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Ricardo low emissions combustion technology helps JCB create the off-highway industry's cleanest engine

JCB today announced its new 'Ecomax T4' 4.4 litre engine – the first production engine to feature Ricardo's new advanced low particulate Twin Vortex Combustion System technology. This technology enables the elimination of exhaust aftertreatment and provides a cost-effective, durable and high fuel economy solution for mid-range off-highway engine customers

The new Ricardo Twin Vortex Combustion System – on which a range of international patents are pending – incorporates a unique re-entrant combustion bowl design and injector nozzle geometry which are combined with cooled EGR, high air-fuel ratio and injector pressures, and closed-loop control strategies using electrical actuators for the exhaust and air handling systems – as used in the Ecomax engine. The Twin Vortex Combustion System is capable of meeting Tier 4 interim/Stage 3B legislation without the need for any form of exhaust aftertreatment. There are consequent benefits in terms of reduced fuel consumption, lower total cost of ownership, improved reliability and greater package flexibility through the elimination of potentially bulky and expensive aftertreatment, which give this system clear advantages for mid-range off-highway equipment manufacturers and engine customers.

Development of this new Ricardo combustion system was carried out in collaboration with JCB, which will be the first production user of the new Twin Vortex Combustion System technology. Speaking at the announcement of the Ecomax T4 engine, Alan Tolley, JCB's director of engine programmes, said:

“Meeting Tier 4 emissions legislation is a massive challenge but also a huge opportunity for innovation – an opportunity to come up with a solution that has real advantages for our customers. We believe the result is not only the off-highway sector's cleanest engine, but a first for our industry.”



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While Ricardo's Twin Vortex Combustion System provides a fuel-efficient and cost-effective solution for off-highway Tier 4/Stage 3B interim regulations that come into force in 2012, it also provides an attractive development pathway for the Tier 4 final regulations that will apply from 2014. To achieve this in its current form it would require the addition of simple NOx control measures such as an SCR system, or with further development to achieve the low NOx requirements without aftertreatment.

Commenting on the new Ricardo Twin Vortex Combustion System, Ricardo global diesel product group director Ian Penny said:

"The Ricardo Twin Vortex Combustion System provides a breakthrough in clean off-highway power as demonstrated by JCB with the announcement today of its new Ecomax T4 engine. We are proud to have been able to apply this technology through the assistance provided to JCB with the development of the Ecomax – the world's cleanest off-highway engine. We are continuing active development of Ricardo's Twin Vortex Combustion System and hope that it will ultimately be able to deliver a solution for Tier 4 final regulations without the need for any form of aftertreatment. In addition to this, we are exploring the potential to extend this highly innovative clean combustion system to larger engine sizes and believe that it has significant benefits to offer too for application in on-highway engines."

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NOTES TO EDITORS:

Ricardo plc: With technical centres and offices in the UK, USA, Germany, the Czech Republic, France, Italy, Russia, China, Japan, India and Korea, Ricardo is a leading independent technology provider and strategic consultant to the world's transportation sector and clean energy industries. The company's engineering expertise ranges from vehicle systems integration, controls, electronics and software development, to the latest driveline and transmission systems and gasoline, diesel, hybrid and fuel cell powertrain technologies, as well as wind energy and tidal power systems. Ricardo is committed to excellence and industry leadership in people, technology and knowledge; approximately 70 percent of its employees are highly qualified multi-disciplined professional engineers and technicians. A public company, Ricardo plc posted sales of £178.8 million in financial year 2009 and is a constituent of the FTSE techMark 100 index – a group of innovative technology companies listed on the London Stock Exchange. For more information, visit www.ricardo.com.

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