

MAHLE CamInCam® = variability in the valve train

Stuttgart, Germany, September 2007 — Advancing into the next engine era with MAHLE's innovative valve train technology: the CamInCam® camshaft. This world novelty enables variable valve timing and therefore higher torque and performance at lower fuel consumption.

The new CamInCam® camshaft is an ideal solution, particularly for engines with OHV (OverHead Valve) and SOHC (Single OverHead Camshaft) valve trains. Due to its variability, ideal intake and exhaust timing can be adjusted for any driving condition. The MAHLE CamInCam® camshaft is the only variable valve control available in the market for this type of engine. The results are improved performance, higher torque, lower fuel consumption, reduced emissions, and improved idling behavior.

The CamInCam® camshaft, however, offers additional potential for the future: it also has the potential to support downsizing concepts. If, for example, a CamInCam® camshaft is installed on the exhaust side of a turbocharged DOHC (Double OverHead Camshaft) engine with four-valve cylinder heads, the exhaust valves of a cylinder can be variably controlled. This in turn enables spontaneous responsiveness of the turbocharger even at low rotational speeds. The result: an agile torque curve at improved fuel consumption and low emissions.

Reduced emissions, lower fuel consumption

The recent first-time series production application of the CamInCam® camshaft in a sports car of a U.S. manufacturer produced considerably improved engine properties: significantly lower emission values as well as an increase in specific engine output by 20 percent. At the same time, the fuel economy was improved. MAHLE thus sees excellent potential for the CamInCam® camshaft on the U.S. market, among others. V-type

engine configurations with central camshaft are becoming competitive again — without necessitating fundamental changes to the engine concept and entire production facilities.

Fewer nitrogen oxide emissions

After the start of series production in a V-type engine, MAHLE is now also working on solutions for four-cylinder engines. The CamInCam[®] camshaft offers considerable potential in connection with SOHC valve trains. It thus enables similar properties as the considerably more complex DOHC cylinder heads. In tests, smaller four-cylinder engines were already equipped with the new camshafts. The results were astounding: higher performance, higher torque, and lower fuel consumption. In addition, the variable valve train opens the exhaust valves later, if required, so that the air-fuel mixture burns more slowly, resulting in lower nitrogen oxide values.

CamInCam[®] demonstrator

To demonstrate the potential of this innovative valve train for individual applications, MAHLE is currently building CamInCam[®] demonstration engines. These demonstrators enable the comparison with existing engine configurations and provide a preview of the potential of the CamInCam[®] camshaft.

The MAHLE Group is one of the 30 largest automotive suppliers worldwide. As the leading manufacturer of components and systems for the internal combustion engine and its peripherals, MAHLE is among the top 3 systems suppliers for piston systems, cylinder components, valve train systems, air management systems, and liquid management systems. With more than 40,000 employees in 110 production plants and seven research and development centers, MAHLE generated sales in excess of EUR 4.3 billion (USD 5.8 billion) in 2006.

For further information:

MAHLE GmbH

Birgit Albrecht

Central Corporate Communications/Public Relations

Pragstraße 26–46

70376 Stuttgart

Germany

Phone: +49 (0) 711/501-12506

Fax: +49 (0) 711/501-13700

birgit.albrecht@mahle.com