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SCHAEFFLER (UK) LTD, SUTTON COLDFIELD

Powertrain developments cut fuel consumption and CO2 by 10 per cent

The development project involved the use of novel, optimised engine components, which when combined, achieve an overall 10 per cent reduction in fuel consumption and CO2 emissions.

CO2ncept-10% is a CO2 demonstration vehicle based on a Porsche Cayenne with a V8 engine. In addition to tried and tested, optimised engine components, the vehicle is also equipped with several new powertrain and chassis components supplied by Schaeffler. These components help to significantly reduce the car's fuel consumption compared to existing production models.

In the joint development project, Schaeffler was responsible for the design and testing of components, while Porsche managed system coordination and validation for the entire vehicle.

The reductions in fuel consumption and CO2 emissions were verified theoretically through complex simulation calculations at Schaeffler, and practically via extensive bench testing at Porsche. The calculation standard used was the Standardised New European Driving Cycle (NEDC).

The engine accounts for 5.8% of the optimised fuel consumption and associated CO2 emissions. Most of this (4.1%) comes from modification of the VarioCam Plus valve control system, by replacing hydraulic cam timers with electromechanical equivalents, as well as the use of optimised switching tappets on the intake side. An extra 1.7% reduction can be achieved through minimising frictional losses, by cross-system optimisation of valve train, belt drive and chain drive components.

Schaeffler's double-row angular contact ball bearings that are installed in the front and rear axle differentials generated a further 1.1% in fuel savings. These TwinTandem bearings, which replaced the existing tapered roller bearings, reduce frictional resistance significantly when compared to conventional transmission systems. This reduction amounts to 35% in the front axle transmission and 42% in the rear axle transmission.

Fuel consumption can also be reduced via the chassis. By replacing the hydraulic roll stabiliser with an electromechanically controlled equivalent and using smooth running wheel bearings, a 3.2% reduction in fuel consumption is achieved. "As is the case with cam timers, electrically-operated components make such an important contribution because they only require energy when they are operating," explained Dr. Robert Plank, Manager of Corporate Engineering for the Schaeffler Group. "In hydraulically-controlled systems, the pumps need to maintain pressure at all times, resulting in much higher energy requirements."

"This project is a good example of successful cooperation between an automobile manufacturer and supplier. This cooperation reduces development times, avoids extensive redundancies and makes an important contribution to competitive ability," commented Dr. Plank. "To us, the CO2ncept-10% is clear

proof of the continuing optimisation potential that is also closely related to volume production. This is not the end of the line though. CO2ncept-10% is the sum of its components, and these components are just a few from Schaeffler's portfolio that enable similar levels of energy efficiency optimisation to be reached for vehicles from other industry sectors."

For more information on Schaeffler's range of bearing solutions for the automotive industry, please visit www.schaeffler.co.uk or telephone the marketing department on 0121 313 5870.

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