

As Mercedes-Benz unveils more details of its Euro-6 standard engine, Steve Banner reports on what drivers and operators can expect when vehicles powered by the six-cylinder enter service

# Six appeal

One of the first heavy truck diesel engines to meet Euro 6 – Mercedes-Benz's new OM 471 six-cylinder in-line 12.8-litre – will be no thirstier than the manufacturer's existing Euro 5 power plants. That is the explicit promise made by Georg Weiberg, head of product engineering at Daimler Trucks in Germany.

Nor will it impose an excessive weight burden, he promises. "Very approximately, the engine will be 100kg heavier than the current V6, but around 50kg lighter than the V8," states the German.

Marketed under the Blue Efficiency Power banner, OM 471 is likely to be several thousand euros more expensive than both the existing V6 and V8, thanks to Daimler's considerable expenditure on research and development, and the technology used. However, it is unclear to what

extent the additional cost will be reflected in the price paid by British operators.

The first truck to be fitted with the new engine will be the successor to the current Actros, due to break cover later this year. However, there is, as yet, no indication as to when that vehicle will arrive in the UK.

OM 471's power outputs are set at 421bhp, 449bhp, 476bhp or 510bhp, with respective torque outputs of 2,100Nm, 2,200Nm, 2,300Nm and 2,500Nm. So-called Top Torque versions are available that provide automatic models with an extra 200Nm in top gear.

Fitted with two overhead hollow camshafts – a first for engines of this size, says Mercedes, and aimed at reducing weight by 50% – and four valves per cylinder, the engine makes use of EGR (exhaust gas recirculation), as well as SCR

## Scania premieres two Euro 6 engines

(selective catalytic reduction). That, of course, means pouring in AdBlue, but Mercedes says that dosing rates will be no higher than those with the existing Euro 5 machine and could even be less.

### Pulses racing

Other major components include a particulate filter, an asymmetric exhaust gas turbocharger and an amplified common-rail fuel injection system with an X-Pulse pressure booster. This is the first time X-Pulse has been used in a Mercedes engine.

The system's twin-piston pump produces a maximum pressure of around 900 bar in the rail itself, boosted to 2,100 bar in the injectors. Also, two solenoid valves allow pressure and pressure distribution to be adjusted during the main injection, in line with the engine's operating conditions.

Elsewhere, the three-stage exhaust brake (controlled by a steering column stalk) acts on three cylinders in the first stage, then on all six, and finally brings in the EGR valve and the wastegate controls.

### Interim measures

Incidentally, since Euro 6 is not a legal requirement until 2014, the new engine will also be produced in less expensive Euro 5 guise. This involves omitting the particulate filter, fitting a smaller EGR cooler and reducing the EGR system's recirculation rate.

While some European markets will probably offer financial incentives to operators adopting Euro 6 early, the cash-strapped UK government seems unlikely to do so. It will be interesting to see if, as a consequence, British operators will be offered the Euro 5 version as an alternative until Euro 6 comes into force.

With an eye to cost savings, OM 471 has its roots in a platform used by Daimler-owned engine maker Detroit Diesel in the USA since 2007 for Freightliner trucks and by Fuso in Japan since last year. However, like the engine used by Fuso, OM 471 is built at Mercedes-Benz's Mannheim plant. That factory also makes key components for Detroit Diesel's version.

The first of a family of three Mercedes-Benz engines being developed with different displacements, but a common basic design, it has been fitted with more than 200 special components for its new European role. They include the injection nozzles, turbocharger, flywheel, exhaust system, air compressor and the control electronics. The overall tuning differs from the variants used in North America and Japan, too.

As for service intervals, they are set at up to 150,000km, and Mercedes says that its latest offering should complete at least 1.2 million kilometres before requiring a major overhaul.

On the subject of power games, although the

**Brian Tingham writes:** Comparing Mercedes-Benz's new offering with Scania's 440 and 480hp 13-litre Euro 6 engines – which received their world premiere last month – reveals that the world's majors are thinking along similar lines.

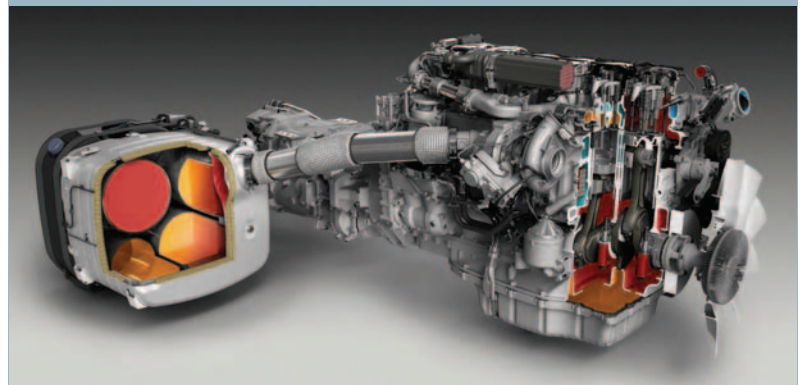
Just as with the German power plant, Scania's inline six includes EGR, SCR and particulate filtering – DOC (diesel oxidation catalyst) and DPF (diesel particulate filter). There's also high pressure common rail fuel injection (XPI, handling up to three pulses) and, in this case, a variable geometry turbo, and Scania's own engine and exhaust management system.

Both Scania units are based on its modular engine (introduced with EGR for Euro 5, in 2007), with the cast iron cylinder block, ladder frame between block and sump, low-friction, plasma-coated cylinder liners and steel pistons (with a remodelled bowl, giving 17.3:1 compression ratio). Beyond that, low emitting crankcase ventilation is now standard, a plastic oil sump increases capacity by three litres (also reducing noise and saving weight) and cooling capacity is up, as per the R Series, introduced in 2009.

Notwithstanding an overall weight increase of 200kg, compared to its Euro 5 EGR engine (due to the AdBlue system and more complex exhaust), the company claims that performance and fuel consumption are easily as good as its Euro 5 engines. That means Scania's classic high torque to power ratio, at around 5:2, and 2,300Nm torque for the 440hp unit (2,500Nm, 480hp), with full torque from 1,000rpm, allowing low rev cruising at 1,100rpm.

Transmissions include 12+2 speed range splitter gearboxes, with or without overdrive, and Scania also recommends its Opticruise for optimised gear changing and ultimate fuel efficiency. Looking at the fuel itself, these engines are approved for use with 8% biodiesel and tests are underway with 100% biodiesel – the after-treatment system being the issue. As for AdBlue, consumption is around 3–4%, compared with 5–6% on the Euro 5 SCR engines.

Scania's new Euro 6 engines are immediately available across its G- and R-Series rigids and tractor units, with all the cab types and for all applications, including ADR. That includes 4x2, 6x2 and 6x4s. 8x2s and 8x4s won't arrive until next year.



new engine family may run up to 600hp, Mercedes apparently has no plans to emulate some of its rivals and advance to 700hp. "Nobody really needs that much power," observes one senior executive. "Torque is much more important." **TE**

**TE**

For further information on technology and suppliers, visit [www.transportengineer.org.uk](http://www.transportengineer.org.uk)