IMechE – Internal Combustion Engines

Dynamic Downsizing for Gasoline Engines

Ben Hibberd, Jonathan Hall and Mike Bassett
MAHLE Powertrain Ltd.

Kevin Gray and Bryn Richards
Aeristech Ltd.

ABSTRACT

Gasoline engine downsizing is already established as a proven technology for reducing CO_2 emissions. Values of up to 25 % improvement have already been demonstrated. Additional reductions are still considered possible through further downsizing; however there is a trade-off between the CO_2 reduction achieved and vehicle drivability which currently limits the level of engine downsizing adopted.

For these to be realized, however, the next generation of downsized-gasoline engines will demand advanced charge-delivery systems to provide high-pressure charge-air across a broad engine speed range. Moreover, to meet drivability requirements, this pressurized charge air needs to be available almost instantly.

The key objective of this project is to demonstrate the highest specific power and torque output combination of a gasoline engine for the road car market, whilst retaining excellent drivability and fuel economy.