MAHLE

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PRESSRELEASE

Le Mans 2007 diesel piston technology

Stuttgart, Germany, October 2007 — Just as the requirements for pistons in passenger car diesel engines increase steadily, the requirements placed on pistons in the diesel engines of the Audi Le Mans racing cars have risen tremendously in their second year. Compared to the debut of the Audi diesel racing engines in 2006, considerable adjustments and detailed optimizations had to be made to the pistons to account for the more demanding load spectrum. In addition, for 2007, the sporting authority reduced the tank volume for diesel vehicles by 10 percent compared to 2006. Consequently, one of the development goals was to trim the diesel engine to even lower fuel consumption while achieving higher performance at the same time.

In addition to the cooled ring carrier, proven and tested extensively in passenger car diesel pistons, the engineers at MAHLE relied on a fiber reinforcement of the bowl rim. This allows the pistons to withstand the extremely high thermal load at the bowl rim, without cracking, for the duration of the 24-hour race. The cast-in ceramic fibers considerably increase the load-bearing capacity at the bowl rim. Specifically for this purpose, MAHLE has developed a pressure-supported casting process referred to as robot-aided medium-pressure die casting, or RMD. This process ensures complete incorporation of the ceramic fibers in the aluminum melt and thus guarantees the perfect integration of the ceramic fibers in the aluminum structure. In addition to meticulous preparation and optimum quality assurance, this technology was the key to yet another overall victory of Audi at this year's 24-hour Le Mans race. The V12 diesel engine of the Audi R10 TDI racing cars, boasting 650 horsepower, covered a distance of 5,029 kilometers in 369 laps — which corresponds to an average speed of 236 km/h (!), under constantly changing weather conditions!

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The results of our racing experience and our high-performance engine know-how are directly incorporated in the series production development of the MAHLE product lines.

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 Japan Ltd.
Judy Ann Go
Corporate Communications/Public Relations
3-1-2 Ikebukuro, Toshima-ku
Tokyo 171-0014
Japan
Phone: +81 (0) 3-3989-8412
Fax: +81 (0) 3-3986-2928
judy-ann.go@jp.mahle.com