

Cleaner diesels thanks to laser light

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Dutch researcher Bas Bougie has developed a laser system to investigate soot development in diesel engines. Small soot particles are not retained by a soot filter but are, however, more harmful than larger soot particles. Therefore, soot development needs to be tackled at the source. Laser Induced Incandescence is a technique that reveals exactly where soot is generated and can be used by project partners to develop cleaner diesel engines.

Measuring soot formation in a diesel engine is far from easy. Due to the turbulent environment in the combustion cylinder, no two combustion cycles are the same. Furthermore, the measurements are difficult to reproduce as the pressure at which fuel is injected into the cylinder causes an extra source of turbulence. Bougie made his measurements in a glass cylinder with an engine adapted for this purpose.

Laser Induced Incandescence (LII) can be used to investigate optimal engine conditions that reduce soot emission from the engine. LII can be deployed in different types of engines and with different fuels.

Bougie carried out measurements during higher and lower loading of the engine and for two different fuel injection systems: a line pump system and a common rail system. Neither the engine load nor the injection system was found to affect the primary particle size of the soot emitted. However, there are many other motor settings that can lead to an improvement in the combustion.

The results of the measurements can now be used to verify existing

combustion models at Eindhoven University of Technology. Together with the STW users' committee (participants are: DAF, Eindhoven University of Technology, Delft University of Technology, the University of Twente, Cyclone Fluid dynamics, EP Controls BV, Paul Scherrer Institute (Villigen, Switzerland), Royal Netherlands Naval College, TNO and Shell), Eindhoven University of Technology will investigate further improvements to the measuring system with the ultimate objective of producing cleaner diesel engines.

Source: Netherlands Organization for Scientific Research

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