

The fast path of the molecules: from the engine cylinder to mass spec and what this has to do with lube oil consumption

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Car emission standards are getting more stringent in the future. To reduce the emission of hydrocarbons and other combustion products, the highly dynamic process in the cylinder has to be understood.

Taking into account the high pressure (250 bar/3600PSI) and the pressure and temperature gradients in diesel engine, a fast high temperature direct inlet system has been developed and CFD optimized to observe the generation and emission of CO₂, NO, H₂O and especially long-chain hydrocarbons from the lubricating oil in the cylinder during the combustion process.

Transient driving cycles reveals unknown dynamic engine characteristics regarding the lube oil emission. In combination with a QTOF-MS additional information can be obtained. The peak distribution gives hints about the source of oil consumption. This is an excellent development tool for engine manufacturers.