Pressinformation

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Diesel engine with innovative steel pistons

Innovative cooling concept enables more efficient engines

Car engines are becoming increasingly compact with a greater specific power. This reduces the weight, moving masses and fuel consumption. In the engine, however, the temperatures and pressures rise for individual components. This causes conventional pistons made of aluminium to reach their limits. The new BINE Projektinfo brochure entitled "Steel pistons for more efficient diesel engines" (14/2016) presents a cooling concept for engine pistons using a liquid metal alloy. Compared with aluminium, steel offers greater strength against thermal and mechanical loads.

In diesel engines, particularly the piston head and the chemical stability of the engine oil are prone to temperature peaks. This can lead to cracks in the material and coking reactions by the oil. Therefore a coolant was needed which compensated for the poorer thermal conductivity of steel compared with aluminium. It also needs to remain stable at temperatures above 500 °C. The researchers therefore used a mixture of sodium and potassium as a cooling medium in a modified, serial-produced steel piston with a cooling channel. The fast heat dissipation enables an even temperature distribution in the piston.

A diesel engine demonstrator successfully passed the test run on the test rig. At the same time, the developers are also researching the use of engines with the new steel pistons for commercial vehicles and stationary applications. Mahle GmbH has carried out the development work in cooperation with research institutes.

The BINE Projektinfo brochure, which can be obtained free of charge from the BINE Information Service at FIZ Karlsruhe, is available online at www.bine.info or by calling +49 (0)228 92379-0. The brochure cover and an additional image can also be downloaded from the press section in this web portal.

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