

GMT - Global measurement technique



The global fibre optic measurement technique is a system to detect the combustion luminosity of a large portion of the combustion chamber. With the help of optical filters or other spectral analysis components it is possible to record the combustion process at a specified wavelength, which provides information on the gaseous components in different phases of the combustion.

A special lens system in the combustion chamber provides a large detection angle ($>90^\circ$)

and couples the combustion luminosity into combined flexible fibre cables which transmit the light to photo multipliers or photodiodes.

One possibility to record the signals is the data acquisition system COMBI, which can record the cylinder pressure, too. The easy adaptation and handling of the system makes it suitable for the optimization of mass production and research engines. The optical probes can easily be fitted into existing indication probe holes.

The application of the system in a CI engine allows the analysis of the course of the temperature and the particles during the combustion which makes it easy to optimize the engine. The analysis of the luminosity of single gas components permits the user to draw conclusions as to the energy consumption during the combustion.

The application of the system in an SI engine allows the determination of the energy consumption as well as knocking and misfire detection. The investigation of the early flame development is also very important in view of the cycle-by-cycle variation of the engine.



Entire electronic components

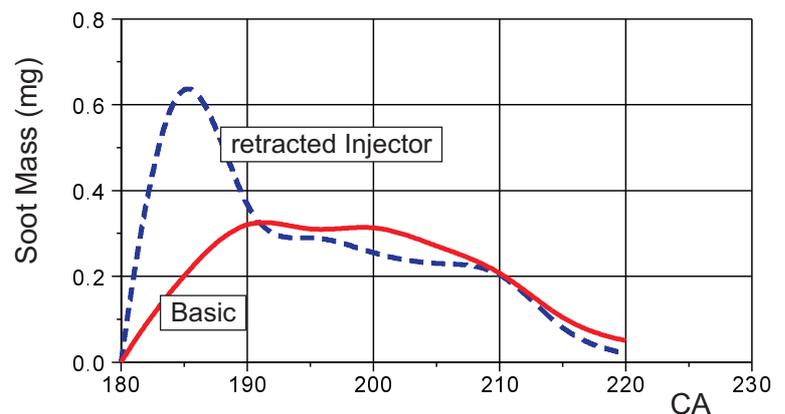
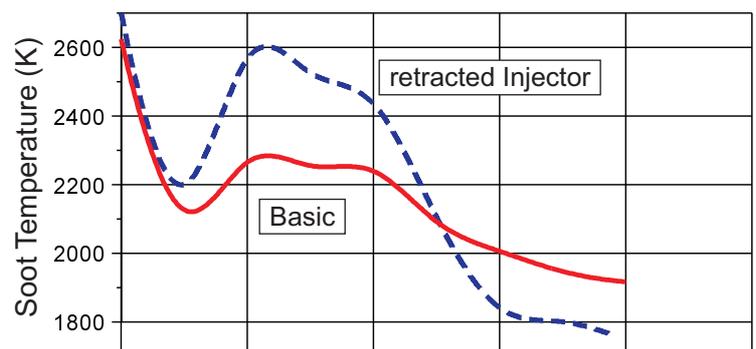
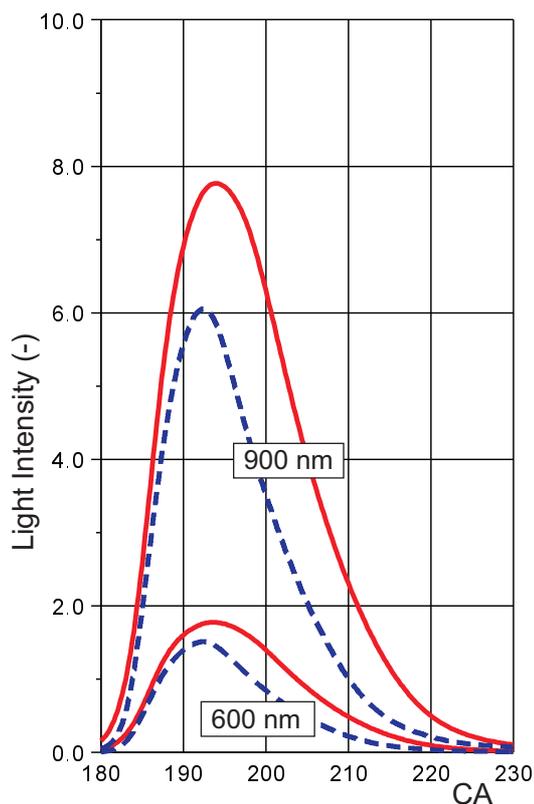
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Applications

- Course of temperature and soot concentration
- Early flame development
- Misfire detection
- Analysis of the gaseous components of the combustion

Advantages

- Observation of a large portion of the combustion chamber.
- Easy adaptation (into existing probe holes)
- Application in mass production and research engines
- Easy handling



Example of an investigation. Basis injector vs. retracted injector. Filtered with 600 nm and 900 nm. Results of mass and temperature are calculated as a relation of the filtered radiation.