

PRESS RELEASE



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Lean, clean and RDE-compliant gasoline: Ricardo charts options for even lower CO₂

Gasoline engine fuel-efficiency can be improved while also meeting Euro 6d regulations, by adopting lean combustion with cost-effective NOx control – so says a paper presented by Ricardo today at the at the SIA Powertrain international conference and exhibition being hosted at Versailles, France

Ricardo will today report the findings of a detailed simulation study to determine the applicability of different engine operating modes – stoichiometric, lean homogeneous and lean stratified – in meeting Euro 6d Real Driving Emissions (RDE) limits for gasoline engines using lean operation zones in C-segment applications. The results of this work are included in the paper, *Engine and aftertreatment strategies for lean gasoline engines to meet real driving emissions legislation*, which will be presented at SIA Powertrain Versailles 2017, this year's international conference of Société des Ingénieurs de l'Automobile.

The simulation carried out by Ricardo incorporated a range of different combustion modes and aftertreatment solutions for NOx control over WLTP and RDE test cycles. The vehicle, engine and aftertreatment simulations were carried out using the Ricardo Integrated Model Based Development (IMBD) process and environment, which provides a framework for the exchange of data and information between analysis and simulation operations.

The results of this work highlighted the trade-off in emissions control and fuel economy for applications with different aftertreatment technologies, as well as for combined solutions. A cost analysis was used to determine the most cost-effective solution in meeting RDE emissions limits. The research highlighted the opportunities



for fuel and CO₂ savings while meeting the strict new RDE regulations, through the selection of appropriate combustion and aftertreatment technology and control.

The simulation work showed that while each of the systems considered was able to meet Euro 6d NO_x emissions limits, using the ability to switch between stoichiometric and lean operation, significant differences were indicated in terms of the cost/benefit of fuel efficiency gains, once the costs of aftertreatment technology were considered.

“Whether used as part of a hybrid architecture or in a conventional powertrain, it is an imperative for the automotive industry to further improve the fuel efficiency of gasoline engines if future CO₂ targets are to be met,” commented Ian Penny, managing director – engines business, Ricardo. “Lean operation offers a route to further fuel-efficiency improvements compared with current state-of-the-art products, but this requires careful attention to aftertreatment selection and combustion control. The research we are presenting today at SIA Powertrain Versailles 2017 provides some valuable insights that I hope will be of use in reducing CO₂, while meeting the challenge of the new RDE regulations.”

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NOTES TO EDITORS:

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