>2</sub> emissions
- Maximum design freedom for the piston gallery ensures optimized cooling

Stuttgart, February 04, 2019 – A new production process from MAHLE with maximum design freedom for the piston gallery permits the way for the use of steel pistons in powerful passenger car diesel engines. The special laser welding process that is used allows for a kidney-shaped cross section of the piston gallery.

MAHLE is thus solving a problem existing since the invention of the cooled piston itself. Thick walls have poor heat dissipation and produce high temperatures at the bowl rim. On the other hand thin walls can lead to undesired high temperatures at the inner wall of the piston gallery, causing a layer of oil carbon to form. This acts as a thermal insulator and promotes due to excessive operating temperatures undesired wear and damage to the piston and cylinder liner. The solution: a piston gallery with a kidney-shaped cross section that guides the cooling oil flow in an optimal hydraulic path and ensures uniform heat dissipation that makes overheating impossible.

Such a design is only feasible, however, using the laser welding process developed by MAHLE. It is typical to use friction welding to produce pistons, but the material buildup in the cooling channel hinders the controlled guidance of the cooling oil flow.

The use of steel pistons in passenger car diesel engines saves fuel and thus significantly reduces CO<sub>2</sub> emissions. The reason is the lower expansion of steel relative to an aluminum piston, which has a positive effect on frictional losses. Steel pistons can also have a shorter top land and allow for a longer connecting rod with their low overall height. The smaller pivoting angle of the longer connecting rod results in smaller lateral forces and lower friction in the region of the piston skirt.

**About MAHLE**

MAHLE is a leading international development partner and supplier to the automotive industry as well as a pioneer for the mobility of the future. The MAHLE Group is committed to making transportation more efficient, more environmentally friendly, and more comfortable by continuously optimizing the combustion engine, driving forward the use of alternative fuels, and laying the foundation for the worldwide introduction of e-mobility. The group's product portfolio addresses all the crucial issues relating to the powertrain and air conditioning technology—both for drives with combustion engines and for e-mobility. MAHLE products are fitted in at least every second vehicle worldwide. Components and systems from MAHLE are also used off the road—in stationary applications, for mobile machinery, rail transport, as well as marine applications.

In 2017, the group generated sales of approximately EUR 12.8 billion with about 78,000 employees and is represented in more than 30 countries with 170 production locations. At 16 major research and development centers in Germany, Great Britain, Luxembourg, Spain, Slovenia, the USA, Brazil, Japan, China, and India, around 6,100 development engineers and technicians are working on innovative solutions for the mobility of the future.

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