

Low pollutant emissions diesel vehicle - VDH with a low temperature homogeneous innovative combustion concept

Partners

IFP – Project leader
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Project duration: 2 years (2006-2008)

Context

Diesel engines, which to date represent 70 % of the registrations in France, will have to meet, by 2010, the following main challenges:

- Convergence of the pollutant emissions standards for gasoline and diesel engines, with notably the objective of a very high NOx reduction in a context of particle filter generalization
- Maintaining the advantage of reduced CO2 emissions in relation to gasoline engines
- Improving full-load performances to meet customers' expectations and continue diesel engines downsizing with a positive effect on the consumption of vehicles

Objective

Design a diesel engine for a mid-range or top-range vehicle allowing:

- to reach very low pollutant emissions
- without any engine efficiency degradation
- with no particular post-treatment system to reduce NOx emissions



demonstrator vehicle VDH

Solutions

- Homogeneous type NADI™ combustion concept associated with high EGR rates
- Advanced model-based engine control algorithms
- Redefinition of the air and EGR loop with dedicated cooling circuit using low-temperature water and EGR exchanger bypass
- Exhaust post-treatment with oxidation catalyst and particulate filter



air loop integration

Results

- Complete validation of the combustion chamber, turbocharger selection, EGR loop components and post-treatment system
- Engine calibration over the entire operating range with extension of the operating zone in homogeneous combustion
- Engine control validated under stabilized and transient operating conditions between the homogeneous and conventional combustion modes
- Definitive integration of the engine and of its onboard electronic equipment in the demonstrator vehicle